

TRANSPORTATION RESEARCH BOARD

2015 ANNUAL REPORT



The **National Academy of Sciences** was established in 1863 by an Act of Congress, signed by President Lincoln, as a private, nongovernmental institution to advise the nation on issues related to science and technology. Members are elected by their peers for outstanding contributions to research. Dr. Ralph J. Cicerone is president.

The **National Academy of Engineering** was established in 1964 under the charter of the National Academy of Sciences to bring the practices of engineering to advising the nation. Members are elected by their peers for extraordinary contributions to engineering. Dr. C. D. Mote, Jr., is president.

The **National Academy of Medicine** (formerly the Institute of Medicine) was established in 1970 under the charter of the National Academy of Sciences to advise the nation on medical and health issues. Members are elected by their peers for distinguished contributions to medicine and health. Dr. Victor J. Dzau is president.

The three Academies work together as the National Academies of Sciences, Engineering, and Medicine to provide independent, objective analysis and advice to the nation and conduct other activities to solve complex problems and inform public policy decisions. The Academies also encourage education and research, recognize outstanding contributions to knowledge, and increase public understanding in matters of science, engineering, and medicine.

Learn more about the National Academies of Sciences, Engineering, and Medicine at **www.national-academies.org**.

The **Transportation Research Board** is one of seven major programs of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to increase the benefits that transportation contributes to society by providing 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 committees, task forces, and panels 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.

Learn more about the Transportation Research Board at **www.TRB.org**.



DEAR SUPPORTER OF TRB,

Excellent organizations continually innovate and evolve to increase the value they provide to their sponsors and stakeholders. For the Transportation Research Board (TRB), 2015 was a year of evolution that built on past successes and initiated changes to meet the current and future needs of our customers.

TRB is known for convening researchers and practitioners from a wide range of fields to address current and future issues in transportation, for producing highly respected policy studies on complex and often contentious topics, and for managing research that introduces products widely used by transportation professionals. Guided by a strategic plan that reflects the input and vision of thousands of stakeholders, TRB is focused on innovation, leadership, purpose, growth, customer service, and flexibility.

Innovation, Leadership, and Purpose

EXPANDING PARTICIPATION AND DIVERSITY

TRB is best known for its convening activities. Our annual meeting attracts more than 12,000 attendees each January to Washington, D.C., from across the globe and from all disciplines involved in transportation. The Board draws on the expertise of 220 standing committees and task forces and convenes hundreds of other panels for conferences and workshops, for policy studies, and for projects conducted through the six Cooperative Research Programs. In total, more than 7,000 volunteers serve on TRB committees, task forces, and panels.

Diversifying participation in our committees, task forces, and panels in terms of race, gender,

national origin, discipline, age, and experience is a priority for TRB. Among several efforts under way is the Minority Fellows Program, which doubled in size in 2015, thanks to a major increase in financial support from the Federal Highway Administration (FHWA) and from individuals. The 2016 Annual Meeting will welcome 26 students presenting papers through the program's financial support. TRB also is reaching out to involve disciplines that are under-represented in our activities and programs.

APPLYING TECHNOLOGIES, EXTENDING OUTREACH

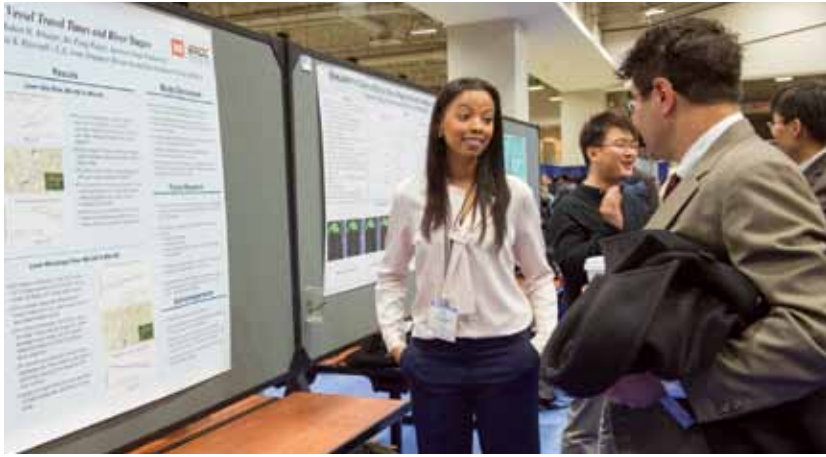
TRB's 94th Annual Meeting changed venues for the first time in nearly 60 years. The Water E.



U.S. Transportation Secretary Anthony Foxx defined a 30-year framework for transportation priorities at the 2015 TRB Annual Meeting in Washington, D.C. (Photo: Risdon Photography)



(Left to right:) James Crites, 2015 Executive Committee Vice Chair; Neil Pedersen, TRB Executive Director; and Daniel Sperling, 2015 Executive Committee Chair. (Photo: Risdon Photography)



Ivy Riley, a participant in the 2015 TRB Minority Fellows program, shares her research on vessel travel times and river stages. (Photo: Risdon Photography)

Washington Convention Center and the interconnected Marriott Marquis Hotel in Washington, D.C., hosted participants from 68 countries. The new venue provides a single location for all attendees and offers technologies that enable live webcasts of select sessions, allowing participation by committee members unable to travel. Attendees gave the new venue high ratings in a survey.

In addition, TRB sponsored or cosponsored 66 conferences and workshops in 2015, with attendance totaling approximately 26,000. Webcasts of several conferences—notably, one on sustainability and another on resilience—reached international audiences.

TRB also hosted the third in a series of United States–European Union symposia, at the National Academy of Sciences building, on automated vehicles. These international symposia have proved valuable in sharing information in evolving fields of interest on both sides of the Atlantic. The Executive Committee is reviewing TRB’s involvement in international programs to identify those that promise the greatest mutual value for the Board and international partners.

TRB is committed to applying technology to expand participation in activities and awareness of products and services. TRB’s webinar series has enabled thousands of transportation professionals to learn about research results and current topics. In 2015, TRB conducted 72 webinars for an estimated 26,400 participants. The weekly *TRB E-Newsletter* highlights research conducted by TRB, the U.S. Department of Transportation (DOT), state DOTs, universities, and other transportation organizations for more than 58,000 subscribers. TRB’s comprehensive,

online Transportation Research Information Documentation database now has more than one million entries for research papers and other documents on virtually every subject related to transportation.

ADVISING DECISION MAKERS

TRB policy committees advised the federal government and Congress on controversial and complex topics, including the maintenance and sources of funding for reinvestments in the nation’s inland waterways; improvements in the federal oversight of rate cases involving captive shippers and railroads; and the importance and value of federal research programs in railroad safety and in highways.

Policy committees also completed independent, third-party reviews for Congress on U.S. DOT reports addressing (a) the communications technology that is key to the connected vehicle initiative and (b) federal truck size and weight regulations. In response to congressional interest in the organizational reform of federal air traffic control (ATC) into an independent non-profit entity, a steering committee organized a symposium to provide congressional staff with the views of experts involved in the reform of ATC in Europe and in past U.S. efforts.

MANAGING RESEARCH FOR PRACTITIONERS

The six Cooperative Research Programs administered by TRB—the National Cooperative Highway Research Program, the Transit Cooperative Research Program, the Airport Cooperative Research Program, the National Cooperative Freight Research Program, the Hazardous Materials Cooperative Research Program, and the National Cooperative Rail Research Program—issued 140 publications covering a variety of topics of value to practitioners.



The third annual EU–U.S. Transportation Research Symposium, held at the National Academy of Sciences Building in Washington, D.C., in April, explored opportunities for public–private collaboration in road transportation automation.



An MQ-1 Predator unmanned aerial vehicle. ACRP Report 144, *Unmanned Aircraft Systems at Airports: A Primer*, delves into an emerging field of research. (Photo: Brian Ferguson, U.S. Air Force)

Many of the titles addressed a variety of safety and emergency management issues, including such topics as incorporating safety into planning processes; interactive training for maintenance and operations field personnel in all-hazards emergency planning, preparation, and response; work zone speed management; improving safety culture in public transportation; pedestrian crossings of transit rail lines; policing and security practices for small and medium-sized public transit systems; recovery after airport emergencies; best practices for airport cybersecurity; managing wildlife hazards at airports; unmanned aircraft systems; safety risk management for airports; and dealing with diversions of cargo traffic in national emergencies.

IMPLEMENTING SHRP 2 PRODUCTS

The research phase of the second Strategic Highway Research Program (SHRP 2) concluded in 2015. The \$218 million program developed new methods and products for highway safety, renewal, capacity, and reliability.

- In the SHRP 2 Safety Focus Area, the Naturalistic Driving Study instrumented 3,500 vehicles with cameras and other digital recording devices and collected detailed data on the roadways most frequently used by the vehicles' drivers. The compiled databases are available for researchers to study safety issues, particularly in relation to driver behavior. TRB has stewardship responsibility for the data until 2019. Guided by an oversight committee, TRB and its contractors are making the data available to qualified researchers.
- Transportation agencies across the nation are using SHRP 2 Renewal products to



accelerate the rehabilitation and reconstruction of highways and bridges, to reduce traffic disruptions, and to build longer-lasting facilities.



- Results from research in the Capacity Focus Area are enabling planning and project development that meet community, economic, and environmental goals; improve safety and mobility; and increase the likelihood of obtaining necessary approvals in a timely manner.
- Products from the Reliability Focus Area are helping agencies operate the transportation system more effectively, reducing the variability of travel times.



Through implementation programs undertaken by FHWA and the American Association of State Highway and Transportation Officials, transportation agencies in every state and the District of Columbia are adopting SHRP 2 products to address user needs more effectively.

ORGANIZATIONAL CHANGES

Soon after the 2015 TRB Annual Meeting, a changing of the guard took place, as longtime Executive Director Robert E. Skinner, Jr., retired, and was succeeded by Neil J. Pedersen, a longtime TRB volunteer and former Chair of TRB's Executive Committee and Technical Activities Council. Bob's 30 years of service to TRB included 21 as Executive Director. Under his guidance, TRB strengthened the multimodal and multidisciplinary range of its programs, inaugurated major communications initiatives, fostered international research partnerships and coordination, and worked proactively to enhance the diversity of the Board's committees and programs.

Also of note for 2015 was the reorganization within the National Academies to create the National Academy of Medicine and to integrate the Institute of Medicine staff with the other divisions. TRB draws tremendous strength from being part of the National Academies of Sciences, Engineering, and Medicine. Several initiatives highlighted here and in other portions of this annual report benefit greatly from the collective resources of the Academies.

TRB continues to seek opportunities to work with other parts of the Academies on issues of



Ann Brach, who led the SHRP 2 program to its conclusion in March, now serves as TRB's Director of Technical Activities. (Photo: Risdon Photography)



Former Executive Director Robert E. Skinner, Jr., received a standing ovation at the 2015 Annual Meeting. He delivered the Chairman's Luncheon address and received the Frank Turner Medal for Lifetime Achievement in Transportation. (Photo: Risdon Photography)

common interest. For example, TRB will be collaborating with the National Academy of Medicine and its operating division to address issues related to transportation and public health.

Growth, Customer Focus, and Flexibility to Support Change

ADDRESSING STRATEGIC ISSUES

A primary focus in 2015 was the implementation of the strategies and actions described in the strategic plan adopted by the TRB Executive Committee in June 2014. The plan calls for TRB to provide leadership on strategic, critical, emerging, and future issues in transportation. In 2015, the Executive Committee identified three strategic issues as priorities for TRB: transformational technologies, resilience, and transportation and public health.

- Transformational technologies have the potential to change transportation services fundamentally. These technologies include connected and autonomous vehicles, shared mobility services, unmanned aerial systems, and the Internet of Things, which relates to the concept of smart cities.
- Resilience includes the adaptation of the transportation system to a changing climate and the recovery of the system after severe weather events and human-caused disasters.
- The interrelationships of transportation and public health include the prevention of deaths and injuries from traffic crashes; access to health care facilities, particularly for those not able to drive; the effects of aging and disabilities on transportation; and the transmission of diseases via the transportation system.



Transformational technologies—such as automated and connected vehicles—are a priority research area for TRB. (Photo: Delphi)

The Executive Committee has established task forces to develop plans for addressing each topic, including collaborations with other parts of the Academies and with other organizations. Many sessions at the 2016 Annual Meeting will explore the three strategic issues. TRB standing committees are identifying activities related to the topics, and the Cooperative Research Programs are addressing the topics through several projects. These topics also may yield policy studies.

CULTIVATING CONSTITUENCIES

TRB took steps to involve a broader cross section of stakeholders and constituencies in programs and activities. These steps included initiating or building on relationships with transportation-related companies, government agencies, and trade associations—for example, the American Association of Motor Vehicle Administrators, companies developing transformational technologies, organizations representing women and minorities in transportation, and government agencies involved in transportation issues, such as the Environmental Protection Agency, the Department of Energy, and the Transportation Security Administration.

ACCELERATING DELIVERY, TRACKING IMPACTS

Another priority in the TRB strategic plan is to accelerate the delivery of research results to sponsors and stakeholders. This goal is driving changes in the production of the *Transportation Research Record: Journal of the Transportation Research Board* (TRR). In 2015, 5,600 papers were submitted to peer review for presentation at the 2016 Annual Meeting, publication in the TRR, or both. Approximately 900 of these papers will

be selected for publication in the journal.

A change in the TRR publication process, starting this year, enables early editing of select papers. As a result, approximately 20 percent of the papers accepted for publication in the 2016 series will be available three to five months earlier than in the past. TRB will continue to explore ways to speed the release of TRR papers and Cooperative Research Programs reports.

Another priority in the strategic plan is the development of ways to track the impacts of TRB research activities. The Cooperative Research Programs have identified and will be implementing methods to improve the tracking of the impacts of project reports. In cooperation with the National Academies Press (NAP), TRB has initiated a process to apply analytics tools available through NAP to identify the real-world impact of TRB's practice-ready research results.

TARGETING AND ENHANCING COMMUNICATIONS

The Executive Committee is exploring options to enhance and expand TRB's revenue sources to strengthen our long-term financial stability. An Executive Committee task force has developed revenue options and is exploring the feasibility of several—for example, attracting philanthropic gifts.

The Executive Committee recognized a need to enhance efforts to inform and educate stakeholders about TRB products and services. TRB developed a strategic marketing and communications plan that includes recommendations for changing communications practices. The plan seeks to integrate communications into every TRB project and activity and to keep communications practices vital and relevant as the



Included in TRB's strategic plan is increased diversity of committee members as well as of stakeholders and constituencies. (Photo: Risdon Photography)



The Exhibit Hall at the Annual Meeting is a robust source of revenue. The Executive Committee also is exploring other options to ensure long-term financial stability. (Photo: Risdon Photography)

transportation landscape changes. TRB is implementing a dissemination strategy that emphasizes the sharing of information with targeted audiences.

The development and deployment of software systems to provide volunteers and staff with the resources to meet the needs of their stakeholders and customers continued throughout the year. The software changes involved enhancements to the MyTRB system, which has improved the support of Technical Activities standing committee rotations, TRR paper submission and review, and Annual Meeting program development. We appreciate the commitment of all the volunteers who have assisted in the development, piloting, and initial deployment of the software changes.

PARTNERING FOR INCREASED VALUE

Innovation, leadership, purpose, growth, customer service, and the flexibility to support change are fundamental values that will continue as TRB hallmarks. We appreciate your support of TRB and look forward to partnering with you to ensure that TRB provides the greatest possible value to you, our stakeholders.

Thank you!

Dan Sperling
Chair, TRB Executive Committee

Neil J. Pedersen
TRB Executive Director



The Annual Meeting smartphone app, first introduced in 2013, is a helpful navigation tool for meeting attendees. (Photo: Risdon Photography)

TRANSPORTATION RESEARCH BOARD 2015 EXECUTIVE

Chair: Daniel Sperling, Professor of Civil Engineering and Environmental Science and Policy; Director, Institute of Transportation Studies, University of California, Davis
Vice Chair: James M. Crites, Executive Vice President of Operations, Dallas–Fort Worth International Airport, Texas
Executive Director: Neil J. Pedersen, Transportation Research Board



Sperling



Crites



Pedersen

Victoria A. Arroyo, Executive Director, Georgetown Climate Center; Assistant Dean, Centers and Institutes; and Professor and Director, Environmental Law Program, Georgetown University Law Center, Washington, D.C.



Arroyo



Bennett



Butler



Cohan

Scott E. Bennett, Director, Arkansas State Highway and Transportation Department, Little Rock
Deborah H. Butler, Executive Vice President, Planning, and CIO (retired), Norfolk Southern Corporation, Norfolk, Virginia (Past Chair, 2013)
Jennifer Cohan, Secretary, Delaware Department of Transportation, Dover

Malcolm Dougherty, Director, California Department of Transportation, Sacramento



Dougherty



Fotheringham



Halikowski



Hancock

A. Stewart Fotheringham, Professor, School of Geographical Sciences and Urban Planning, University of Arizona, Tempe

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



Hanson



Heminger



Hendrickson



Holt

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

Chris T. Hendrickson, Professor, Carnegie Mellon University, Pittsburgh, Pennsylvania

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

Roger B. Huff, Manager, Ford Global Customs, Material Export Operations, and Logistics Standardization, Ford Motor Company, Farmington Hills, Michigan

Geraldine Knatz, Professor, Sol Price School of Public Policy, Viterbi School of Engineering, University of Southern California, Los Angeles



Huff



Knatz



Llort



Osterberg

Ysela Llort, Consultant, Miami, Florida

Donald A. Osterberg, Senior Vice President, Safety and Security (retired), Schneider National, Inc., Freedom, Wisconsin

James P. Redeker, Commissioner, Connecticut Department of Transportation, Newington

Mark L. Rosenberg, President and CEO, The Task Force for Global Health, Inc., Decatur, Georgia

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

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



Redeker



Rosenberg



Rosenbloom



Schwartz

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

Kirk T. Steudle, Director, Michigan Department of Transportation, Lansing (Past Chair, 2014)

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

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

COMMITTEE*



Sinha



Steudle



Thomas



Trombino



Bostick



Card



Conway



Darling



Dominguez



Feinberg



Gishi



Gray



Huerta



Jaenichen



McMillan



Melaniphy



Nadeau



Rogoff



Rosekind



Rutland



Wallerstein



Winfree



Wright



Zukunft

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

James C. Card (Vice Admiral, U.S. Coast Guard, retired), Maritime Consultant, The Woodlands, Texas, and Chair, TRB Marine Board (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)

Marie Therese Dominguez, Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation (ex officio)

Sarah Feinberg, Administrator, Federal Railroad 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., 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, Administrator, Federal Highway Administration, U.S. Department of Transportation (ex officio)

Peter M. Rogoff, Under Secretary for Transportation Policy, Office of the Secretary, U.S. Department of Transportation (ex officio)

Mark R. Rosekind, Administrator, National Highway Traffic Safety Administration, U.S. Department of Transportation (ex officio)

Craig A. Rutland, U.S. Air Force Pavement Engineer, Air Force Civil Engineer Center, Tyndall Air Force Base, Florida (ex officio)

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 (Admiral, U.S. Coast Guard), Commandant, U.S. Coast Guard, U.S. Department of Homeland Security (ex officio)

* Membership as of December 2015.



EXECUTIVE OFFICE



Neil Pedersen became TRB Executive Director in spring 2015, succeeding Robert E. Skinner, Jr. (Photo: Risdon Photography)

The TRB Executive Office provides policy and operational guidance for programs and activities; oversees committee and panel appointments and report review; supplies staff support to the Executive Committee and its Subcommittee for National Research Council (NRC) Oversight throughout the report review process; 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; operates a bibliographic database of transportation research and provides library reference services; and maintains liaison with the executive offices of the National Academies of Sciences, Engineering, and Medicine, the Board's parent institution. The Executive Office also manages the editing, production, design, and publication of many TRB reports, including its journal series, magazine, policy studies, and other titles.

Oversight Activities

The Executive Office supports the work of the TRB Executive Committee, which provides policy direction to TRB programs and activities in accord with the policies of the National Academies. The Executive Office oversees the implementation of the TRB strategic plan, as approved by the TRB Executive Committee, applying the following approaches:

1. Developing and implementing processes to identify and address emerging and critical transportation issues in a strategic and proactive manner.
2. Involving a broader cross section of stakeholders and constituencies in TRB programs and activities.
3. Conducting strategic reviews of the portfo-



As Director of Development and Strategic Initiatives, Mark Norman guides the implementation of TRB's strategic plan. (Photo: Risdon Photography)



Subcommittee for NRC Oversight (SNO) members for 2015 (left to right): John Halikowski, Arizona Department of Transportation; A. Stewart Fotheringham; H. Gerard (Gerry) Schwartz, Jr., SNO Vice Chair; Kirk T. Steudle, past Executive Committee Chair; Neil J. Pedersen, TRB Executive Director; James Crites, Executive Committee Vice Chair; and Daniel Sperling, Executive Committee Chair. (Not present: Susan Hanson, SNO Chair) (Photo: Risdon Photography)

lio of TRB legacy programs and products and introducing activities to meet critical marketplace needs.

4. Applying systematic approaches for identifying and tracking the impacts of TRB’s research programs.
5. Strengthening the long-term financial stability of TRB by augmenting traditional federal and federally derived sources of funding.
6. Developing and implementing coordinated approaches to communicate information on TRB activities and products that address emerging and critical issues.
7. Providing TRB staff with the knowledge, resources, and tools necessary to meet and exceed the expectations of TRB stakeholders and customers.

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 of Sciences, Engineering, and Medicine. As part of this oversight, the subcommittee monitors the Board’s progress in expanding the participation by minorities underrepresented in the transportation field and by women on TRB committees and panels.

Susan Hanson chairs the subcommittee and represents TRB as an ex officio member on the NRC Governing Board. Henry G. (Gerry) Schwartz, Jr., serves as SNO Vice Chair, with responsibilities that included oversight for the



Susan Hanson
Chair
Subcommittee for
NRC Oversight



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



Neil J. Pedersen
Executive Director



Russell W. Houston
Associate Executive
Director



Mark R. Norman
Director
Development and
Strategic Initiatives



With more than two dozen participants from 14 schools in 2016, the TRB Minority Fellows program—which involves faculty advisers—continues to expand. (Photo: Risdon Photography)

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 of Sciences, Engineering, and Medicine—designed to ensure the independent, rigorous review of reports. In maintaining these high standards, TRB follows established guidelines that match the review criteria and procedures to the type of report.

Minority Student Fellows Program

In collaboration with the U.S. Federal Highway Administration, TRB administers the Minority Student Fellows Program to promote diversity in transportation research. The program provides all expenses for minority students from 14 eligible institutions to attend the Annual Meeting and present research at poster or lecture sessions. More than 55 graduate and undergraduate students have participated in the program, which began in 2010, and the 26 fellows selected to present their research at the 2016 Annual Meeting constitute the largest cohort to date.



Karen Febey updates the TRB Executive Committee on TRB’s report review process. (Photo: Risdon Photography)

Publications

To fulfill one of its oldest missions, TRB disseminates transportation research results and technical information through an array of publications. The Board has gained national and international prominence for its books and reports assessing the state of the practice in specific areas of transportation, presenting the results of transportation research, addressing major national transportation policy issues, and identifying research needs. In addition to print, TRB publishes the majority of its titles electronically, some exclusively in electronic format.

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



- *Transportation Research Record: Journal of the Transportation Research Board* gathers technical papers that have been accepted for publication through a rigorous peer review process refereed by TRB technical committees. In 2015, the Board published 69 volumes containing 970 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 approximately 15,000 papers in the TRR series.¹ The service allows all visitors to identify papers of interest and to review the abstracts. 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 2015, *TR News* published theme issues on moving energy—the effects of the surge in domestic energy production on transportation and infrastructure—and on public health and transportation, a TRB “hot topic” for 2015. Other special features explored the legacy and future of the Panama Canal, technology trends at state agencies, the development and influence of TRB’s *Critical Issues in Transportation*, the logistical innovations of the American circus, commercial spaceports, and more. 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 the U.S. Congress—focus on a variety of complex, often controversial, topics. Special reports published in 2015 included *Modernizing Freight Rail Regulation*, *The Essential Federal Role in Highway Research and Innova-*

tion, and *Funding and Managing the U.S. Inland Waterways System: What Policy Makers Need to Know*. 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.⁴ *Towards Road Transport Automation: Opportunities in Public–Private Collaboration*, released in November, reported on the third European Union–U.S. symposium in Washington, D.C. Two titles were released in the Conference Proceedings on the Web series: *The Role of Freight Transportation in Economic Competitiveness: Summary of the 8th University Transportation Center Spotlight Conference* and *Application of Real-Time Monitoring of Offshore Oil and Gas Operations: Workshop Report*.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 data for valuing transportation infrastructure, surface transportation financing, 50 years of traffic flow theory, moisture damage to hot-mix asphalt mixtures, geotechnical research deployment, transportation asset management from plans to practice, lessons from history about emerging technology, and more. Circulars are available exclusively in electronic format on the TRB website.⁶
- *Meeting Summaries* adapt a model pioneered by another National Academies program unit to accelerate publication of officially approved reports on conferences. This year, TRB published a summary of the symposium on Air Traffic Control: Organizational Reform Options.⁷
- *Miscellaneous Reports* include special publications like the *Highway Capacity Manual 2010* and the 530-page *Access Management Manual, Second Edition*, released at the end of 2014. Editorial production progressed this year



The 200th issue in the Transportation Research E-Circular series was released in August.

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

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.

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



TRB's webinar team (left to right): Steve Andreadis, Distance Learning and Electronic Dissemination Coordinator; Reggie Gillum, Customer Service and Marketing Associate; and Elaine Ferrell, Distance Learning Program Coordinator.

on *Access Management Applications Guidelines*, and on the sixth edition of the *Highway Capacity Manual*, incorporating findings from SHRP 2; both titles are slated for release in 2016.

In addition, the Cooperative Research Programs and SHRP 2 produced an array of titles in several publications series. For a list of all TRB publications, see pages 54–57.

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

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 inter-

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

national 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 has authorization to issue professional development hours and certification maintenance credits through the American Institute of Certified Planners for select live webinars.

TRB produced more than 70 webinars in 2015. The average attendance at each session was more than 350. Two webinars exceeded 1,200 participants—one covering 20 years of roundabout design advances and one presenting innovative intersections for pedestrians and bicycles.

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 13,900 Twitter followers and more than 5,000 Facebook fans.

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

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



As Director of Information Technology and Research Services, Lisa Loyo (far left) guides work in software development and implementation, as well as TRID and the TRB library.

Information Technology and Research Services

In late 2014, TRB reorganized and consolidated the management of the Information Technology (IT) and Transportation Research Information Services (TRIS) departments. Both groups had key responsibilities that included the development, maintenance, and application of software in support of various TRB missions.

The IT department's primary focus has shifted from the development of systems to operation, maintenance, and management. The new focus aligns with the TRIS staff's responsibilities in relation to the Transport Research International Documentation (TRID) database, the Research in Progress (RiP) database and website, the Research Needs Statements (RNS) database, the Practice-Ready Papers (PRP) database, and the TRB Publications Index.

The responsibilities of the IT and Research Services group include customer support for internal and external users of TRB's software systems; software enhancement and development; server and website monitoring and security; general IT support activities, such as training, documentation, and troubleshooting; and management and operation of transportation research services, bibliographic databases, and the TRB Library.

INFORMATION TECHNOLOGY

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

In 2015, under an ongoing, long-term effort to replace and upgrade these specialty software systems, TRB introduced a new system to manage the Annual Meeting paper submission, paper peer review, and program development processes. This new system was integrated with 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 contact information.



Senior Librarian Aryeh Cohen leads a hands-on workshop on the resources available through TRID and the TRB research library.

TRID

TRID is a comprehensive bibliographic database containing more than 1 million records of citations and abstracts of transportation research in all modes and disciplines. The records comprise published or ongoing research in English, German, French, or Spanish; more than 165,000 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 to share via social media. TRID is available free of charge on TRB's website.¹¹

PUBLICATIONS INDEX

The TRB Publications Index includes more than 65,000 citations and abstracts for all TRB, Highway Research Board (HRB), SHRP, and Marine Board publications since 1923.¹² 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 RNS database is a dynamic collection of highest-priority topics developed by TRB technical standing committees.¹³ The database serves as a tool for reviewing research needs, setting research priorities, and identifying gaps in

¹¹ <http://trid.trb.org>.

¹² <http://pubsindex.trb.org>.

¹³ <http://rns.trb.org>.

current research. More than 1,200 statements are posted.

RESEARCH IN PROGRESS DATABASE

RiP is a database of more than 12,900 records of active or recently completed research projects.¹⁴ 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.

PRACTICE-READY PAPERS DATABASE

The PRP database helps practitioners easily find TRB Annual Meeting and TRR papers identified by peer reviewers on TRB's standing committees as presenting research results immediately applicable to problems or issues.¹⁵ The database offers a search by keywords, title, author, index term, subject area, and date of publication, with links to the full text of PRPs since 2006 and to abstracts from 1998 to 2005.

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 col-

lection of TRB, HRB, SHRP, and Marine Board publications.

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

STAFF NEWS

MARK NORMAN, longtime Director of Technical Activities, was appointed Director of Development and Strategic Initiatives.

LISA L. LOYO was named Director, Information Technology and Research Services.

WILLIAM B. MCLEOD was promoted to Manager, Library Services, and **JANET S. DALY** was promoted to Indexing Manager.

ADRIENNE C. BLACKWELL transferred from the Cooperative Research Programs to become Report Review Associate, and **MICHAEL DECARMINE** transferred from the Technical Activities Division to become Business Systems Analyst.

Joining the Communications staff were **ELAINE FERRELL**, Distance Learning Program Coordinator, and **STEVE ANDREADIS**, Distance Learning and Electronic Dissemination Coordinator.

The IT and Information Resources department added **ALAN E. REZAEI** as End User Support Specialist and **BETH S. SAFFER** as Database Librarian.

¹⁴ <http://rip.trb.org>.

¹⁵ www.trb.org/Publications/PubsPracticeReadyPapersBackground.aspx.



TECHNICAL ACTIVITIES

The Technical Activities Division provides a forum for transportation professionals and researchers to advance the knowledge and practice of the many disciplines that support all modes of transportation. The division's staff of specialists in each mode and several disciplines works with thousands of volunteers on more than 200 standing committees to identify research needs, share information, and carry out other 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 universities, and in 25 transit agencies serve as liaisons to the committees and activities of the division.

The Technical Activities Division is focusing on three "hot topics" identified by the TRB Executive Committee:

- Transformative technologies,
- Transportation resiliency, and
- Transportation and public health.

Efforts to improve understanding in these areas contribute to other portions of the TRB strategic plan, such as identifying and pursuing strategic issues, strengthening relationships with sponsors for whom these issues are significant, and developing relationships with new stakeholders who can contribute expertise and insights in these areas.

Initiatives on the three hot topics began in previous years as a result of the experience and

interests of Technical Activities standing committees. In 2015, several key activities advanced the topics; understanding will be developed and transformed into useful information for transportation decision makers and practitioners.

Transformative Technologies

Advanced technologies have been an ongoing interest for Technical Activities committees. Transformative, or disruptive, technologies



Simon Fraser University students test an autonomous drone. Stimulating research in advanced technologies such as unmanned aircraft systems is an area of emphasis for Technical Activities committees. (Photo: Simon Fraser University)



The Technical Activities Council held its midyear meeting in June in Washington, D.C.



The third annual EU–U.S. Transportation Research Symposium convened experts from across the globe to share research and perspectives on road transportation automation.

comprise innovative tools and techniques that fundamentally change transportation in one or more important ways. Examples include unmanned aviation systems, connected and automated vehicles (CAVs), 3-D printing, nanomaterials, big data, and on-demand and shared transportation services.

CAVs received focused strategic attention in 2014; related activities in 2015 included the following:

- The Fourth Symposium on Vehicle Automation, cosponsored by the Standing Committees on Intelligent Transportation Systems and on Vehicle–Highway Automation in the Ann Arbor, Michigan, area, attracted almost 900 participants from academia, industry, public agencies, and consulting firms.
- The Third European Union (EU)–U.S. Transportation Research Symposium, Towards Road Transport Automation Opportunities in Public–Private Collaboration, was sponsored by U.S. DOT, the EU, and TRB. The two-day symposium gathered high-level experts to share technological and socioeconomic perspectives on surface transport automation, with the goal of fostering transatlantic partnerships and collaboration on research areas of mutual interest.
- A workshop on Connected Vehicle Dynamic Mobility Applications and Multimodal Intelligent Traffic Signal Systems, sponsored by the Standing Committee on Traffic Signal Systems in Scottsdale, Arizona, explored the state of the practice in multimodal traffic signal control in relation to CAVs.
- The Ninth University Transportation Center Spotlight Conference on Connected and Automated Vehicles in Washington, D.C., cosponsored by TRB, identified roles for university transportation research programs in developing tools and concepts to enhance deployment of these advanced technologies.



Daniel Turner
Council Chair
Technical Activities



Hyun-A Park
Chair
Policy and
Organization Group



Ram Pendyala
Chair
Planning and
Environment Group



D. Stephen Lane
Chair
Design and
Construction Group



Peter Briglia
Chair
Operations and
Preservation Group



Robert Shea
Chair
Legal Resources
Group



Paul Jovanis
Chair
Safety and System
Users Group



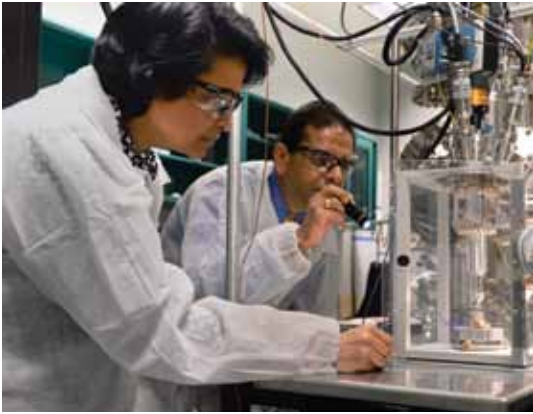
David Wilcock
Chair
Public
Transportation
Group



Stephen Popkin
Chair
Rail Group



Barbara Ivanov
Chair
Freight Systems
Group



U.S. Army scientists conduct research on nanomaterials, a growing focus in research supporting materials and construction applications. (Photo: U.S. Army)

Technical Activities efforts related to other transformative technologies include the following:

- TRB’s new Subcommittee on Unmanned Aircraft Systems cosponsored the NASA Unmanned Aircraft Systems Traffic Management Convention at Moffett Field in California.
- TRB cosponsored the 5th International Symposium on Nanotechnology in Construction, hosted for the first time in the United States, to establish collaborations among scientists and practitioners from around the world.
- A Performance Measurement and Data Conference included presentations on working with big data to develop and apply performance measures.
- The Freight Systems Group focused on big data issues in freight at a summer meeting.

Transportation Resilience

Transportation resilience refers to the ability of transportation systems to withstand, respond

to, and recover from extreme events, whether caused by natural forces, human activities, or both. The Technical Activities Division established a Transportation Systems Resilience Section in 2015, with three standing committees focused on Critical Transportation Infrastructure Protection, Logistics of Disaster Response and Business Continuity, and Emergency Evacuations. Highlights of resilience activities in 2015 include the following:

- The First International Conference on Surface Transportation Systems Resilience to Climate Change and Extreme Weather Events convened nearly 250 climate scientists and transportation professionals in Washington, D.C., in September. The conference examined efforts to mainstream the consideration of climate change and extreme weather resilience in all transportation sector initiatives, including planning and



A Virginia urban search and rescue team conducts water rescues and safety checks after severe flooding in South Carolina in 2015. The Marine Board has identified emergency planning and preparedness as a priority issue. (Photo: Fairfax County Fire and Rescue Department)



Mary Ellen Eagan
Chair
Aviation Group



Eric Shen
Chair
Marine Group



Harold (Skip) Paul
State DOT
Representative



Alison Conway
Young Members
Council
Representative



Ann M. Brach
Director
TRB Technical
Activities Division



Preventing the spread of infectious disease in air travel is one of the many areas of intersection between public health and transportation. (Photo: Flickr)

programming, capital improvements, and operations and maintenance.

- The Marine Board identified climate change, cybersecurity in the marine transportation system, and emergency planning, preparedness, response, recovery, and mitigation among its priority issues for 2015. The Marine Board developed a summary of each issue, with links to resources and studies, identifying relevant federal agencies and subject matter experts.

Transportation and Public Health

For years, experts in transportation safety—especially highway safety—have argued that the tens of thousands of deaths and millions of injuries sustained from highway crashes constitute a public health issue of enormous proportions. Increasingly, other health issues associated with transportation have emerged—for example, the effects of air, water, and noise pollution; the spread of infectious diseases; the positive and negative effects of transportation on fitness and obesity; and the role of transportation in providing access to health care. Some 2015 highlights in this area include the following:

- The Standing Committees on Pedestrians and on Bicycle Transportation cosponsored a conference with the American College of Sports Medicine on Moving Active Transportation to Higher Ground: Opportunities for Accelerating the Assessment of Health Impacts.



The Subcommittee on Health and Transportation developed a theme issue of *TR News* on public health and transportation.

- The Subcommittee on Health and Transportation led an interdisciplinary workshop at the 2015 Annual Meeting on Tools to Support Health and Transportation Planning and Analysis. The workshop offered information on tools for those working at the intersection of health and transportation. The subcommittee also assembled a theme issue of *TR News* on public health and transportation.

Additional Initiatives

Additional Technical Activities initiatives and milestones include the following:

- The moving of the TRB Annual Meeting to the Washington, D.C., Convention Center in January was a success. With all sessions in one venue, attendees were able to take advantage of the intermodal and interdisciplinary nature of the Annual Meeting program. The larger meeting rooms and superior Internet access allowed Technical Activities committees to explore different approaches to shar-



The relocation of the TRB Annual Meeting to the Washington Convention Center in 2015 brought sessions, workshops, meetings, and exhibits under the same roof for the first time in more than 50 years. (Photo: Risdon Photography)



Ed Leonardo, Director of Meetings, worked with staff to ensure a smooth transition to the new Annual Meeting venue. (Photo: Risdon Photography)

ing information—for example, through the webcasting of sessions; additional innovative approaches will be pursued.

- The initial webcasts of conferences featured the Transportation for Sustainability International Conference, with more than 250 in-person attendees and more than 150 virtual attendees; the Transportation Systems Performance Measurement and Data Conference, with more than 300 in-person attendees and 100-plus virtual attendees; and the First International Conference on Surface Transportation Systems Resilience to Climate Change and Extreme Weather Events, with more than 250 onsite attendees and more than 250 participants online. The online participants in the conference on climate change engaged in the discussions at the plenary and breakout sessions.
- The division undertook management of Phase 1 of the Safety Data Project, enabling research access to the vast database compiled through the Naturalistic Driving Study of the second Strategic Highway Research Program (SHRP 2).
- A procedure for the early acceptance and accelerated online publication of *Transportation Research Record* papers for the journal's 2016 series was implemented at the end of the year.

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

Policy and Organization

POLICY AND ADMINISTRATION

The Fifth International Transportation Systems Performance Measurement and Data Conference, in Denver, Colorado, in June was a major activity of the Policy and Administration standing committees and involved onsite and web-based participants. A workshop for state practitioners on Transportation Asset Management: From Plans to Practice took place in conjunction with the conference.

INTERNATIONAL

The 2015 Annual Meeting attracted 2,130 attendees from outside the United States, an increase over previous years. The Standing Committee on International Cooperation led several Annual Meeting sessions, including a workshop on harnessing the potential payoff of research implementation across borders. The workshop engaged a diverse group of experts, with presentations including eight international perspectives.

DATA AND INFORMATION

Data and information initiatives combined investigation into the use of data in decision making with examination of data needs, sources, and management. Freight data were an area of emphasis. Highlights include the following:

- A peer exchange on Transportation Investment for Economic Development brought together the CEOs of six state DOTs and their economic development partners to explore ways for transportation investments to support economic development.



Steve Phillips, Conference of European Directors of Roads, participates in a panel discussion on research implementation across borders at the 2015 Annual Meeting. (Photo: Risdon Photography)



Sara Maurer, Stanford University, presented research on bike share access at a poster session during the Transportation for Sustainability International Conference in May.

- A competition sought out good examples of the use of data and information to support transportation decisions.
- The Performance Measurement and Data Conference included themes on linking data to decision making and on working with new and big data sources for performance measures.
- A peer exchange on Data Governance focused on the business case for strategies to maximize the effectiveness of data-driven decision making for safety and other agency objectives.
- The Freight Fluidity Performance Measures Task Force worked with the Federal Highway Administration's (FHWA's) Freight Office to organize a second workshop on next steps in the deployment of a prototype fluidity measurement system.
- The Commodity Flow Survey Workshop continued the tradition of hosting survey users to gather feedback for the Bureau of Transportation Statistics.
- Using Knowledge Management as a Tool for Successful Succession Planning,
- Keys to Transportation Research Innovation: Managing Intellectual Property,
- Ahead of the Curve: Mastering the Management of Transportation Research and Innovation, and
- Innovative Doctoral Research from the Dwight David Eisenhower Transportation Fellowship Program.

The Ahead of the Curve training program for research managers developed detailed outlines for the four core courses and piloted the introductory course at the July 2015 meeting of the Research Advisory Committee of the American Association of State Highway and Transportation Officials (AASHTO) and TRB state representatives.

Planning and Environment

TRANSPORTATION SYSTEM PLANNING

The planning committees had a busy year:

- The 15th National Transportation Planning Applications Conference, in Atlantic City, New Jersey, in May, provided planners an opportunity to learn from peers.
- Summer meetings took place in Salt Lake City, Utah, in July, in conjunction with the AASHTO Conference on 21st Century Mobility for Freight and Passenger Transportation. Committees met jointly to discuss ways of moving transportation research into practice—including techniques at conferences, user-friendly web tools, and specific ways to encourage practitioners to adopt new procedures, practices, or approaches.
- The Statewide Multimodal Transportation Planning Committee held a peer exchange in conjunction with the AASHTO conference, focusing on the impacts of connected vehicles on various steps in the transportation planning process.

SOCIAL AND ECONOMIC ISSUES

The committees involved in Social and Economic issues sponsored events aligned with two of the hot topics: the Transportation for Sustainability International Conference and the interdisciplinary workshop on Tools to Support Health and Transportation Planning and Analysis.

RESEARCH AND EDUCATION

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



Fawn Thompson, Federal Highway Administration, introduces an Annual Meeting session featuring presentations by young researchers in the Dwight David Eisenhower Transportation Fellowship Program. (Photo: Risdon Photography)



Katharine Hayhoe, Texas Tech University, delivers the keynote presentation at the First International Conference on Surface Transportation System Resilience to Climate Change and Extreme Weather Events in September.

ENVIRONMENT, ENERGY, AND CLIMATE CHANGE

Seven of the eight Environment and Energy Section committees sponsored or cosponsored conferences in 2015 on such topics as ecological issues in transportation systems; the changing approaches to solid and hazardous waste, from remediation and management to resource efficiency; and technological advances to decrease harmful emissions from heavy freight traffic and improve air quality. The 1st International Conference on Surface Transportation Systems Resilience to Climate Change and Extreme Weather Events was a focus of activities and offered occasion for the new Transportation Systems Resilience Section and its committees to hold midyear meetings.

Design and Construction

DESIGN

Standing committees examined research needs, priorities, and findings via webinars, midyear meetings, and conferences:

- The Standing Committee on Roadside Safety Design held a joint workshop with the AASHTO Technical Committee on Roadside Safety on Making Roadside Departure Safety a Priority, in Chicago, Illinois, in July.

The workshop examined the nature of roadway departure crashes and explored strategic ways to reduce their frequency and severity.

- The Standing Committee on Landscape and the Environment met in Albuquerque and Santa Fe, New Mexico, in August to learn about transportation landscape issues in the Southwest, cultural landscapes and transportation, and related multimodal projects and to develop research needs statements.
- The Standing Committee on Pavement Management Systems cosponsored the 9th International Conference on Managing Pavement Assets, in Alexandria, Virginia, in May.



New bridges on I-91 in Hartford, Vermont, were constructed next to the existing bridges and moved laterally into place in a single weekend. Accelerated bridge construction techniques dramatically reduce the offline time for bridges undergoing replacement. (Photo: Vermont Agency of Transportation)



Hot-mix asphalt delivered from a material transfer vehicle, an example of the techniques presented in Transportation Research E-Circular 198, *Moisture Damage to Hot-Mix Asphalt Mixtures*.

In addition, committees in the Structures Section cosponsored international conferences on accelerated bridge construction, nondestructive testing, and orthotropic bridge decks.

CONSTRUCTION AND MATERIALS

The standing committees in the Construction, the Asphalt Materials, and the Concrete Materials Sections addressed issues and emerging topics through the following activities:

- Workshops on data standards for streamlining digital project delivery from design to construction; innovative additives for asphalt materials, including recent changes in performance-graded binder specifications;

and the state of the practice in the design and construction of concrete overlays;

- Publication of a circular, *Moisture Damage to Hot-Mix Asphalt Mixtures*;¹ and
- Cosponsorship of the 5th International Symposium on Nanotechnology in Construction, in Chicago in May.

GEOTECHNICAL ENGINEERING

The geotechnical engineering committees addressed practitioners' concerns through workshops, sessions, and specialty conferences. Highlights of activities include the following:

- A workshop on Improving Processes for Characterization of Soil Corrosion Potential of Buried Metallic Elements examined research needs and the methods, challenges, and protocols for various applications, as well as time-dependent electrochemical considerations related to AASHTO specifications.
- A workshop on full-depth reclamation projects for road rehabilitation presented lessons learned and outlined benefits, such as expedited construction, reuse of in-place materials, and decreased project costs.
- The 11th International Conference on Low-Volume Roads, held in Pittsburgh, Pennsylvania, in July, facilitated international technology transfer on safety, soil stabilization, materials, pavements, and maintenance

¹ Transportation Research Circular E-C198, www.trb.org/Publications/Blurbs/172749.aspx.



Steven Blaser, Director of the Center for Dirt and Gravel Road Studies at Pennsylvania State University, leads a site visit to a low-volume road during the 11th International Conference on Low-Volume Roads in Pittsburgh, Pennsylvania, in July. (Photo: G. P. Jayaprakash)



As part of a larger corridor project, a crossing at Mercer Street in Seattle, Washington, was updated to provide safe, accessible crossings. (Photo: Seattle DOT)

and preservation. Highlights included an interactive session on Current Issues Facing Low-Volume Roads Managers and a session on managing and financing low-volume roads in the United States.

Operations

Operations continues to thrive as an area for transportation research. In 2015, committees in the Operations Section peer-reviewed more than 700 technical papers, sponsored more than 200 sessions and conducted 90 meetings at the Annual Meeting.

The Standing Committee on Highway Capacity sponsored a workshop in Little Rock, Arkansas, on the development of the next edition of the *Highway Capacity Manual*, focusing on research findings on travel time reliability and other topics to be incorporated into the sixth edition, scheduled for release in 2016.

The Access Management Committee cosponsored the 11th National Access Management Conference: Access Management Across the Modes, in Seattle, Washington. The conference convened engineers, planners, consultants, land developers, and academics in highway planning, design, operations, and engineering.

Maintenance and Preservation

Committees in the Maintenance and Preservation Section, in partnership with the AASHTO Subcommittee on Maintenance, held a joint conference on Transportation Infrastructure

Maintenance and Operations in Des Moines, Iowa. The conference provided information on the state of the art and practice in infrastructure maintenance operations and management. Papers and presentations examined such topics as needs-based budgeting, incorporating risks within maintenance operations and management, tools for transparent decision making, and mobile technology in maintenance operations, including winter maintenance.

The 14 standing committees sponsored a variety of workshops and sessions at the 2015 TRB Annual Meeting:

- Advances in Technology, Facilities, and Operations for Winter Maintenance;
- Developing the 21st Century Maintenance Workforce;
- Managing and Maintaining Nonpavement, Nonbridge Highway Assets;
- Handing over Digitally Constructed Projects to Operations and Maintenance; and
- Performance-Based Contracting: Toward More Efficient and Effective Road Maintenance.

Safety and System Users

In addition to the conference on Moving Transportation to Higher Ground, highlights of activities undertaken by the Safety and System Users committees included the following:

- The Standing Committees on Highway Safety Performance and on Safety Data, Analysis, and Evaluation held a joint midyear meeting in Irvine, California, to review ongoing research and future needs, particularly for the development of the second edition of the *Highway Safety Manual*; and
- The 2nd National Roadway Safety Culture Summit in Washington, D.C., in November engaged participants in a dialogue on safety culture changes in transportation organizations.

In addition, the following committees and subcommittees met during the year to discuss states of practice and knowledge and to identify areas for research: Highway Safety Workforce Development; Young Drivers; Safe Mobility for Older Persons; Truck and Bus Safety; Traffic Law Enforcement; Occupant Protection; and Alcohol, Other Drugs, and Transportation.



Litigation in 2015 involving guardrail end treatments was a topic studied by the Legal Resources Group. (Photo: D. Allen Covey, Virginia DOT)

Legal Resources

The Annual Workshop on Transportation Law continues to be the cornerstone of the outreach and educational efforts by the Legal Resources Group. The 54th annual workshop, held in Chicago in July, attracted nearly 200 participants and addressed such issues as the following:

- Legal and technical issues related to the Americans with Disabilities Act (ADA) requirements for public rights-of-way and
- Recent litigation involving guardrail end treatments and the potential legal impacts to public entities.

The Legal Resources Group explored approaches to other concerns through conferences and workshops that addressed such issues as the security of infrastructure and data, the inclusion of right-of-way and legal professionals on project delivery teams, and the coordination of risk management and tort liability in the development and redevelopment of land uses.

Research related to National Cooperative Highway Research Program Project 20-6, Legal Problems Arising out of Highway Programs and Transit Cooperative Research Program Project J-5, Legal Aspects of Transit and Intermodal Transportation Projects continued to revise



An airplane on the tarmac at Miami International Airport in Florida. Miami was the site of the 2015 Airfield and Highway Pavements Conference. (Photo: Miami-Dade Aviation Department)

Selected Studies in Transportation Law. Supplements have been completed for Volume 1, Contracts, Volume 2, Environmental, and Volume 5, Transit.

Aviation

The Standing Committee on Aviation System Planning sponsored its triennial National Aviation System Planning Symposium in Charleston, South Carolina. The Standing Committee on Aircraft–Airport Compatibility met with the American Society of Civil Engineers in Miami, Florida, at the 2015 Airfield and Highway Pavements Conference. TRB’s new Unmanned Aircraft Systems Subcommittee cosponsored the NASA Unmanned Aircraft Systems Traffic Management Convention.

The Aviation Group committees maintained active involvement in TRB’s Airport Cooperative Research Program (ACRP), developing and sponsoring problem statements and providing reviews of problem statements for the ACRP Oversight Committee. Several committees, including Environmental Impacts of Aviation, Airfield and Airspace Capacity and Delay, and Light Commercial and General Aviation, held summer meetings in Washington, D.C., to advance discussions about completed, ongoing, and needed research in aviation.

Marine

The standing committees of the Marine Group, together with the Marine Board, cooperatively address issues in marine transportation on behalf of TRB. Major themes addressed at the 2015 Annual Meeting and the Marine Group Summer Meeting included seaport resiliency and cargo diversion; port drayage and chassis



A panel discussion at the Marine Board meeting in June addressed freight mobility challenges and research needs.



Trends in the movement of crude oil by rail were among the topics explored by Rail Group standing committees in 2015. (Photo H. Michael Miley, Flickr)

management; Arctic shipping; and marine environmental, safety, and human factors concerns.

In spring and fall meetings, the Marine Board addressed cybersecurity in the marine transportation system, response to emergencies in the Arctic, and human and intellectual capital in marine transportation. The Marine Board identified 11 priority issues for 2015 and prepared fact sheets including additional resources and lists of committee members with related expertise. Topics of focus were the aging infrastructure; Arctic shipping; building and fostering a strong safety culture; climate change; cybersecurity; emergency planning, preparedness, response, recovery, and mitigation; the future of navigation; human and intellectual capital; marine incidents and development of a near-miss database; new energy options and the associated infrastructure requirements; and risk assessment and analysis.² The issues are guiding the Marine Board's engagement with federal agencies, transportation stakeholders, and the standing committees.

Rail

The growth of the domestic energy-producing sector remained the dominant issue for the railroad industry, as the volume of rail movements of crude oil and ethanol continued despite the softening of petroleum prices. Highlights of the Rail Group committee activities for the year include the following:

- A half-day workshop at the TRB Annual Meeting focused on trends in the movement

² www.trb.org/MarineBoard/PriorityIssues.aspx.

of crude oil by rail and on the separation of passenger and freight trains in urban areas.

- An Annual Meeting session brought together industry leaders to discuss the surge in domestic intermodal container movements.
- The 2015 Joint Rail Conference in San Jose, California, cosponsored by TRB, featured a dialogue on the construction of California's high-speed rail system.

Freight Systems

The standing committees in the Freight Systems Group have been exploring the interdependencies and interplays between infrastructure resiliency, supply chain dynamics, system capacity, and investment strategies. In 2015, the committees carried out the following initiatives:

- Partnered with the Marine Group to organize four Freight Day sessions at the 2015 Annual Meeting, focusing on consumer and manufacturing effects on corridors, infrastructure and operations trends, policy and strategic initiatives, and energy mobility;
- Cosponsored a conference with the American Association of Port Authorities on shifting international trade routes and the possible effects on freight flows in the United States in relation to the expansions of the Panama and Suez Canals;
- Partnered with the Data and Information Group to organize the FHWA-sponsored workshop on a freight fluidity measurement system; and
- Jointly organized a summer meeting addressing trends in domestic energy flows and regulation; port disruption, resilience, and cargo



Drew McElroy discusses disruptive technologies and the Internet during one of the four Freight Day sessions at the 2015 Annual Meeting. (Photo: Risdon Photography)



Miraflores Locks on the Panama Canal. (Photo: Amanda Richards)

diversion; the effects of pending trade agreements on the U.S. freight system; and big data.

Public Transportation

The Public Transportation Group committees stimulate and foster research and communication to advance public transportation, travel demand management, and accessibility. The group explores issues, best practices, research needs, and technology transfer in support of public transportation providers, users, policy makers, and funders. Activities in 2015 included the following:

- The 9th Geographical Information Systems in Transit Conference, in Washington, D.C.;
- The 13th National Light Rail and Streetcar Conference, in Minneapolis, Minnesota, cosponsored by TRB and the American Public Transportation Association;
- The 14th TRANSED Conference, in Lisbon, Portugal, on the development of transport services and systems that meet the needs of people with disabilities;
- The inaugural meeting of the Public Transportation and Security Task Force; and
- A retreat hosted by Denver Regional Transportation District to refine the mission of the group and to update the strategic plan.



Opened in 2014, Atlanta Streetcar runs a 2.7-mi loop in downtown Atlanta, Georgia, from Centennial Olympic Park to the Martin Luther King, Jr., National Historic Site. (Photo: Paul Sableman, Flickr)

SHRP 2 Safety Data Phase 1

As SHRP 2 ended on March 31, the first phase of implementing its largest product—two petabytes of real-world driving data—began under a memorandum of understanding between FHWA, AASHTO, the National Highway Traffic Safety Administration, and TRB. A small team of SHRP 2 staff is responsible for this activity, now housed in the Technical Activities Division. The Phase 1 budget of \$25 million supports key activities that include the following:

- Establishment of the Safety Data Oversight Committee to provide policy guidance, plus two expert task groups to supply technical expertise on such issues as data access and user community development;
- The completion of contracts to operate the

Naturalistic Driving Study Data and the Roadway Information Database, facilitating data use by more than 80 research projects and exploring downloadable public use data sets;

- The rollout of the production version of the InSight website, which provides information about the safety data and allows selected data to be viewed and queried;
- A student competition to encourage graduate and undergraduate students to explore innovative uses of the data; and
- Webinars to introduce potential users to the data, along with periodic publications to update stakeholders on the progress on Phase 1.

STAFF NEWS

ANN M. BRACH was named Director of Technical Activities in March, after completing three-and-a-half years at the helm of SHRP 2.

Also moving to the division from SHRP 2 were **STEVEN J. ANDRLE**, as Program Manager for SHRP 2 NDS Safety Data and Public Transportation; **DAVID J. PLAZAK**, as Associate Director—Safety Data; and **ALYSSA M. HERNANDEZ**, as Program Officer, Safety Data.

CLAIRE E. RANDALL joined the staff as Program Officer, Public Transportation.

ELIZABETH ANGELA CHRISTIAN was hired as Program Coordinator.



Members of the SHRP 2 Oversight Committee directed the program to a successful conclusion in 2015, delivering more than 100 products that improve highway infrastructure renewal, safety, reliability, and capacity. The Technical Activities Division is managing the first phase in the use of the vast safety data assembled under SHRP 2.

MAJOR AWARDS PRESENTED IN 2015

The Roy W. Crum Award for outstanding transportation research leadership was presented to **Forrest M. Council**, former Director and current Research Scientist, University of North Carolina Highway Safety Research Center (HSRC). A nationally recognized expert in highway safety issues, Council has overseen research to identify and strengthen methodologies in roadway safety—including development of the Federal Highway Administration’s (FHWA’s) *Accident Research Manual*. After retiring as HSRC director in 1999, Council dedicated his time to research—notably the planning, development, and implementation of FHWA’s Highway Safety Information System.



He began his longtime association with TRB in 1974 as a member of the Traffic Records Committee. Since then, Council has served on approximately 25 TRB committees, panels, and task forces. In 2009, he was appointed emeritus member of the TRB Standing Committee on Safety Data, Analysis, and Evaluation and was named a National Associate of the National Research Council of the National Academies of Sciences, Engineering, and Medicine.



Katherine F. Turnbull received the W. N. Carey, Jr., Distinguished Service Award for contributions to transportation research and to TRB. Turnbull is Executive Associate Director and Research Scientist, Texas A&M Transportation Institute (TTI).

For more than 27 years, Turnbull has been an active TRB volunteer, serving as chair or member of more than 23 councils, groups, sections, committees, panels, and task forces—as well as authoring nearly 40 TRB publications since 1988. She is nationally recognized for her work in performance measurement and assessment of high-occupancy vehicle and high-occupancy toll facilities, intelligent transportation systems technologies, and innovative transit service in national parks and federal lands.

Turnbull served as chair of the TRB Technical Activities Council from 2011 to 2013; in 2011, she was named a National Associate of the National Research Council of the National Academies of Sciences, Engineering, and Medicine.

Robert E. Skinner, Jr., received the Frank Turner Medal for Lifetime Achievement in Transportation. Executive Director of TRB from 1994

until his retirement earlier this year, Skinner presided over a period of robust growth in TRB programs and influence.

During his 21-year tenure as Executive Director, TRB’s annual budget rose from \$35 million to \$113 million. Initiatives and programs developed under Skinner include the Airport Cooperative Research Program; the second Strategic Highway Research Program; the Minority Student Fellows Program; the Young Members Council; and efforts to increase participation by women, members of minority groups, and young people in committees, activities, and leadership positions. TRB also expanded the range of its programs and fostered international research partnerships and coordination.



Before serving as executive director, Skinner directed TRB’s policy study activities, supervising more than 30 studies that helped guide federal and state decision making. Before joining TRB in 1983, he served as Vice President of Alan M. Voorhees and Associates, a transportation consulting firm.

Daniel Sperling, Professor of Civil Engineering and Environmental Science and Policy, University of California



(UC), Davis, delivered the 2015 Thomas B. Deen Distinguished Lecture on the emerging transportation of mobility, vehicles, and fuels. A leading expert on transportation technology assessment and on the energy and environmental aspects of transportation, Sperling is founding director of the Institute of Transportation Studies at UC Davis.

A pioneer in the study of efficient, low-carbon transportation systems, Sperling was appointed to the California Air Resources Board in 2007. His advisory work includes service on the review committees of three U.S. Department of Energy national laboratories. He also has served on 13 National Research Council committees, was founding chair of the TRB Standing Committee on Alternative Transportation Fuels, and was first chair of the Standing Committee on Sustainable Transportation.

Author and coauthor of more than 200 technical papers and 12 books, notably *Two Billion Cars* and *Driving Climate Change: Cutting Carbon from Transportation*, Sperling was named a National Associate of the National Research Council of the National Academies of Sciences, Engineering, and Medicine in 2004.



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; produces syntheses of current practices in highway, transit, and airport operations; and manages Innovations Deserving Exploratory Analysis (IDEA) programs in highways, transit, and rail safety.

Policy Studies

With the guidance of committees drawn from the nation's leading experts, the Policy Studies unit produces reports examining complex and controversial transportation issues. Studies address a variety of safety, economic, environmental, and research policy issues affecting all modes of transportation. In addition, studies conducted through TRB's Marine Board address offshore engineering and regulatory issues not directly related to transportation.

TRB's parent organization, the National Academies of Sciences, Engineering, and Medicine, 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

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

COMPLETED REPORTS

Several major studies were completed and released during 2015, spanning a range of topics: connected vehicle technology, reinvestment in inland waterways, freight rail regulation, evaluations of the research and development (R&D) programs of the Federal Railroad Administration (FRA) and of the Federal Highway Administration (FHWA), the regulation of truck size and weight, and the innovative urban mobility services provided by upstart companies such as Uber and Lyft.

Connected Vehicle Initiative

At the direction of the U.S. Congress, the Com-



Sandra Rosenbloom (*center*) guides the Subcommittee for Planning and Policy Review in its oversight of TRB's policy work.



Sandra Rosenbloom
Chair
Subcommittee on
Planning and Policy
Review



Stephen R. Godwin
Director
Studies and Special
Programs



The Committee for the Review of the U.S. Department of Transportation (DOT) conducted a peer review of a U.S. DOT report to Congress on dedicated short-range technology for applications such as automated and connected vehicles. (Photo: U.S. DOT)

mittee for the Review of the U.S. Department of Transportation (DOT) conducted an independent peer review of a draft U.S. DOT report to Congress, *Status of the Dedicated Short-Range Communications Technology and Applications*.² The committee agrees with the draft report statements about the benefits that digital short-range communication (DSRC) technology offer for safety-critical messages. The committee also agrees that the proposed spectrum sharing in the 5.9 GHz band is the most serious risk and uncertainty in relying on DSRC for safety-critical messages. The committee identifies other unknowns and uncertainties that the report should address, including spectrum frequency coordination, the scalability of DSRC communications levels, message security, and other issues. U.S. DOT funded the project; Dennis Wilkie, NAE, Motorola (retired), chaired the committee.

U.S. Inland Waterways System Maintenance and Funding

TRB Special Report 315, *Funding and Managing the U.S. Inland Waterways System: What Policymakers Need to Know*, explores the role and importance of the federally funded inland waterways system, priorities for future investment, the beneficiaries, and the sources of funding.³ The study committee finds that

- The most critical need for the inland waterways system is a sustainable and well-executed plan for maintaining system reliability and performance and

² www.trb.org/main/blurbs/172448.aspx.

³ www.trb.org/Publications/Blurbs/172741.aspx.

- More reliance on a user-pays funding strategy for the commercial navigation system is feasible and would generate new revenues for maintenance and promote economic efficiency.

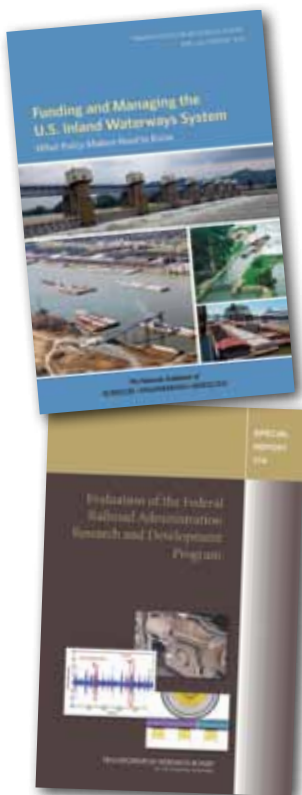
The committee concludes that an asset management program focused on economic efficiency would help prioritize maintenance spending and would identify the funding levels required for reliable freight service. The TRB Executive Committee initiated and funded this study; Chris Hendrickson, Carnegie-Mellon University, chaired the committee.

FRA Research and Development Program

TRB Special Report 316, *Evaluation of the Federal Railroad Administration Research and Development Program*, assesses the effectiveness of the agency's process for identifying research priorities and the usefulness of R&D products for improving safety in track and structures, rolling stock, train control and communications, and human factors.⁴ Evaluation criteria included the extent to which FRA has based the R&D on an understanding of the needs and priorities of the industry and of the agency itself; has benefited from communication with parties within and beyond FRA; and has yielded products that are high quality, applicable, and have demonstrable benefits.

The committee concluded that the productivity of the R&D program appears good and that the program appears well focused on safety.

⁴ www.trb.org/Publications/Blurbs/172277.aspx.



Maintenance on Lock and Dam 8 near Genoa, Wisconsin. The U.S. inland waterways system was the subject of a TRB policy study. (Photo: Patrick Moes, U.S. Army Corps of Engineers)



The Research and Technology Coordinating Committee monitors and advises on FHWA's research and technology activities.

The report recommends ways to strengthen the program in the areas of communications with industry and the Office of Railroad Safety, priority setting, strategic planning, and project evaluation. FRA requested and funded the project; John Samuels, NAE, Norfolk Southern (retired), chaired the committee.

FHWA Research and Innovation

TRB Special Report 317, *The Essential Federal Role in Highway Research and Innovation*, summarizes conclusions and advice on FHWA's critical role in highway research, development, and technology (RD&T) that TRB's Research and Technology Coordinating Committee (RTCC) has provided over the years.⁵ The RTCC monitors and reviews FHWA's research and technology activities and advises on research topics and on the conduct of research. The RTCC concludes that FHWA plays an essential role in exploratory, advanced research; addresses national priorities that other highway RD&T programs do not; and facilitates adoption of innovations at the state and local levels through technology transfer.

The RTCC notes that FHWA, along with its other responsibilities, will play a particularly important role in

- Ensuring the standardization of safety alerts from infrastructure and vehicles to motorists as part of the national connected vehicle initiative and
- Assisting transportation agencies in implementing the many innovations developed in the second Strategic Highway Research Program (SHRP 2).

⁵ www.trb.org/Publications/Blurbs/172447.aspx.

FHWA funds the RTCC's work. Michael Meyer, Modern Transport Solutions, LLC, chaired the committee.

Modernizing Freight Rail Regulation

TRB Special Report 318, *Modernizing Freight Rail Regulation*, examines the future role of the Surface Transportation Board (STB) in overseeing and regulating service levels and rate offerings as railroads become revenue adequate.⁶ This congressionally requested report recommends approaches to resynchronize a regulatory program that has become outdated. The study committee finds that although the U.S. freight railroad industry has become modernized and financially stable since the Staggers Rail Act of 1980, some of the industry's remaining economic regulations have not kept pace and should be replaced with practices better-suited to today's modern freight rail system. FRA funded the study. Richard Schmalensee, Massachusetts Institute of Technology, served as the committee chair.

U.S. DOT Truck Size and Weight Study

In the Moving Ahead for Progress in the 21st Century Act, Congress mandated a U.S. DOT study of truck size and weight. U.S. DOT requested a peer review of the study; the TRB committee issued an initial letter report in mid-2014 and released a final letter report after receiving the draft empirical results in mid-2015.⁷

The committee concluded that the study lacks a consistent and complete quantitative summary of alternative configuration scenarios and that major categories of costs—such as bridge structures, crashes, and infrastructure—are not estimated. The letter report does not take a position on changes to the federal truck size and weight limits but offers recommendations for improving the study's estimates. James Winebrake, Rochester Institute of Technology, chairs the committee.

Innovative Urban Mobility Services

The TRB Executive Committee initiated a project to assess the consequences of urban transportation services made possible by mobile phone applications. Special Report 319, *Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services*, provides

⁶ www.trb.org/Publications/Blurbs/172736.aspx.

⁷ www.trb.org/Main/Blurbs/173282.aspx.





Lyft and other ridesharing companies have altered the landscape of urban mobility. Special Report 319, *Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services*, addresses these changes.

guidance to policy makers and regulators about transportation network companies (TNCs), such as Uber and Lyft, which are gaining popularity but generating controversy by competing with traditional taxi providers.⁸ Also of interest are the potential effects on travel behavior, residential location preferences, and vehicle ownership from such mobility services as carsharing, bikesharing, and integrated applications that provide real-time information about travel time and cost for urban mobility options. Brian Taylor, UCLA, chairs the committee.

Assistance in Other National Academies Studies

In addition, the Policy Studies staff assisted the National Academies' 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.

FORTHCOMING REPORTS

- Offshore Oil and Gas Industry Safety Culture is a study conducted under the auspices of the Marine Board. The project is funded through a settlement between the U.S. Department of Justice and a company operating in the Gulf of Mexico. Nancy Tippins, Valtera Corporation, chairs the study committee. The final

⁸ <http://onlinepubs.trb.org/onlinepubs/sr/sr319.pdf>.



The Offshore Oil and Gas Industry Safety Culture Committee is conducting a study on strengthening offshore industry safety culture, with a report expected in early 2016.

report is expected in early 2016.

- 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. Martin Wachs, RAND Corporation, chairs the committee; the report is expected to be released in early 2016.
- 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 and on ways that the offshore industry and the bureau can use the technologies



The *Empire Builder* leaves the station at Chicago, Illinois, for points west. Intercity passenger rail travel is the topic of a study initiated by the TRB Executive Committee. (Photo: vxla, Flickr)

to enhance safety. The chair of the study is Richard Sears, Stanford University.

- TRB also is assisting the NRC Committee on National Statistics in a study for the Federal Motor Carrier Safety Administration; the study will provide advice on the appropriate research methods and data for assessing the ways that regulating the hours of operation affects driver fatigue and safety.

ONGOING STUDIES

Other committees provide ongoing peer review of the research and development programs of FHWA, FRA, and the Federal Transit Administration, as well as for 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 publicly available on TRB's website.⁹

NEW STUDIES

TRB Policy Studies staff began work on two major studies at the end of 2015:

- Transportation of Petroleum, Natural Gas, and Ethanol, initiated by the TRB Executive Committee, is examining policy and technical options to facilitate the most efficient and lowest-risk means of transporting liquid and gaseous domestic energy products.
- Performance-Based Safety Regulation, funded by the Pipelines and Hazardous Materials Administration, is addressing the possible replacement of prescriptive safety regulations with a performance-based approach that encourages the pipeline industry to exceed minimum requirements.

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.

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



The Long-Term Pavement Performance Committee met in Washington, D.C., in October.

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 2015, 10 new airport, 16 new highway, and six new transit studies started up. 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 55–57. 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.¹⁰

TRB maintains an inventory of hard-copy synthesis reports for sale.¹¹ Following are summaries of illustrative reports published in 2015.

ACRP SYNTHESIS REPORTS

ACRP Synthesis 68, *Strategies for Maintaining Air Service*, by Mike Gordon, compiles the current practices of smaller airports to maintain air service during airline route consolidations and cancellations.

ACRP Synthesis 64, *Issues Related to Accommodating Animals Traveling Through Airports*, explores ways for airports to develop a coord-

¹⁰ www.trb.org/Publications/PubsNCHRPSynthesisReports.aspx; www.trb.org/Publications/PubsTCRPSynthesisReports.aspx; and www.trb.org/Publications/PubsACRPSynthesisReports.aspx.

¹¹ www.trb.org/Finance/Bookstore.aspx.



A new policy study will examine the transportation of natural gas and other domestic energy products. (Photo: Kurt Haubrich, Flickr)



Paw prints at San Francisco International Airport direct traveling service animals and their handlers to pet relief areas. Issues related to animals traveling through airports were addressed in ACRP Synthesis 64. (Photo: SFO)

minated approach to accommodate the well-being of animals traveling through airports. The report identifies regulations; reviews issues, accommodation requirements, and strategies; and illustrates effective practices.

ACRP Synthesis 60, *Airport Emergency Post-Event Recovery Practices*, describes approaches to improve the resiliency of airports through planning for the recovery phase of emergency response. The report includes case studies of high-profile emergencies and compiles the changes made to maintain resilience at airports recovering from emergencies.

NCHRP SYNTHESIS REPORTS

- NCHRP Synthesis 480, *Economic and Development Implications of Transportation Disinvestment*, by Chandler Duncan and Glen Weisbrod, examines methods for estimating the effects of disinvestment on transportation systems. The report includes information on economic forecasting and travel demand models, risk or probability models, needs models, and benefit and impact models. A TRB webinar on the report attracted 157 registrants, and the 2014 International Transportation Economic Development Conference in Dallas, Texas, addressed the topic.
- NCHRP Synthesis 479, *Forecasting Transpor-*



Statnamic load tests at St. George Island Bridge, as addressed in NCHRP Synthesis 478, *Design and Load Testing of Large-Diameter, Open-Ended Driven Piles*. (Photo copyright Applied Foundation Testing)

tation Revenue Sources: Survey of State Practices, by Martin Wachs and Benton Heimsath, documents current and proposed forecasting methodologies, as well as the shortcomings of the methods, as reported by state DOTs. The report includes information about the types of revenue being forecasted and DOT satisfaction with the accuracy of the projections. TRB hosted a webinar on the report in August with 150 registrants.

- NCHRP Synthesis 469, *Impacts of Energy Developments on U.S. Roads and Bridges*, by Leslie McCarthy and Anthony Giancola, documents the economic impact of heavy truck traffic generated by energy development on the nation's roads and bridges. The report presents strategies to minimize and pay for the damage from heavy loads. A feature article in the September–October 2015 *Public Roads* magazine highlighted the report.
- NCHRP Synthesis 478, *Design and Load Testing of Large-Diameter, Open-Ended Driven Piles*, by Dan A. Brown and W. Robert Thompson III, documents the state of practice in the selection, use, design, construction, and quality control of large-diameter, open-ended driven piles for transportation structures. Agencies can apply the information to develop methods, technical guides, and design

codes. TRB is sponsoring a webinar on this report in December 2015.

TCRP SYNTHESIS REPORTS

- TCRP Synthesis 114, *Critical Incident Management and Clearance Practices for Rail Transit*, by Daniel K. Boyle, summarizes the major issues for rail transit agencies in responding effectively to incidents and in identifying successful strategies and examines the effects of post-incident evaluation on response to the next incident. The report presents proven solutions and serves as a concise guide for communities and responders.
- Transit agencies have begun making schedule and real-time operational data available to the public, a practice known as open data. TCRP Synthesis 115, *Open Data: Challenges and Opportunities for Transit Agencies*, by Carol Schweiger, reviews the state of the practice in applying open data for transit planning, service quality, and customer information.

The National Transit Institute has recommended the two TCRP Synthesis reports as topics for webinars.

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 2015:



The Utah Transit Authority conducts a FrontRunner commuter rail training exercise. Critical incident management by transit agencies is the subject of TCRP Synthesis 114.

- NCHRP IDEA, collectively funded by the state DOTs, for highway-related research;
- Transit IDEA, funded by FTA through TCRP, for research on innovations applicable to transit practice; and
- Rail 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 2015 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 interacted directly with the inventors.

Each of the IDEA programs publishes an annual report that includes summaries of completed and current projects. The summaries also are posted on the IDEA page of the TRB website, along with the IDEA program announcement, which contains forms and guidelines for submitting proposals.¹² Contractor final reports for completed IDEA projects are posted on the TRB website.¹³

RECENT SUCCESSES

- NCHRP IDEA Project 171, *Producing a Sustainable and Bio-Based Alternative for Petroleum-Based Asphalt*, by Elham H. Fini, North Carolina A&T State University, aims to produce bioasphalt adhesives from swine manure. The European Union's Infravation Program selected this as a demonstration project; several European adhesive and asphalt vendors have indicated interest in the

¹² www.trb.org/IDEAProgram/IDEAProgram.aspx.

¹³ www.trb.org/Publications/PubsIDEAHighwayFinalReports.aspx; <http://www.trb.org/Publications/PubsIDEATransitFinalReports.aspx>; and www.trb.org/Publications/PubsIDEASafetyFinalReports.aspx.



Protran's Rail Neutral Temperature Monitoring system, first developed with support of the Transit IDEA program, monitors the health of continuous rails. (Photo: Protran)

product, and manufacturers from four European nations have requested licensing for the technology.

- The Hybrid Composite Beam (HCB), developed jointly under the NCHRP IDEA and the High-Speed Rail IDEA programs, by John Hillman, continues to gain acceptance among state DOTs in the construction of highway bridges. The HCB weighs approximately one-tenth of a typical precast concrete beam of the same span length, and the improved speed of installation is well suited to accelerated bridge construction. FHWA's Highways for LIFE program has facilitated implementation of the technology in the United States. To date, 17 highway bridges in nine states and the province of British Columbia have installed HCBs, and at least 11 more projects are under consideration or construction in five states and three Canadian provinces.

Canadian Pacific Railroad is installing HCBs on a bridge in British Columbia. The White House recently recognized Hillman as one of 12 "Transportation Champions of Change."

- Transit IDEA Project 76, RideScout Mobile Application, aggregates information from all types of ground transportation. RideScout provides door-to-door trip planning for users with a single point of access for all ride providers in the system. The application was launched in Austin, Texas, and Washington, D.C., and more than a dozen U.S. cities have implemented it. DaimlerChrysler recently acquired RideScout.
- Transit IDEA Project 78, Rail Neutral Temperature Monitoring, by Peter Bartek, Protran Technology, developed and tested a system to monitor rail neutral temperature for significant changes, which can contribute to rail buckling and derailments. The Maryland Transit Administration has tested the device, and the Washington Metropolitan Area Transit Authority is conducting pilots in various locations. Harsco Corporation, an industrial services company, recently acquired Protran Technology.

STAFF NEWS

JILL WILSON, Senior Program Officer, retired in 2015 after more than 20 years of exemplary service to TRB and to the Division on Engineering and Physical Systems.

THOMAS R. MENZIES was promoted to Deputy Program Director, and **MARK HUTCHINS** was promoted to Senior Program Officer.

VELVET FITZPATRICK and **MICAH HIMMEL** joined the Policy Studies staff as program officers in August 2015.



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 2015, these programs produced 140 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 to the work of transportation professionals at all levels of government and private practice. Since 1962, NCHRP has helped the transportation community find practical solutions to pressing problems and develop and apply innovations to improve current practices.

Support for NCHRP is voluntary; funds are drawn from the Federal-Aid Highway apportionment for State Planning and Research (SPR) and can be spent only for the administration of projects approved by at least two-thirds of the states. NCHRP's close association with AASHTO and its position within the National Academies of Sciences, Engineering, and Medicine have enabled the program to carry out research with sound, practical, and nationally important results. Stakeholder involvement throughout the NCHRP process guarantees that the program addresses high-priority research



Director Christopher W. Jenks shares Cooperative Research Programs research activities at a January meeting of the TRB Executive Committee. (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 Manager Christopher Hedges advises the AASHTO Standing Committee on Research (SCOR) on the status of program funding and projects.

needs and develops products that are ready for implementation by transportation practitioners.

NCHRP manages projects in research areas that range 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 have appeared in 1,343 publications in the NCHRP Report and NCHRP Synthesis of Highway Practice series, in addition to 398 Research Results Digests and 67 Legal Research Digests, as well as 294 other documents published electronically. NCHRP reports published during the past 12 months are listed on pages 55–56.

PROVEN PROCESS

AASHTO considered 122 problem statements for the Fiscal Year (FY) 2016 program and selected 16 continuing projects and 45 new projects. Each NCHRP project follows an approved research plan under the guidance of a panel of technical specialists and experienced practitioners. The panel defines the scope of work, selects the contractor through a competitive proposal process, and monitors the research from beginning to end. The panel's participation ensures the credibility of the research findings, facilitating adoption by AASHTO, state

DOTs, and other organizations.

NCHRP panels convened for more than 162 project meetings in 2015; more than 2,416 volunteers offered their time, energy, and expertise as panel members, attending meetings and reviewing materials, primarily for the challenges and the satisfaction of making contributions to the field. Most NCHRP research projects have recommended specifications and produced manuals and guidelines that have had a direct impact on practice, and the program often partners with AASHTO to ensure that the state DOTs learn about and deploy the products. Examples of NCHRP successes can be found in the *Impacts on Practice* series.¹

OTHER ACTIVITIES

In March, the AASHTO Standing Committee on Research (SCOR), which serves as the governing board for NCHRP, agreed to support a series of projects to explore the impacts of connected and automated vehicles on state and local transportation agencies. The projects are

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



Jenks briefs the first meeting of the NCHRP project panel on Incorporating Freight, Transit, and Incident Response Stakeholders into Integrated Corridor Management: Processes and Strategies for Implementation.



Mcity is a test facility for connected and automated vehicle systems at the University of Michigan. AASHTO SCOR has authorized a series of NCHRP projects on connected and automated vehicles. (Photo: University of Michigan)

investigating a strategic communications plan for connected and automated vehicle research, road markings for machine vision, the implications of automation for motor vehicle codes, dedicated lanes for connected and automated vehicles, and regional transportation planning and modeling tools that include the impacts of connected and automated vehicles.

In addition, SCOR initiated three activities:

1. **An update to the SCOR strategic plan.** The update was completed, approved in June, and posted on the SCOR–Research Advisory Committee website.²
2. **Incorporating strategic research needs into the FY 2017 call for problem statements.** The FY 2017 call, issued on July 1, 2015, encouraged the submission of problem statements in three strategic areas: resiliency, freight transportation, and transformational technologies, in addition to the statements typically developed by practitioners in AASHTO committees and member agencies, FHWA, and SCOR.
3. **Development of an implementation plan for NCHRP research results.** The plan is slated for presentation at the SCOR meeting in December 2015.

RESEARCH RESULTS

Following is a sample of the NCHRP reports published in 2015 that have particular impor-

² <http://research.transportation.org/Pages/SCORStrategicPlan.aspx>

tance to AASHTO. All reports are available on the TRB website.³ General information on all projects is available in the NCHRP Summary of Progress, December 31, 2015,⁴ and on the web.

NCHRP Reports

- NCHRP Report 797, *Guidebook on Pedestrian and Bicycle Volume Data Collection*, describes methods and technologies for counting pedestrians and bicyclists, offers guidance on developing a nonmotorized counting program and on selecting appropriate counting methods and technologies, and provides examples of how organizations have applied nonmotorized count data.
- NCHRP Report 798 examines *The Role of Planning in a 21st Century State Department of Transportation—Supporting Strategic Decision Making*.
- NCHRP Report 799, *Management Guide to Intellectual Property for State Departments of Transportation*, addresses issues related to copyrights, patents, and other intellectual property used or produced as part of an agency’s business activities.
- NCHRP Report 806, *Guide to Cross-Asset Resource Allocation and the Impact on Transportation System Performance*, provides guidance and a spreadsheet tool for applying data-driven techniques to prioritize projects, develop programs, analyze scenarios, and set targets. The tool and guidebook also offer assistance in analyzing and communicating the performance impacts of investment decisions.
- NCHRP Report 811, *Institutionalizing Safety in Transportation Planning Processes: Techniques, Tactics, and Strategies*, provides field-tested guidance on integrating safety into transportation planning and programming, as well as ways of measuring the effectiveness and success of the efforts.
- NCHRP Report 813, *A Guide to Agencywide Knowledge Management for State Departments of Transportation*, assists state transportation agencies in adopting and implementing a strategy for knowledge management—a variety of techniques for preserving and enhancing the knowledge of an organization’s employees as a productive asset.

³ www.trb.org/NCHRP/NCHRP.aspx.

⁴ <http://onlinepubs.trb.org/onlinepubs/nchrp/nchrpannual2015.pdf>.



Counting device maintenance is explored in NCHRP Report 797, *Guidebook on Pedestrian and Bicycle Volume Data Collection*. (Photo: Tony Hull, Toole Design Group)



NCHRP Syntheses

- NCHRP Synthesis 468, *Interactive Training for All-Hazards Emergency Planning, Preparation, and Response for Maintenance and Operations Field Personnel*, identifies interactive emergency training tools and resources for state DOTs and public works agencies. The report also identifies potential obstacles to implementation and develops a toolkit of relevant training and exercises.
- NCHRP Synthesis 469, *Impacts of Energy Developments on U.S. Roads and Bridges*, documents the economic impact on the nation's roads and bridges from heavy truck traffic related to energy development.
- NCHRP Synthesis 479, *Forecasting Transportation Revenue Sources: Survey of State Practices*, documents current and proposed forecasting methodologies, as well as the shortcomings reported by state DOTs. The report includes information about the types of revenue forecasted and agencies' level of satisfaction with the accuracy of the projections.
- NCHRP Synthesis 480, *Economic and Development Implications of Transportation Disinvestment*, examines methods for estimating the effects of disinvestment on the transportation system within and across modes in urban areas, regions, and nonmetropolitan areas. The report focuses on macroeconomic effects, intermodal trade-offs, and methods for informing decision making in an era of constrained resources. The report

includes information on economic forecasting and travel demand models, risk or probability models, needs models, and benefit and impact models.

NCHRP Legal Research Digest

NCHRP Legal Research Digest 65, *Liability Aspects of Pedestrian Facilities*, addresses legal claims that relate to pedestrian facilities, such as sidewalks and crosswalks, and focuses on allegations of violations of the Americans with Disabilities Act and lawsuits alleging negligence by a government agency in maintaining its facilities.

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 a subcommittee of 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 23 years, TCRP has undertaken more than 700 research studies. Details on the program's progress since 1992 can be found in the 2015 TCRP Annual Report.⁵

TCRP produced 20 publications in 2015, bringing the total to more than 620 since the program's inception. The following TCRP pub-

⁵ <http://onlinepubs.trb.org/onlinepubs/tcrp/tcrpannual2015.pdf>.



Under the direction of Sherry Little (fourth from right), the TCRP Oversight and Project Selection Committee sets research priorities for the program.



A pictogram in a blank-out sign in Los Angeles shows a side view of approaching trains, from TCRP Report 175, *Guidebook on Pedestrian Crossings of Public Transit Rail Services*. (Photo: Fitzpatrick)

lications of particular interest were completed during the year.

OPERATIONS, MAINTENANCE, AND SAFETY

- TCRP Report 174, *Improving Safety Culture in Public Transportation*, defines safety culture and identifies the key components for the public transportation industry; presents methods and tools for assessing safety culture; describes performance indicators and reporting practices; presents best practices; and provides guidelines for initiating and building a program.
- TCRP Report 175, *Guidebook on Pedestrian Crossings of Public Transit Rail Services*, presents engineering treatments to improve pedestrian safety for light rail, commuter rail, and streetcars. The guidebook addresses key pedestrian safety issues associated with public transit rail services; summarizes flowcharts for decision making about pedestrian treatments at rail crossings; presents information on 34 treatments; and includes four case studies.
- TCRP Report 177, *Preliminary Strategic Analysis of Next-Generation Fare Payment Systems for Public Transportation*, addresses the design of next-generation transit fare payment systems to improve customer experience, streamline transit system operation, and integrate transit more effectively into mobility management programs. The report presents information and solutions related to emerging technologies for expanding fare payment options.
- TCRP Report 180, *Policing and Security Practices for Small and Medium-Sized Public Transit*

Systems, responds to the specific challenges and issues associated with the security of small and medium-sized transit agencies. The report provides baseline options and identifies security countermeasures in use, prospective countermeasures, and best practices for reducing risks. The report is intended as a reference for transit agency personnel without security backgrounds who must address, perform, or supervise security activities as a part of their job.

PLANNING AND MARKETING

- TCRP Report 173, *Improving Transit Integration Among Multiple Providers*, presents a comprehensive set of guidelines and procedures for evaluating, planning, and implementing steps to integrate transit services in areas with multiple providers. The report comprises two volumes—the Transit Integration Manual and the Research Report—to guide the process of transit service integration, including tips for success.
- TCRP Report 176, *Quantifying Transit's Impact on GHG Emissions and Energy Use—The Land Use Component*, analyzes the complex interrelationships between transit and land use patterns to understand their role in



Puget Sound Regional Passenger Ferry is one of the many public transit options for travelers in the Seattle, Washington, area. TCRP Report 173, *Improving Transit Integration Among Multiple Providers*, presents guidelines and procedures to assist transit agencies in integrating services.

compact development and in reducing greenhouse gas (GHG) emissions. An Excel-based sketch modeling tool applies the findings to estimate the land use benefits of transit projects with a minimal amount of input data.

- TCRP Report 179, *Use of Web-Based Rider Feedback to Improve Public Transit Services*, provides an easy-to-use toolkit of best practices, emerging platforms, and promising approaches for customer web-based and electronic feedback to improve public transit services. Part I identifies best practices using in-house or third-party web-based and mobile platforms and provides guidance on managing feedback; Part II helps agencies select the most appropriate web-based feedback tool.

HUMAN RESOURCES

- TCRP Report 178, *A National Training and Certification Program for Transit Vehicle Maintenance Instructors*, proposes a national program for training and certifying transit bus and rail maintenance instructors. The report describes best practices in the public and private sectors to prepare and certify technical instructors, as well as the instructional delivery methods most effective for maintenance instructors.
- TCRP Report 181, *Labor–Management Partnerships for Public Transportation*, offers guidance for public transportation management and labor union leaders in establishing, managing, and improving labor–management partnerships.

Airport Cooperative Research Program

Airports present dynamic operating environments challenged with perpetual threats and



The ACRP Oversight Committee sets project priorities, defines funding levels, and identifies expected products.



Members of the ACRP panel on Airport Management Guide for Providing Aircraft Fueling Services define the scope and goals of the project.

opportunities. Airport practitioners need easy access to tools and information to help manage these and other challenges and to ensure that their airports are operating safely and efficiently. For the past 10 years, ACRP has met this vital need for resources and has provided the airport community with unbiased, proven solutions.

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 develops research publications available online at no additional cost to the industry. TRB manages the program, which is sponsored by FAA. ACRP undertakes research and other technical activities across disciplines, including airport design, construction, law, maintenance, operations, safety, policy, planning, human resources, and administration. The research fills voids in knowledge and practice, addresses persistent problems, and offers guidance on new issues to spur innovation in airport management.

ACRP has authorized 469 research projects, each scoped and guided by panels of subject-matter experts. The program 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 the challenges faced by airports. ACRP applies a grass-roots approach to engage practitioners, ensuring that the research captures the issues most relevant to the airport industry.

Through its more than 300 publications and its engagement with stakeholders, ACRP plays a key role in helping airports collaborate and share lessons learned, fulfill their environmental responsibilities, and operate safely and effi-

ciently. ACRP ensures that its 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 website⁶ also serves as a valuable tool for sharing information, offering airport practitioners easy access to all ACRP publications. Additional information on ACRP can be found in the ACRP 2015 Annual Report of Progress.⁷

PRACTICAL SOLUTIONS AND TOOLS

In ACRP's practical, hands-on tools and resources, industry stakeholders find a reliable source of information for innovating and for improving the conduct of airport business. ACRP's growing library offers software guidance, modeling tools, sample planning documents, best practices, worksheets, checklists, and more.

Maintaining safe and efficient operations in a capacity-constrained system is critical to the transportation of people and goods. ACRP resources assemble the guidance to help airport practitioners anticipate, prepare for, and implement solutions to meet new challenges involving revenue, emergency management, winter operations, wildlife mitigation, energy use, and more. Titles released in 2015 include the following:

- ACRP Report 121, *Innovative Revenue Strategies: An Airport Guide*;
- ACRP Report 122, *Innovative Airport Responses to Threatened and Endangered Species*;
- ACRP Report 123, *A Guidebook for Airport Winter Operations*;
- ACRP Report 124, *Airport Parking Garage Lighting Solutions*;
- ACRP Synthesis 60, *Airport Emergency Post-Event Recovery Practices*;
- ACRP Synthesis 62, *Cell Phone Lots at Airports*; and
- ACRP Synthesis 65, *Practices to Develop Effective Stakeholder Relationships at Smaller Airports*.

EMERGING THREATS AND OPPORTUNITIES

Management of an airport requires situational awareness and planning; ACRP publications inform practitioners about emerging threats

⁶ www.trb.org/ACRP/ACRP.aspx.

⁷ <http://onlinepubs.trb.org/onlinepubs/acrp/acrpannual2015.pdf>.



Civic Plaza concourse at Indianapolis International Airport's Midfield Terminal. Optimized concession programs are explored in ACRP Report 121, *Innovative Revenue Strategies—An Airport Guide*. (Photo: The Indianapolis Star)

and opportunities in the industry. ACRP research has shed light on issues relating to emerging threats and opportunities:

- ACRP Report 140, *Guidebook on Best Practices for Airport Cybersecurity*;
- ACRP Report 142, *Effects of Airline Industry Changes on Small- and Non-Hub Airports*; and
- ACRP Synthesis 68, *Strategies for Maintaining Air Service*.

MANAGEMENT OF SMALL AIRPORTS

ACRP research continues to resonate with the management of small airports. ACRP Report 16, *Guidebook for Managing Small Airports* (2008), is a perennial favorite and compiles information on the many issues faced by practitioners. Managers of the nation's small airports have varied backgrounds and fill many roles—for example, dealing with budgets, debris on the runway, customer service, and emergency management planning.

ACRP has produced comprehensive resources for managers of small airports, including guidance on a range of financial, administrative, operational, and technical topics. Titles added in 2015 include the following:

- ACRP Report 128, *Alternative IT Delivery Methods and Best Practices for Small Airports*;
- ACRP Report 129, *Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports*;
- ACRP Report 132, *The Role of U.S. Airports in the National Economy*;



ACRP Report 123, *A Guidebook for Airport Winter Operations*, examines effective chemical applications for ice and snow removal at airports. (Photo: Batts, Inc.)



Flight information display at the Tampa International Airport cell phone lot. ACRP Synthesis 62, *Cell Phone Lots at Airports*, presents findings from surveys of these services and facilities at North American airports. (Photo: Harriet Baskas, Stuck-atTheAirport.com)

- ACRP Report 138, *Preventative Maintenance at General Aviation Airports*; and
- ACRP Synthesis 67, *Airside Snow Removal Practices for Small Airports with Limited Budgets*.

Through engagement with stakeholders and with a well-established research process, ACRP consistently provides the airport community with relevant, valuable guidance and tools to help practitioners successfully manage their day-to-day operations, avoid common problems, and take advantage of new opportunities for growth and innovation.

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 section of freight stakeholders.⁸ Annual funding averaged \$3.4 million during SAFETEA-LU, but the Moving Ahead for Progress in the 21st Century Act (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 2015, eight projects remain. Work on six of the eight projects should be completed by early to mid-2016. The remaining two projects are in development as a result of a balance in the program funding through FY 2012. The two new projects, which will be under way in the spring of 2016, are

⁸www.trb.org/NCFRP/NCFRP.aspx.

- NCFRP Project 49, *Understanding and Using New Truck Data Sources to Address Urban Freight Challenges*; and
- NCFRP Project 50, *Freight Resiliency: Dealing with Major Cargo Traffic Diversions in National Emergencies*.

Three reports were published in 2015:

- NCFRP Report 33, *Improving Freight System Performance in Metropolitan Areas: A Planning Guide*, identifies strategies and practical solutions for public and private stakeholders to improve regional freight movement and system performance in metropolitan areas. The guide serves as a comprehensive reference, from the urban core to suburban and exurban areas, and includes a tool to aid in selecting alternatives for various problems, as well as Freight Trip Generation software that identifies problematic locations.
- NCFRP Report 34, *Evaluating Alternatives for Landside Transport of Ocean Containers*, presents a systematic method for evaluating alternatives to diesel trucks for transporting containers between deepwater ocean ports and inland destinations within 100 miles. The report reviews active inland container transport proposals, including work in Southern California on zero-emissions container movement systems, and proposes performance-based criteria reflecting the transportation, emissions, energy use, congestion relief objectives, and cost of alternative transport options. The criteria can be used to evaluate container transport technology and systems.
- NCFRP Report 35, *Implementing the Freight Transportation Data Architecture: Data Element Dictionary*, describes the research to develop a dictionary for the myriad of freight data ele-



New York City DOT's time-specific freight parking and loading zone project along the Church Avenue corridor in Brooklyn is a featured case study in NCFRP Report 33, *Improving Freight System Performance in Metropolitan Areas: A Planning Guide*.



NCFRP Report 34, *Evaluating Alternatives for Landside Transport of Ocean Containers*, explores the electric cargo conveyor system and other landside container transportation alternatives.



ments in use. The research identifies differences in data element definitions and offers methods for bridging the differences. The U.S. DOT's Bureau of Transportation Statistics will host a product of this research, a searchable and sustainable web-based freight data element dictionary for transportation analysis.⁹

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.¹⁰ Annual funding averaged \$1.1 million, but MAP-21 did not provide funding beyond FY 2012.

The program will be discontinued with the completion of the remaining active project, initiated in July 2014 and expected by early 2016. The project findings will be published as HMCRP Report 15, *Evaluation of Small Quantities of Class 3 and Class 9 Hazmat Materials in Transportation*.

National Cooperative Rail Research Program

Authorized by the Passenger Rail Investment and Improvement Act, NCRRP was initiated under TRB management in 2012 with the

⁹ A temporary link to the freight data dictionary web application is available at <http://freightdatadictionary.com>.

¹⁰ www.trb.org/HMCRP/HMCRP.aspx.

sponsorship of FRA.¹¹ The program carries out applied research on problems that address the following:

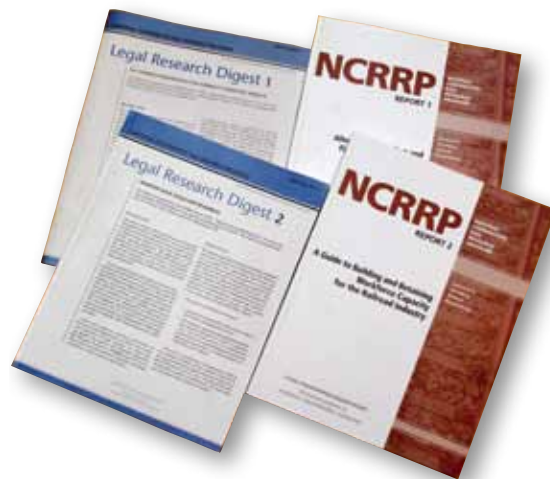
- Intercity rail passenger and freight rail services, including technologies and operating speeds, enhanced rail systems and infrastructure, and new high-speed, wheel-on-rail systems;
- Ways to expand the transport of international trade by rail, enhance the efficiency of intermodal interchange at ports and other terminals, and increase the capacity and availability of rail service for seasonal freight;
- The interconnectedness of commuter rail, passenger rail, freight rail, and other rail networks; and
- 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.

PUBLICATIONS

The NCRRP Oversight Committee, appointed by the Secretary of Transportation, selected initial research topics with one year of funding at \$5.0 million. During 2015, two NCRRP reports were released:

- NCRRP Report 1, *Alternative Funding and Financing Mechanisms for Passenger and Freight Rail Projects*, identifies alternative funding and financing tools for passenger and freight rail project development, including capital investments, operations, and maintenance.

¹¹ www.trb.org/NCRRP/NCRRP.aspx.



Transportation of Class 3 and Class 9 hazardous materials is the subject of HMCRP Report 15. (Photo: Ben Ostrowsky)



Railroad workers handle signal cables in the Saint Paul Union Depot in Minnesota. Workforce capacity is an area of focus in the National Cooperative Rail Research Program. (Photo: Michael Hicks)

nance. The report has two parts: a guidebook for practitioners and a report summary for policy and decision makers. The guidebook assesses financing and funding requirements, reviews options, and examines implementation of a range of projects and services. The summary highlights the issues and policy considerations of paying for rail projects and services that have funding gaps.

- NCRRP Report 2, *A Guide to Building and Retaining Workforce Capacity for the Railroad Industry*, provides a comprehensive review and analysis of employee characteristics in the railroad industry, including past trends and current forecasts and a detailed gap analysis of employee supply and demand, to formulate workforce competency requirements. The report presents a strategy for improving employee retention and develops recommendations for enhancing educational programs to attract new employees to the industry who can meet the competency requirements. The models focus on performance needs instead of on credentials. The report offers guidance for responding to the long-term need for building an effective workforce to support the growth of the passenger and freight rail industry.

In addition, NCRRP published Legal Research Digest 1, *Buy America Requirements for Federally Funded Rail Projects*, and Legal Research Digest 2, *Railroad Legal Issues and Resources*.

PROJECTS IN PROGRESS

Research projects under way include the following:

- Project 2-01, Comparison of Passenger Rail Energy Consumption with Competing Modes;
- Project 3-01, Intercity Passenger Rail Service and Development Guide;
- Project 3-02, Intercity Passenger Rail in the Context of Dynamic Travel Markets;
- Project 7-01, Alternative Financing Approaches for Passenger and Freight Rail Projects;
- Project 7-02, Developing Multistate Institutions to Implement Intercity Passenger Rail;
- Project 7-03, Inventory of Federal and State Passenger and Freight Rail Programs; and
- Project 12-01–Task 2, Legal Aspects of Rail Programs: Issues That Emerge When Public Entities Acquire a Real Property Interest in Rail Lines.

All are scheduled for publication by mid-2016. The pending reauthorization process and appropriations will determine NCRRP's continuation.

STAFF NEWS

SREYASHI ROY joined the staff as an editor in July 2015.

DAN MAGNOLIA and **NATASHA DONAWA** joined the staff as Senior Program Assistants in July and August 2015, respectively.

JOSEPH SNELL was promoted to Administrative Coordinator, Cooperative Research Programs, in November.



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 of Sciences, Engineering, and Medicine.

Financial Management

The division manages the contracts and grants that support TRB's work, prepares budgets for continuing operations and individual projects, and controls expenditures. TRB's total expenditures are estimated at \$93 million for the calendar year 2015 (see graph, page 50). A statement of income and expenditures appears on pages 48–49.

Affiliate and Sponsor Services

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

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

of TRB computer-based information services. Individual and student affiliates also may subscribe to publications at a substantially reduced rate through a selective distribution program.

Organizational affiliates include government agencies, academic organizations, private organizations, and consultants committed to the advancement of knowledge about the nature and performance of transportation systems and system components. In addition to the range of benefits for individual affiliates, organizational affiliates receive most publications at no cost and complimentary registrations—as

(continued on page 50)



Gary J. Walker
Director
Finance and Business
Operations



Greg Nadeau, FHWA (*center*), addresses audience questions at a session with U.S. DOT leadership. TRB's core technical activities are supported by sponsors such as U.S. DOT. (Photo: Risdon Photography)

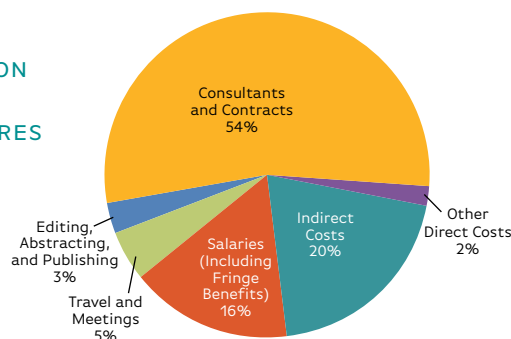
STATEMENT OF ACTIVITIES

FUNDING SUPPORT BY PROGRAM AND EXPENDITURES

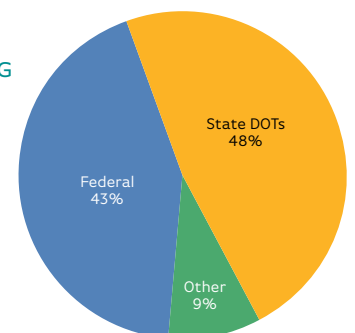
Calendar Years 2014 and 2015

	2014 (ACTUAL)	2015 (PROJECTED)*
Core Technical Activities		
State Highway and Transportation Departments (State DOTs)	\$6,973,000	\$6,973,000
Federal Government		
Federal Highway Administration (FHWA)	1,900,000	1,900,000
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	204,000	208,000
Bureau of Indian Affairs, Department of the Interior	80,000	80,000
Federal Motor Carrier Safety Administration (FMCSA)	75,000	75,000
Federal Aviation Administration (FAA)	65,000	65,000
Federal Railroad Administration (FRA)	65,000	65,000
U.S. Air Force Civil Engineer Center	65,000	65,000
U.S. Army Corps of Engineers	65,000	75,000
Subtotal, Federal Government	\$3,069,000	\$3,083,000
Other		
American Public Transportation Association	65,000	65,000
Association of American Railroads	65,000	65,000
South Coast Air Quality Management District, California Fees and Sales	5,618,000	5,730,000
Subtotal, Other	\$5,813,000	\$5,925,000
Total, Core Technical Activities	\$15,855,000	\$15,981,000
Marine Board Core Program		
U.S. Coast Guard	75,000	75,000
U.S. Army Corps of Engineers	65,000	75,000
National Oceanic and Atmospheric Administration	40,000	40,000
Bureau of Safety and Environmental Enforcement	30,000	30,000
Maritime Administration	17,000	19,000
U.S. Navy	12,000	12,000
Total, Marine Board Core Program	\$239,000	\$251,000
Cooperative Research Programs (CRP)		
National Cooperative Highway Research Program (State DOTs)	33,041,000	34,400,000
Airport Cooperative Research Program (FAA)	13,090,000	14,736,000
Transit Cooperative Research Program (FTA)	4,504,000	3,694,000
National Cooperative Freight Research Program (OST-R)	2,294,000	1,520,000
National Cooperative Rail Research Program (FRA)	1,612,000	1,595,000
Hazardous Materials Cooperative Research Program (Pipeline and Hazardous Materials Safety Administration)	220,000	296,000
Total, Cooperative Research Programs	\$54,761,000	\$56,241,000

DISTRIBUTION OF TRB EXPENDITURES



TRB FUNDING SUPPORT



	2014 (ACTUAL)	2015 (PROJECTED)*
Strategic Highway Research Program 2 (SHRP 2)	\$29,239,000	\$4,409,000
SHRP 2 Safety Data Phase 1	0	3,955,000
Continuing Programs		
Innovations Deserving Exploratory Analysis (IDEA)		
NCHRP IDEA (State DOTs)	1,032,000	1,249,000
Transit IDEA (FTA)	699,000	416,000
Safety IDEA (FRA and FMCSA)	331,000	224,000
Subtotal, IDEA Programs	\$2,062,000	\$1,889,000
Synthesis Programs		
NCHRP Synthesis (State DOTs)	1,831,000	1,790,000
ACRP Synthesis (FAA)	976,000	1,300,000
TCRP Synthesis (FTA)	603,000	549,000
Subtotal, Synthesis Programs	\$3,410,000	\$3,639,000
Legal Programs		
NCHRP Legal (State DOTs)	340,000	331,000
TCRP Legal (FTA)	234,000	172,000
ACRP Legal (FAA)	312,000	9,000
Subtotal, Legal Programs	\$886,000	\$512,000
Total, Continuing Programs	\$6,358,000	\$6,040,000
Policy Studies	\$3,848,000	\$3,323,000
Conferences and Workshops	\$2,284,000	\$2,388,000
TRB TOTAL	\$112,584,000	\$88,633,000
Sources of Funds		
Federal	61,450,000	39,970,000
State DOTs	43,217,000	44,743,000
Other	7,917,000	7,875,000
	<u>\$112,584,000</u>	<u>\$92,588,000</u>
Expenditures by Major Cost Category		
Salaries (including fringe benefits)	16,019,000	14,420,000
Travel and Meetings	4,993,000	5,074,000
Editing, Abstracting, Publishing	2,858,000	2,735,000
Consultants and Contracts	66,169,000	49,875,000
Other Direct Costs	2,672,000	2,141,000
Indirect Costs	19,581,000	18,832,000
Total Expenditures	\$112,292,000	\$93,077,000

TRB Reserve Fund

Fund balance, end of previous fiscal year	\$17,501,000	\$17,793,000
Plus (minus) current fiscal year income over (under) expenditures	292,000	-489,000
Balance, current fiscal year	\$17,793,000	\$17,304,000

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 2015 comprises actual data through October and estimates for the rest of the year.



Finance and Business Operations Director Gary Walker advises the Executive Committee on TRB's financial status at the 2015 Annual Meeting. (Photo: Risdon Photography)

(continued from page 47)

well as marketing and exhibit opportunities—at the TRB Annual Meeting. Organizational affiliate contributions range from \$4,850 to \$11,875, depending on the level of benefits selected.

In addition to the many benefits offered to an organizational affiliate, TRB sustaining affiliates are also entitled to complimentary registration for any webinar offered by TRB. In 2015, TRB conducted more than 70 webinars on a variety of transportation-related topics, with more than 26,000 registered attendees. The webinars offered 90 Professional Development Hours for professional engineers, and certified planners could 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. Each sponsor places a representative on the TRB Executive Committee. (See pages 58–59 for a list of TRB sponsors and sustaining affiliates.)

Publications Sales and Distribution

TRB's timely distribution of publications disseminates the results of transportation research and technology worldwide. In addition to hard-



TRB's Cooperative Research Programs produced 140 publications in 2015. (Photo: Risdon Photography)

copy books, TRB releases almost all 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 a select area of interest. A complete listing of TRB publications issued from January 1 through December 31, 2015, appears on pages 54–57.

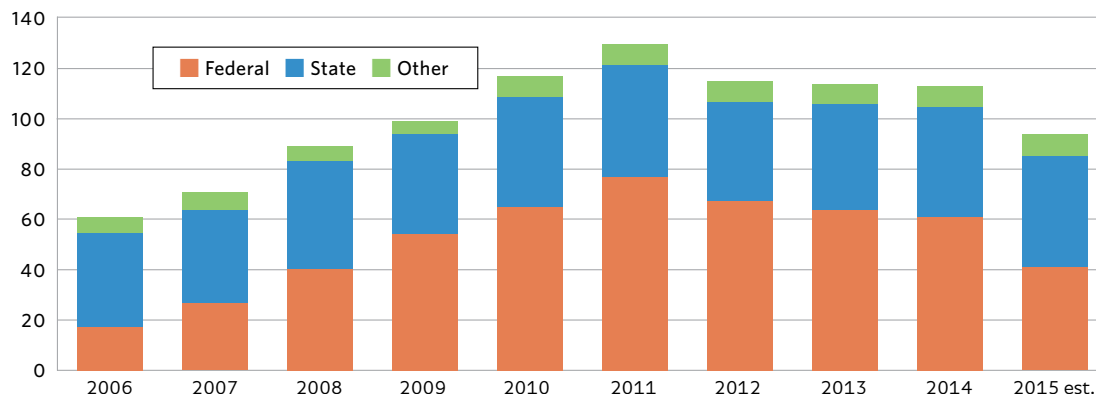
STAFF NEWS

ANDREA KISINER retired as Manager of Publication Sales and Affiliate Services after 16 years of outstanding service.



Andrea Kisiner acknowledges colleagues at her retirement reception in September.

TRB ACTIVITY LEVEL BY YEAR



TRB CONFERENCES AND WORKSHOPS

(JANUARY 1, 2015– DECEMBER 31, 2015)

January

- 11–15** TRB 94th Annual Meeting
- 29–30** Shifting International Trade Routes Workshop

February

- 15–18** Geosynthetics Conference*

March

- 23–26** Joint Rail Conference*

April

- 13–14** Moving Active Transportation to Higher Ground: Opportunities for Accelerating the Assessment of Health Impacts
- 16–17** Ferry Safety and Technology: Design and Operations Conference
- 19–22** American Association of State Highway and Transportation Officials (AASHTO) Geographic Information Systems (GIS) for Transportation Symposium*
- 21–23** International Highway Technology Summit: Cities, Transportation, and People*
- 26–28** International Bridge, Tunnel and Turnpike Association Transportation Finance and Road Usage Charging Conference

May

- 7–8** Transportation for Sustainability: International Conference
- 10–15** International Choice Modeling Conference*
- 17–19** 9th National Aviation System Planning Symposium
- 17–21** 15th TRB National Transportation Planning Applications Conference
- 18–22** 9th International Conference on Managing Pavement Assets*
- 24–26** 5th International Symposium on Nanotechnology in Construction*
- 26–29** 2nd International Conference on Public–Private Partnerships*

June

- 1–2** 5th International Conference on Transportation Systems Performance Measurement and Data
- 7–10** American Society of Civil Engineers Airfield and Highway Pavements Conference
- 10–12** 6th International Conference on Bituminous Mixtures and Pavements*
- 22–24** 5th International Symposium on Highway Geometric Design*
- 24–26** Summer Meeting and Conference of Freight Systems and Marine Committees

July

- 6–9** Southern African Transportation Conference (SATC)*
- 12–15** 11th International Conference on Low-Volume Roads

- 18–22** 54th Annual Workshop on Transportation Law
- 19–23** 14th AASHTO–TRB Conference on Transportation Infrastructure Maintenance and Operations*
- 20–24** Automated Vehicles Symposium *
- 28–31** TRANSED: 14th International Conference on Mobility and Transport for Elderly and Disabled People*

August

- 2–5** International Symposium on Systematic Approaches to Environmental Sustainability in Transportation
- 9–12** 44th Annual International Congress and Exposition on Noise Control Engineering*
- 9–13** 9th International Conference on Road and Airfield Pavement Technology
- 24–25** 8th New York City Bridge Conference*

September

- 1–3** Transit GIS Conference*
- 7–9** 3rd Conference on Smart Monitoring, Assessment, and Rehabilitation of Civil Structures*
- 14** Geotechnical Risk Assessment and Performance Management
- 15–17** International Symposium on Nondestructive Testing in Civil Engineering*
- 16–18** International Conference on Transportation System Resilience to Climate Change and Extreme Weather Events
- 20–23** Environmental Analysis in Transportation Summer Workshop
- 20–24** International Conference on Ecology and Transportation
- 21–25** 11th National Conference on Access Management*
- 21–25** 4th International Orthotropic Bridge Conference*
- 28–30** European Transport Conference*

October

- 6–8** 5th International Road Safety and Simulation Conference*
- 26–28** International Symposium on Frontiers of Road and Airport Engineering*
- 29** Commodity Flow Survey Workshop

November

- 4–5** 9th University Transportation Center Spotlight Conference: Connected and Automated Vehicles
- 5–6** 2nd National Roadway Safety Culture Summit
- 11–15** Disrupting Mobility: A Global Summit Investigating Sustainable Futures*
- 15–17** 13th American Public Transportation Association–TRB Joint National Light Rail and Streetcars Conference: Transforming Urban Areas
- 15–18** 15th Pan-American Conference on Soil Mechanics and Geotechnical Engineering*

December

- 7–8** National Accelerated Bridge Construction Conference*
- 9–10** Advancing Freight Fluidity Performance Measures Workshop
- 17–20** 3rd Conference of the Transportation Research Group of India*

* TRB was cosponsor of the meeting.

TRB WEBINARS, WEBCASTS, AND RECORDED SESSIONS

(JANUARY 1, 2015– DECEMBER 31, 2015)

January

- 8** Organizational Approaches and Analytic Tools to Improve Operations Capability
- 21** Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events
- 21** Second Strategic Highway Research Program (SHRP 2) Tuesdays: Freight Demand Modeling and Data Improvement Strategic Plan
- 29** Tools for Pedestrian and Bicycle Volume Data Collection

February

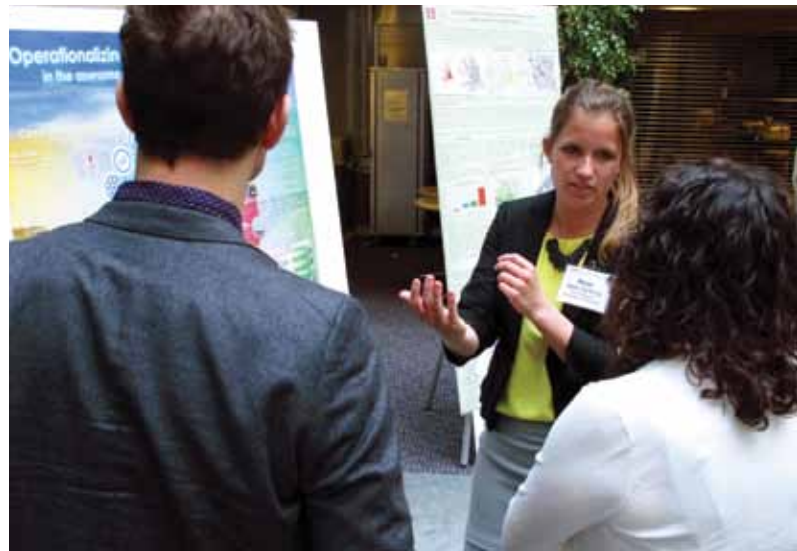
- 9** Maintenance Training and Certification Programs
- 11** Planning for Safety Considerations on Airfields
- 17** Decisions Are Made on Tuesday Mornings: The Role and Requirements for Data in the Decision-Making Process
- 24** Factors That Influence Air Service Development
- 26** Performance of Warm-Mix Asphalt Technologies: Stage I—Moisture Susceptibility

March

- 5** The Impact of Regulatory Compliance and Through-the-Fence Operations on Small Airports
- 11** Long-Term Pavement Performance Program InfoPave: Visualization to Facilitate Extraction of Information Out of Data
- 17** Next Generation Air Transportation System: Research Update
- 18** Developing Reliability-Based Bridge Inspection Practices
- 24** Model for Publishing and Linking Transportation Datasets and Reports
- 30** Considerations for the Selection of Continuously Reinforced Concrete Pavement (CRCP) for Projects

April

- 1** Pothole Patching: One More Time
- 2** Debt Finance Practices for Surface Transportation: Current Issues and Research Needs
- 8** Rigid Pavement Preservation: Research Results



- 9** Safety and Financial Impacts of Airport Winter Operations
- 14** Achieving Sustainable Transportation Through Collaboration
- 15** Creative Ways to Consider Funding Future Transportation
- 29** New Energy Technologies at Airports

May

- 6** Tools for Analysis of Capacity and Efficient Flow for Roundabout Design, Part 1
- 13** Effective Practices for the Protection of Transportation Infrastructure from Cyber Incidents
- 18** Use and Implementation of the Federal Highway Administration Stochastic Empirical Loading and Dilution Model: Oregon and Massachusetts
- 21** Risk Management Applications for All Airports

June

- 1** 20 Years of Advances in Roundabout Design, Roundabout Construction Sequencing, and the Case for Illumination of Roundabouts
- 3** Mechanistic–Empirical Design and Details for CRCP
- 8** Green Infrastructure in the Transportation Sector
- 11** Tools for Analysis of Capacity and Efficient Flow for Roundabout Design, Part 2
- 16** Funding and Managing the U.S. Inland Waterways System: What Policymakers Need to Know
- 17** Case Studies in Performance-Based Analysis of Geometric Design
- 18** Business Planning Approaches for Disruptive or Irregular Airport Operations
- 24** Materials for Unbound Granular Pavement Layers

July

- 14** Tools for Analysis of Capacity and Efficient Flow for Roundabout Design, Part 3

- 21 Basics of Asphalt Modeling, Part 3: Viscoelastic Models to Decipher and Unify Asphalt Stiffness Measures
- 27 Accessing the SHRP 2 Safety Data: User Responsibilities and Access Procedures
- 28 Resources for Evaluating Airport Sustainability Practices
- 29 Using Winter Severity Indices for Winter Maintenance Performance Management

August

- 6 Using the New Research in Progress Project Entry Interface
- 12 Best Practices and Strategies for Assessing Economic Implications of Disinvestment or Right-Sizing Scenarios
- 13 Transportation Revenue Forecasting in the States
- 18 Flexible Pavement Preservation: Research Results
- 19 Innovative Intersections for Pedestrians and Bicycles
- 24 Mechanisms and Mitigation Strategies for Reflective Cracking in Rehabilitated Pavements
- 26 Connected-Vehicle Tracking to Improve Operational Efficiency
- 27 Guidance and Considerations for Improving Airport Terminal Amenities
- 31 Seismic Pushover Analysis Using the American Association of State Highway and Transportation Officials' *Guide Specifications for Load and Resistance Factor Design Seismic Bridge Design*

September

- 2 Methods to Identify and Map State Freight Economic Corridors Based on Freight-Intensive Land Uses
- 3 Cold Central Plant Recycling: A Proven Paving Approach Using 100% Recycled Materials
- 8 Bridging the Gap: Pillars to Build a New Future
- 9 Airport Wildlife Management
- 10 Superpave5®: Constructing Asphalt Pavement with Road Air Voids Equal to Design Air Voids
- 16 Multimodality in Major Cities: Urban Success Stories
- 22 Topics of Special Concern for General Aviation Airports
- 24 Putting Transportation Asset Management into Practice in a State Department of Transportation (DOT)
- 28 More Tools from the Geotechnical Toolbox: Case Histories
- 29 Information Standardization Practices for Digital Project Delivery
- 30 Effective Literature Searches and Reviews: Tools and Tricks for the Trade

October

- 2 Modulus-Based Construction Specification for Compaction of Earthwork and Unbound Aggregate
- 5 New Concepts in Controlling Asphalt Strain for Perpetual Pavement Design
- 7 Strain-Based Structural Health Monitoring for an Informed Extension of Bridge Lifetime
- 14 Asphalt Pavement Crack-Sealing Processes, Materials, and Installation Procedures
- 15 The Vital Role of Operations and Maintenance in Supporting and Enhancing Sustainability

- 19 Effect of Wide-Base Tires on Pavement Damage: National Study, Part 2
- Promoting Careers in Freight Transportation
- 20 Sign and Pavement Marking Retroreflectivity: Measurement Basics, Safety Benefits, Advancements—State DOT Perspective
- 21 Legal Aspects of Airport Programs
- 22 Reducing Costs by Streamlining the Selection and Bidding of Alternative Highway Drainage Pipe Systems
- 27 Sustainability as an Organizing Principle for Transportation Agencies
- 30 Using the U.S. Domestic Scan Program's Model for Quick Peer-to-Peer Innovation Transfer

November

- 4 Signal Timing Manual, Second Edition
- 5 Airport Cooperative Research Program (ACRP): Guidance for Understanding WiFi Disruptions and Cyber Security at Airports
- 10 Performance Measures for the Marine Transportation System
- 12 Work Zone Speed Management
- 17 Effective Practices for the Protection of Transit Infrastructure from Cyber Incidents
- 18 Current Practices to Set a Disadvantaged Business Enterprise Goal on Design-Build and Other Alternative Delivery Projects
- 19 Applications of Adaptive Lighting in Roadways
- 30 Safety of Runway Operations During Construction Works

December

- 1 ACRP: Planning for Climate Change Adaptation at Airports
- 2 Practical Techniques for Successfully Communicating Technical Topics
- 3 Nonnuclear Methods for Compaction Control of Unbound Materials
- 7 Current Practices for Design and Load Testing of Large-Diameter, Open-End Driven Piles
- 8 Economic and Ecological Effects of Roadside Mowing
- 9 Future Directions for Multimodal Research and Practice
- 10 Nanotechnology: New Methods and Materials Coming to a DOT near You

TRB PUBLICATIONS

(JANUARY 1, 2015 – DECEMBER 31, 2015)

Transportation Research Records

- 2471 Public-Sector Aviation: Graduate Research Award Papers
- 2472 Low-Volume Roads, Volume 1
- 2473 Low-Volume Roads, Volume 2
- 2474 Low-Volume Roads, Volume 3
- 2475 Railroads, Volume 1: Freight and Passenger Systems
- 2476 Railroads, Volume 2: Track, Equipment, and Safety
- 2477 Freight Systems, Volume 1: Economics, Planning, and Logistics
- 2478 Freight Systems, Volume 2: Urban Freight and Trucking
- 2479 Marine Transportation, Port Operations, and Intermodal Freight
- 2480 Research and Education
- 2481 Maintenance and Preservation
- 2482 Maintenance Services, Transportation Weather, and Winter Maintenance
- 2483 Highway Capacity and Quality of Service
- 2484 Freeway Operations; Regional Systems Management and Operations; Managed Lanes
- 2485 Visibility and Work Zone Traffic Controls
- 2486 Operational Effects of Geometrics and Access Management
- 2487 Traffic Signal Systems, Volume 1
- 2488 Traffic Signal Systems, Volume 2
- 2489 Intelligent Transportation Systems and Connected and Automated Vehicles
- 2490 Traffic Flow Theory and Characteristics, Volume 1
- 2491 Traffic Flow Theory and Characteristics, Volume 2
- 2492 Traffic Control Devices
- 2493 Travel Demand Forecasting, Volume 1
- 2494 Travel Demand Forecasting, Volume 2
- 2495 Travel Behavior, Volume 1
- 2496 Travel Behavior, Volume 2
- 2497 Network Modeling, Volume 1
- 2498 Network Modeling, Volume 2
- 2499 Planning, Volume 1
- 2500 Planning, Volume 2
- 2501 Aviation
- 2502 Environment and Energy
- 2503 Air Quality
- 2504 Construction
- 2505 Asphalt Materials and Mixtures, Volume 1
- 2506 Asphalt Materials and Mixtures, Volume 2
- 2507 Asphalt Materials and Mixtures, Volume 3
- 2508 Concrete Materials
- 2509 Geomaterials
- 2510 Geology and Properties of Earth Materials
- 2511 Soil Mechanics
- 2512 Developing Countries
- 2513 Safety Management and School Transportation
- 2514 Safety Data, Analysis, and Evaluation
- 2515 Statistical Methods and Highway Safety Performance
- 2516 Operator Education and Regulation; Safe Mobility for Older Persons; Traffic Law Enforcement; Alcohol and Other Drugs
- 2517 Truck and Bus Safety; Roundabouts
- 2518 Human Performance, User Information, and Simulation
- 2519 Pedestrians
- 2520 Bicycles and Motorcycles
- 2521 Highway Design
- 2522 Structures
- 2523 Pavement Management, Volume 1
- 2524 Pavement Management, Volume 2
- 2525 Pavement Management, Volume 3
- 2526 Data and Methods to Understand Travel
- 2527 Traffic Monitoring: Automobiles, Trucks, Bicycles, and Pedestrians
- 2528 Information Technology, Geospatial Information, and Advanced Computing
- 2529 Managing Performance and Assets; Freight Data and Visualization
- 2530 Revenue, Finance, Pricing, and Economics
- 2531 Socioeconomic, Sustainability, Health, and Human Factors
- 2532 Systems Resilience and Climate Change
- 2533 Public Transportation, Volume 1: Urban and Rural Bus Systems
- 2534 Public Transportation, Volume 2: Passenger Rail and Terminals
- 2535 Public Transportation, Volume 3: Management, Performance, and Quality of Service
- 2536 Public Transportation, Volume 4: Paratransit and Emerging Technologies
- 2537 Public Transportation, Volume 5: Planning, Accessibility, and Parking
- 2538 Public Transportation, Volume 6: Marketing, Fare Policy, and Transformative Data Trends

Special Reports¹

- 315 Funding and Managing the U.S. Inland Waterways System: What Policy Makers Need to Know
- 316 Evaluation of the Federal Railroad Administration Research and Development Program
- 317 The Essential Federal Role in Highway Research and Innovation
- 318 Modernizing Freight Rail Regulation
- 319 Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services

Conference Proceedings²

- 52 Towards Road Transport Automation Opportunities in Public-Private Collaboration

Conference Proceedings on the Web (online)

- 16 The Role of Freight Transportation in Economic Competitiveness: Summary of the 8th University Transportation Centers Spotlight Conference
- 17 Application of Real-Time Monitoring of Offshore Oil and Gas Operations: Workshop Report

Letter Reports (online)

- Research and Technology Coordination Committee Letter Report 6, January 21
- Long-Term Bridge Performance Committee Letter Report 5, February 20
- Evaluation of the Federal Railroad Administration Research and Development Program, March 16
- Review of the U.S. Department of Transportation (DOT) Report on Connected Vehicle Initiative Communications Systems Deployment, April 28
- Long-Term Pavement Performance Committee Letter Report 36, August 3
- Review of U.S. DOT Truck Size and Weight Study: Second Report—Review of Technical Analyses and Findings, October 5

Transportation Research E-Circulars (online)

- 193 Surface Transportation Financing: Innovation, Experimentation, and Exploration
- 194 Literature Searches and Literature Reviews for Transportation Research Projects: How to Search, Where to Search, and How to Put It All Together—Current Practices
- 195 Traffic and Transportation Simulation: Looking Back and Looking Ahead—Celebrating 50 Years of Traffic Flow Theory, A Workshop
- 196 Improving Safety Programs Through Data Governance and Data Business Planning: A Peer Exchange
- 197 Celebrating 50 Years of Traffic Flow Theory: A Symposium

- 198 Moisture Damage to Hot-Mix Asphalt Mixtures: Synopsis of a Workshop
- 199 Geotechnical Research Deployment: How Organizations Encourage Innovation—Lessons Learned
- 200 Transportation Asset Management from Plans to Practice: A Workshop for State Practitioners
- 201 Linking the Past to the Future: Lessons from History About Emerging Technology
- 202 Transportation Investment for Economic Development: Making the Case—A Peer Exchange
- 203 Transportation for Sustainability: An International Conference

TR News

Nos. 296-300

Online Newsletters

Intercity Rail Passenger Systems, No. 23
 TRB Transportation Research E-Newsletter

Airport Cooperation Research Program (ACRP) Reports²

- 118 Integrating Aviation and Passenger Rail Planning (with CD-157)
- 121 Innovative Revenue Strategies—An Airport Guide
- 122 Innovative Airport Responses to Threatened and Endangered Species (with CD-160)
- 123 A Guidebook for Airport Winter Operations
- 124 Airport Parking Garage Lighting Solutions
- 125 Balancing Airport Stormwater and Bird Hazard Management (with CD-159)
- 126 A Guidebook for Increasing Diverse and Small Business Participation in Airport Business Opportunities
- 127 A Guidebook for Mitigating Disruptive WiFi Interference at Airports
- 128 Alternative IT Delivery Methods and Best Practices for Small Airports
- 129 Evaluating Methods for Counting Aircraft Operations at Nontowered Airports
- 130 Guidebook for Airport Terminal Restroom Planning and Design (with CD-164)
- 131 A Guidebook for Safety Risk Management for Airports
- 132 The Role of U.S. Airports in the National Economy
- 133 Best Practices Guidebook for Preparing Lead Emission Inventories from Piston-Powered Aircraft with the Emission Inventory Analysis Tool (with CD-167)
- 134 Applying Whole Effluent Toxicity Testing to Aircraft Deicing Runoff
- 135 Understanding Airport Air Quality and Public Health Studies Related to Airports
- 136 Implementing Integrated Self-Service at Airports (with CD-168)
- 137 Guidebook for Advancing Collaborative Decision Making (CDM) at Airports
- 138 Preventative Maintenance at General Aviation Airports, Volume 1: Primer, Volume 2: Guidebook (with CD-170)
- 139 Optimizing Airport Building Operations and Maintenance Through Retrocommissioning: A Whole-Systems Approach (with CD-169)
- 140 Guidebook on Best Practices for Airport Cybersecurity (with CD-171)
- 141 Renewable Energy as an Airport Revenue Source
- 142 Effects of Airline Industry Changes on Small- and Non-Hub Airports
- 143 Guidebook for Air Cargo Facility Planning and Development (with CD-174)
- 144 Unmanned Aircraft Systems (UAS) at Airports: A Primer
- 145 Applying an SMS Approach to Wildlife Hazard Management (with CD-173)
- 146 Commercial Ground Transportation at Airports: Best Practices
- 147 Climate Change Adaptation Planning: Risk Assessment for Airports (with CD-175)
- 148 LED Airfield Lighting System Operation and Maintenance

- 149 Improving Ground Support Equipment Operational Data for Airport Emissions Modeling

ACRP Syntheses of Airport Practice²

- 60 Airport Emergency Post-Event Recovery Practices
- 61 Practices in Preserving and Developing Public-Use Seaplane Bases
- 62 Cell Phone Lots at Airports
- 63 Overview of Airport Fueling System Operations
- 64 Issues Related to Accommodating Animals Traveling Through Airports
- 65 Practices to Develop Effective Stakeholder Relationships at Smaller Airports
- 66 Lessons Learned from Airport Sustainability Plans
- 67 Airside Snow Removal Practices for Small Airports with Limited Budgets
- 68 Strategies for Maintaining Air Service

ACRP Research Results Digest²

- 22 Synthesis of Information Related to Airport Practices

ACRP Legal Research Digests²

- 23 A Guide for Compliance with Grant Agreements Obligations to Provide Reasonable Access to an AIP-Funded Public Use General Aviation Airport
- 24 Sovereign Immunity for Public Airport Operators
- 25 Analysis of Federal Laws, Regulations, Case Law, and Survey of Existing Airport NPDES Permits Regarding Tenant–Operator Responsibilities Under NPDES and Stormwater Management BMPS Under Owner/Airport’s Operating Permits
- 26 Regulations Affecting the Exercise of First Amendment Activities at Airports

ACRP Web-Only Documents (online)

- 21 Quantifying Aircraft Lead Emissions at Airports
- 22 Passenger Value of Time, Benefit–Cost Analysis, and Airport Capital Investment Decisions
 - Vol. 1: Guidebook for Valuing User Time Savings in Airport Capital Investment Decision Analysis
 - Vol. 2: Final Report
 - Vol. 3: Appendix A, Background Research, and Appendix B, Stated Preference Survey
- 23 Guidance on Successful Computer Maintenance Management System (CMMS) Selection and Practices
- 24 Air Cargo Facility Planning and Development—Final Report
- 25 Commercial Ground Transportation at Airports: Best Practices—Appendices C to H

National Cooperative Freight Research Program (NCFRP) Reports²

- 33 Improving Freight System Performance in Metropolitan Areas: A Planning Guide
- 34 Evaluating Alternatives for Landside Transport of Ocean Containers
- 35 Implementing the Freight Transportation Data Architecture: Data Element Dictionary

National Cooperative Highway Research Program (NCHRP) Reports³

- 797 Guidebook on Pedestrian and Bicycle Volume Data Collection
- 798 The Role of Planning in a 21st-Century State Department of Transportation—Supporting Strategic Decision Making
- 799 Management Guide to Intellectual Property for State Departments of Transportation
- 800 Successful Practices in GIS-Based Asset Management
- 801 Proposed Practice for Alternative Bidding of Highway Drainage Systems
- 802 Volume Reduction of Highway Runoff in Urban Areas: Guidance Manual (with CD-162)

- 803 Pedestrian and Bicycle Traffic Along Existing Roads—
ActiveTrans Priority Tool Guidebook (with CD-163)
- 804 Guidebook for Designing and Managing Rights-of-Way for
Carbon Sequestration and Biomass Generation (with CD-165)
- 805 Improved Test Methods for Specific Gravity and Absorption of
Coarse and Fine Aggregate
- 806 Guide to Cross-Asset Resource Allocation and the Impact on
Transportation System Performance (with CD-166)
- 807 Properties of Foamed Asphalt for Warm-Mix Asphalt
Applications
- 808 Guidebook on Alternative Quality Management Systems for
Highway Construction
- 809 Environmental Performance Measures for State Departments of
Transportation
- 810 Consideration of Preservation in Pavement Design and Analysis
Procedures
- 811 Institutionalizing Safety in Transportation Planning Processes:
Techniques, Tactics, and Strategies
- 812 Signal Timing Manual: Second Edition
- 813 A Guide to Agencywide Knowledge Management for State
Departments of Transportation
- 814 Data to Support Transportation Agency Business Needs: A Self-
Assessment Guide
- 815 Short-Term Laboratory Conditioning of Asphalt Mixtures
- 816 Guide for the Preservation of Highway Tunnel Systems

NCHRP Syntheses of Highway Practice³

- 467 Visualization of Geotechnical Data for Hazard Mitigation and
Disaster Response
- 468 Interactive Training for All-Hazards Emergency Planning,
Preparation, and Response for Maintenance and Operations
Field Personnel
- 469 Impacts of Energy Developments on U.S. Roads and Bridges
- 470 Maintenance Quality Assurance Field Inspection Practices
- 471 Practices for Developing Transparent Best Value Selection
Procedures
- 472 FEMA and FHWA Emergency Relief Funds Reimbursements to
State Departments of Transportation
- 473 Indefinite Delivery–Indefinite Quantity Contracting Practices
- 474 Service Life of Culverts
- 475 Fiber Additives in Asphalt Mixtures
- 476 Practices for Permitting Superheavy Load Movements on
Highway Pavements
- 477 Methods and Practices on Reduction and Elimination of Asphalt
Mix Segregation
- 478 Design and Load Testing of Large-Diameter, Open-Ended Driven
Piles
- 479 Forecasting Transportation Revenue Sources: Survey of State
Practices
- 480 Economic and Development Implications of Transportation
Disinvestment
- 481 Current Practices to Set and Monitor DBE Goals on Design–Build
Projects and Other Alternative Project Delivery Methods
- 482 Work Zone Speed Management

NCHRP Research Results Digest³

- 391 Modulus-Based Construction Specification for Compaction of
Earthwork and Unbound Aggregate
- 392 Continuing Project to Synthesize Information on Highway
Problems: 2015
- 393 Selected Indirect Benefits of State Investment in Public
Transportation
- 394 Estimating the Long-Term Impacts of MAP-21 on the Nation's
Local Rural Transit Bus Infrastructure
- 395 Claims Related to Stormwater Discharges
- 396 Approach to Level-of-Service Target Setting for Highway Assets
- 397 Independent Cost Estimates for Design and Construction of
Transit Facilities in Rural and Small Urban Areas

NCHRP Legal Research Digests³

- 64 Legal Aspect of Environmental Permitting in the Emergency
Response Environment
- 65 Liability Aspects of Pedestrian Facilities
- 66 Due Diligence for Insurance Coverage in Transportation
Construction Contracts
- 67 Permissible Changes in Scope of Work for Construction Projects

NCHRP Web-Only Documents (online)

- 209 Volume Reduction of Highway Runoff in Urban Areas: Final
Report and NCHRP Report 802, Appendices C through F
- 210 Input Guidelines for Motor Vehicle Emissions Simulator Model
– Vol. 1: Practitioners' Handbook: Regional Level Inputs
– Vol. 2: Practitioners' Handbook: Project Level Inputs
– Vol. 3: Final Report
- 211 Close to Home: A Handbook for Transportation-Efficient Growth
in Small Communities and Rural Areas
- 212 Alternative Quality Management Systems for Highway
Construction
- 213 Potential MUTCD Criteria for Selecting the Type of Control for
Unsignalized Intersections
- 214 Transportation Agency Self-Assessment of Data to Support
Business Needs: Final Research Report
- 216 Emergency Exit Signs and Marking Systems for Highway Tunnels
- 217 Precision and Bias Statements for AASHTO Standard Methods of
Test TP 98 and TP 99

National Cooperative Rail Research Program (NCRRP) Reports²

- 1 Alternative Funding and Financing Mechanisms for Passenger
and Freight Rail Projects: Report Summary
- 2 A Guide to Building and Retaining Workforce Capacity for the
Railroad Industry
- 3 Comparison of Passenger Rail Energy Consumption with
Competing Modes (with CD-176)

NCRRP Legal Research Digests²

- 1 Buy America Requirements for Federally Funded Rail Projects
- 2 Railroad Legal Issues and Resources (with CD-172)

Transit Cooperative Research Program (TCRP) Reports (online)

- 173 Improving Transit Integration Among Multiple Providers
– Vol. 1: Transit Integration Manual
– Vol. 2: Research Report
- 174 Improving Safety Culture in Public Transportation
- 175 Guidebook on Pedestrian Crossings of Public Transit Rail
Services
- 176 Quantifying Transit's Impact on GHG Emissions and Energy
Use—The Land Use Component
- 177 Preliminary Strategic Analysis of Next-Generation Fare Payment
Systems for Public Transportation
- 178 A National Training and Certification Program for Transit Vehicle
Maintenance Instructors
- 179 Use of Web-Based Rider Feedback to Improve Public Transit
Services
- 180 Policing and Security Practices for Small- and Medium-Sized
Public Transit Systems
- 181 Labor–Management Partnerships for Public Transportation
– Volume 1: Toolkit
– Volume 2: Final Report

TCRP Syntheses of Transit Practice²

- 114 Critical Incident Management and Clearance Practices for Rail
Transit
- 115 Open Data: Challenges and Opportunities for Transit Agencies
- 116 Practices for Establishing ADA Paratransit Eligibility
Assessment Facilities
- 117 Better On-Street Bus Stops
- 118 Practices for Utility Coordination in Transit Projects

TCRP Research Results Digest²

110 Synthesis of Information Related to Transit Problems

TCRP Web-Only Documents (online)

63 Treatments Used at Pedestrian Crossings of Public Transit Rail Services
64 Performance Based Track Geometry, Phase 2
65 Wheel Profile Maintenance Guidelines

Cooperative Research Program CD-ROMs

20 Selected Studies in Transportation Law, Volume 5: Transit Law—2014 Supplement
157 Air–Rail Diversion Model (ACRP Report 118)
159 Bird Strike Risk Analysis and Stormwater Management Decision Tool (ACRP Report 125)
160 Airport Toolbox for ACRP Report 122
161 Estimating Takeoff Thrust Settings for Airport Emissions Inventories
162 NCHRP Report 802—Volume Performance Tool
163 ActiveTrans Priority Tool Programmed Spreadsheet and Contractor's Final Report to Accompany NCHRP Report 803
164 Appendixes for the Guidebook for Airport Terminal Restroom Planning and Design (ACRP Report 130)
165 The Right-of-Way Carbon Sequestration and Bioenergy Feedstock Feasibility Toolkit (NCHRP Report 804)
166 Prototype Resource Allocation Assessment Tool (NCHRP Report 806)
167 Emission Inventory Analysis Tool (ACRP Report 133)
168 Integrated Self-Service Tools for ACRP Report 136
169 Spreadsheet Tool and Appendices to ACRP Report 139
170 Checklists and PowerPoint Template for ACRP Report 138
171 Multimedia Material Supporting the Guidebook on Best Practices for Airport Cybersecurity (ACRP Report 140)
172 Railroad Legal Issues and Resources (NCRRP LRD 2)
173 WHaMRAT Tool, User Guide, and Quick Start Guides (ACRP Report 145)
174 Air Cargo Facility Planning Model (ACRP Report 143)
175 ACROS Tool and Other Resources to Accompany (ACRP Report 147)
176 The Multimodal Passenger Simulation Model: A Spreadsheet Tool for Comparing Passenger Rail Energy Consumption with Competing Modes (NCRRP Report 3)

Selected Studies in Transportation Law (CD-ROM)

Volume 5: Transit Law—2014 Supplement (CD-20)

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

12.1 Effect of Public–Private Partnerships and Nontraditional Procurement Processes on Highway Planning, Environmental Review, and Collaborative Decision Making

40A.1 Integration of National-Level Geospatial Ecological Tools and Data
46.1 Activity-Based Travel Demand Models: A Primer

SHRP 2 Reliability Research Reports¹

7.3 Further Development of the Safety and Congestion Relationship for Urban Freeways
9B.1 Bridges for Service Life Beyond 100 Years: Service Limit State Design
13A.1 Designing the Archive for SHRP 2 Reliability and Reliability-Related Data
32C.1 Post-Course Assessment and Reporting Tool for Trainers and Traffic Incident Management (TIM) Responders Using the SHRP 2 Interdisciplinary Traffic Incident Management Curriculum
33.1 Validation of Urban Freeway Models
35A.1 Value of Travel Time Reliability in Transportation Decision Making: Proof of Concept—Portland, Oregon, Metro
35B.1 Value of Travel Time Reliability in Transportation Decision Making: Proof of Concept—Maryland

SHRP 2 Renewal Research Reports¹

1A.1 Technologies to Support the Storage, Retrieval, and Use of 3-D Utility Location Data
1C.1 Innovations to Locate Stacked or Deep Utilities
9.1 Developing the "Guide for the Process of Managing Risk on Rapid Renewal Projects"
10.2 Guide to Project Management Strategies for Complex Projects

SHRP 2 Safety Research Reports (online)

6.1 Naturalistic Driving Study: Technical Coordination and Quality Control
6.2 Naturalistic Driving Study: Collecting Data on Cell Phone Use
7.1 Naturalistic Driving Study: Field Data Collection
8.1 Analysis of Naturalistic Driving Study Data: Safer Glances, Driver Inattention, and Crash Risk
31.1 Naturalistic Driving Study: Descriptive Comparison of the Study Sample with National Data
31.2 Naturalistic Driving Study: Alcohol Sensor Performance
31.3 Naturalistic Driving Study: Linking the Study Data to the Roadway Information Database

SHRP 2 Letter Report (online)

Committee on Implementing the Research Results of SHRP 2 Letter Report, January 20, 2015

¹ Available in print and online.

² Entire series available in print and online.

³ Publications released since 2001 available in print and online.

INSTITUTIONAL AFFILIATES

SPONSORS

State Transportation Departments

(Listed with TRB Representatives)

Alabama Department of Transportation

Juanita Owens

Alaska Department of Transportation and Public Facilities

Carolyn Morehouse

Arizona Department of Transportation

Anne Ellis

Arkansas State Highway and Transportation Department

Elisha C. Wright-Kehner

California Department of Transportation

Coco A. Briseno

Colorado Department of Transportation

Amanullah Mommand

Connecticut Department of Transportation

Michael Connors

Delaware Department of Transportation

Drew Boyce

District Department of Transportation

Soumya S. Dey

Florida Department of Transportation

James D. Dockstader

Georgia Department of Transportation

David Jared

Hawaii Department of Transportation

Casey C. Abe

Idaho Transportation Department

Ned E. Parrish

Illinois Department of Transportation

Megan Swanson

Indiana Department of Transportation

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