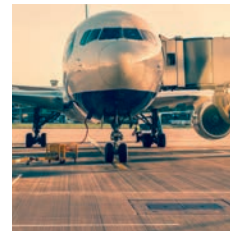


TRANSPORTATION RESEARCH BOARD

2018 ANNUAL REPORT



The National Academies of
SCIENCES • ENGINEERING • MEDICINE

IN MEMORIAM



Michael R. Salamone
ACRP Manager, 2006–2018

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

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. Marcia McNutt 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 National 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.nationalacademies.org.



RESEARCH, COLLABORATION, AND ADVICE ON CRITICAL TRANSPORTATION ISSUES

For nearly a century, the nation's leaders and the global transportation professional community have turned to the Transportation Research Board (TRB) for research, collaboration, and advice on emerging and critical transportation issues.

TRB provides leadership in transportation innovation through timely, evidence-based policy advice, research, and information exchange, conducted within a setting that is independent, objective, interdisciplinary, and multimodal. As one of seven program divisions within the National Academies of Sciences, Engineering, and Medicine, TRB draws upon the expertise of members and staff of the National Academies and leverages the Academies' credibility. TRB engages a vast and diverse pool of transportation experts willing to offer their knowledge to TRB's programs and studies.

As TRB works to identify critical issues and anticipate transportation challenges, it leads

the way advancing and conducting research and policy analysis to help address issues and meet these challenges. TRB promotes knowledge creation and dissemination, especially of innovative practices and technologies in the transportation sector, and provides timely and informed advice on transportation and transportation-related issues to decision makers and others responsible for multimodal transportation systems. TRB also functions as an effective, impartial forum for the exchange of knowledge and information on transportation and its relationship with social, economic, environmental, and other issues and fosters collaboration on transportation research, education, and technology transfer at international, national, regional, state, and local levels; across public and private sectors; and with transportation providers, customers, and other stakeholders.

TRB contributes to the professional development of individuals working in transportation and to the education and enhanced diversity of the pool of future transportation professionals. By engaging in communications efforts, TRB enhances awareness of transportation issues and research and of their contributions to innovation and progress in transportation, and adds to the public's understanding of transportation and its significance to society.

It is an exciting time to be involved in transportation policy and research. Technological transformations are leading



(Left to right:) Katherine F. Turnbull, 2018 Executive Committee Chair; Neil Pedersen, TRB Executive Director; and Victoria A. Arroyo, Executive Committee Vice Chair. (Photo: Risdon Photography)



Jennifer Cortina, University of Texas Rio Grande Valley, describes methods for determining the contract time of highway projects. Cortina was one of 21 Minority Student Fellows who presented research at the 2018 Transportation Research Board (TRB) Annual Meeting. (Photo: Risdon Photography)

to significant changes in transportation, raising questions of how these changes should take place, related consumer and business expectations, economics, and the implications of these changes on society. These transformations directly affect broader societal goals related to safety and security, economic vitality and growth, quality of life, sustainability, equity in providing opportunity, and public health. These changes have significant effects in both the private and public sectors, at all levels of government, and internationally. There never has been a time in which TRB's role in providing policy advice, conducting research, and disseminating information has been more important and needed.

This annual report summarizes TRB's accomplishments in each of its major program areas and how TRB has served the nation and the global transportation professional community during 2018. For more details about the activities of each division, see pages 14–46.

Organization

The National Academies of Sciences, Engineering, and Medicine is a private, nonprofit institution that provides expert advice on some of the most pressing challenges facing the nation and the world. The National Academies' work helps shape sound policies, inform public opinion, and advance the pursuit of science, engineering, and medicine. The National Academies provide independent, objective analysis and advice to the nation; conduct activities to solve complex problems; and inform policy decisions on matters related to science, engineering, and medicine. As one of the program divisions within the National Academies, TRB has access to Academies



Susan Hanson is outgoing chair and Chris Hendrickson is incoming chair of the TRB Division Committee, which provides oversight to TRB activities. (Photos: Risdon Photography)



Wildlife crossing on Montana's Flathead Reservation. Decreasing the environmental impact of transportation is one of the sustainability goals addressed by TRB. (Photo: Djembayz, Flickr)

members—some of the foremost experts in the world on matters related to science, engineering, and medicine, as well as to staff experts from other program divisions.

TRB's direct link to the National Academies is through the TRB Division Committee, which provides oversight of TRB activities. Among the committee's focus areas are ensuring that TRB reports meet National Academies' standards for quality, objectivity, and independence; that committee chairs and members have no conflicts of interest; and that committee chairs and members represent diverse backgrounds and interests. Susan Hanson, professor emerita of Clark University and a member of the National Academy of Sciences, has served as chair of the TRB Division Committee for the past 6 years. In January 2019, Chris Hendrickson, a professor at Carnegie Mellon University and a member of the National Academy of Engineering, will succeed her as chair.

TRB's Executive Committee provides strategic direction to and oversight of TRB's programs and activities. Among the 26 appointed members of the Executive Committee are executives from both the public and private sectors and from all modes of transportation, prominent academics involved in transportation, and members of the National Academies. The 20 ex officio members of the Executive Committee are top executives from TRB's sponsoring agencies.

Periodically, to provide guidance to TRB's programs and committees, the Executive Committee adopts a strategic plan for TRB and identifies critical issues in transportation. Both the Division Committee and the Executive Committee are supported by staff from the TRB Executive Office.

The 220 standing technical committees and task forces of TRB cover all modes and a wide range of issues in transportation. Each committee is comprised of approximately 30 to

35 members as well as many other volunteers who serve as friends of the committee. These committees are responsible for developing the program for TRB's Annual Meeting, held each January in Washington, D.C., along with programs for the conferences and workshops that TRB sponsors or cosponsors. The standing committees also review the more than 6,000 papers submitted for presentation at the Annual Meeting, publication in the *Transportation Research Record: Journal of the Transportation Research Board*, or both. These communities of practice meet to discuss current and emerging issues related to their subject area and to develop problem statements for consideration by TRB and other research programs.

In 2018, 4,963 individuals filled 6,160 positions on TRB's standing committees and task forces, with several thousand additional volunteers participating as friends of the committees and task forces. The Technical Activities Council, chaired by Hyun-A Park, provides oversight of the committees and task forces, which are organized into 11 groups by topic. TRB's Technical Activities Division provides staff support for the committees and task forces and their programs and activities. Ann Brach is Technical Activities Division director.

TRB conducts research through its four Cooperative Research Programs (CRPs). The

content of the research programs is selected and administered by oversight committees, which consist of the ultimate users of the research results: practitioners as well as policy and standards developers throughout the world. CRP research is conducted by contractors; each project is overseen by a panel of experts who also provide peer review. TRB uses open competition to procure contractors, ensuring the quality of the work and the involvement of a wide array of researchers and research organizations.

The Special Committee on Research and Innovation of the American Association of State Highway and Transportation Officials provides oversight to the National Cooperative Highway Research Program (NCHRP). The Transit Cooperative Research Program (TCRP) is governed by the TCRP Oversight and Project Selection Committee, and oversight of the Airport Cooperative Research Program (ACRP) is provided by the ACRP Oversight Committee. A subcommittee of the board of the Governors Highway Safety Association guides the Behavioral Traffic Safety Cooperative Research Program (BTSCRCP). More than 3,200 volunteers serve on CRP oversight committees and project panels. Christopher Hedges is director of TRB's Cooperative Research Program Division, which provides staff support for these programs.



TAC chair Hyun-A Park updates the Executive Committee on the activities of TRB's standing committees. (Photo: Risdon Photography)



The 2018 Technical Activities Council (TAC) provides oversight and strategic direction to the nearly 5,000 volunteers on TRB's standing committees and task forces. (Photo: Risdon Photography)

As part of the National Academies of Sciences, Engineering, and Medicine, TRB conducts advisory studies in accordance with procedures of the National Academies. These studies are performed by committees of volunteer experts and supported by staff in TRB's Consensus and Advisory Studies Division. Each study committee is responsible for producing one or more reports that are subject to the Academies report review process and that contain evidence-based conclusions and recommendations. TRB conducts policy studies requested by Congress or executive branch agencies as well as self-initiated studies funded by TRB. In addition, several standing committees advise the research and development programs of various modal administrations in the U.S. Department of Transportation. The director of the Consensus and Advisory Studies Division is Tom Menzies.



Tom Menzies, Director of the Consensus and Advisory Studies Division.

The Marine Board is an internationally recognized source of expertise on maritime transportation and marine engineering and technology. In response to requests from sponsoring agencies or on its own initiative, the Marine Board provides evaluations of and advice on the ability of the nation's marine and maritime industries to operate safely and efficiently and in an environmentally responsible manner. The board also identifies research needs and facilitates the exchange of information on new technologies, laws and regulations, economics, the environment, and other issues affecting the marine transportation system, port operations, coastal engineering, and marine governance. For the past three



The American Association of State Highway and Transportation Officials Special Committee on Research and Innovation guides the work of the National Cooperative Highway Research Program.

years, the Marine Board was chaired by Mary Brooks of Dalhousie University; in November 2018, Edward Comstock, an independent consultant with expertise in naval architecture, became Marine Board chair.

TRB's Executive Office provides strategic direction and oversight of staff activities and is responsible for many administrative, communications, and information technology functions. The Administration and Finance Division manages TRB's finances, including budgeting, revenue management, and contracts.

Critical Issues

TRB deals with a broad portfolio of issues ranging from strategic policy matters to narrow



The Marine Board identifies needs in maritime transportation, engineering, and technology and facilitates information exchange on economics, environment, and legislation.



technical topics. Over the past few years, the TRB Executive Committee emphasized the strategic focus areas of transformational technologies, resilience, and the relationship between transportation and public health. These topics have been featured in many sessions at recent TRB Annual Meetings, conferences and workshops, published papers, research projects, and studies.

Of particular note is the Automated Vehicles Symposium, jointly sponsored each summer by TRB and the Association for Unmanned Vehicle Systems International. More than 1,700 people attended the 2018 symposium, which provided a forum for presentation and discussion of a full range of issues associated with connected and automated vehicles (CAVs) and with shared mobility services. TRB also has established a roundtable, called the “National Academies–TRB Forum: Preparing for Automated Vehicles and Shared Mobility,” that regularly convenes experts from government, the research community, and the private sector to discuss issues associated with the deployment of CAV technologies and related research needs.

TRB has conducted many research projects related to transportation system resilience and hosts many Annual Meeting sessions on this important subject. As severe weather events continue to disrupt the transportation system, transportation agencies are paying greater attention to the topic of resilience. In October, TRB cosponsored the Transportation Resilience Innovations Summit. In addition to sharing the latest developments and best practices in transportation systems resilience, the conference helped inform the development of a research roadmap that will address gaps in knowledge and procedures.

TRB also collaborates with the Health and Medicine Division of the National Academies to address issues associated with the relationship between transportation and public health: traffic safety–related health issues, access to public health facilities, the effects of transportation-generated air and noise pollution, and the transmission of communicable diseases via the transportation system. TRB features these issues at its Annual Meeting and in published papers, and CRP is developing a research roadmap in health and transportation. An event of particular note was a 2018 ACRP workshop on the role of airports in reducing the transmission of communicable diseases.

Approximately every 5 years, the TRB Executive Committee produces *Critical Issues in Transportation*, a document that helps inform policy makers, the general public, and TRB stakeholders what the Executive Committee considers the most important issues in transportation. The next version of *Critical Issues in Transportation* is being disseminated in conjunction with the 2019 TRB Annual Meeting. The Executive Committee has identified 12 topic areas—each with several specific subtopics—that highlight important issues that will take prominence in transportation over the next 10 to 20 years, with the goal of encouraging TRB’s programs and activities to address these issues in the next 5 years. The topic areas are



TRB’s collaboration with the Health and Medicine Division of the National Academies includes published papers, workshops, and such events as the ACRP Insight Event, Airport Roles in Reducing Transmission of Communicable Diseases, in March.



Nearly 14,000 people from around the world attended the 2018 Annual Meeting, the signature convening event of TRB. The sessions and workshops covered policy, practice, and research in all transportation modes. (Photo: Risdon Photography)

- Transformational technologies and services,
- Serving a growing and shifting population,
- Energy and sustainability,
- Resilience and security,
- Safety and public health,
- Equity,
- Governance,
- System performance and asset management,
- Funding and finance,
- Goods movement,
- Institutional and workforce capacity, and
- Research and innovation.

Convening Activities

TRB's signature event is its Annual Meeting, held each year in Washington, D.C., in January. More than 13,700 people attended the 2018 Annual Meeting, with participants nearly evenly divided among professionals from academia, government, and the private sector. Seventeen percent of attendees came from outside the United States.

The more than 800 sessions and workshops at the Annual Meeting covered a broad range of transportation-related topics. All of TRB's 220 committees and task forces also met during the Annual Meeting; most conducted meetings

at other times during the year as well. In 2018, TRB sponsored 24 conferences and workshops and cosponsored another 27.

TRB also produced 100 live webinars and eight prerecorded webinars in 2018, with an estimated 22,000 total participants. This program has been proven effective in making information on current and emerging topics available to TRB stakeholders without participants having to travel to the Annual Meeting, a conference, or a workshop. The Annual Meeting, some TRB conferences and workshops, and most of TRB's webinars also offer continuing education credits for engineers and planners to meet certification requirements.

TRB also has increasingly used workshops to help develop its research agenda on emerging and strategic issues and to generate early products as part of its consensus study process.

Research

TRB has a broad portfolio of research managed through its Cooperative Research Programs. All the CRPs focus on applied research that is useful to practitioners in the field, and all have oversight committees, primarily consisting of research users, that select projects and provide oversight and strategic advice to the TRB staff managing the programs. The oldest and largest of the CRP programs is NCHRP, funded by state departments of transportation (DOTs). The other three programs—ACRP, TCRP, and BTSCRIP, a new program started in 2018—are all funded by Congress. Research organizations, selected by each CRP project's oversight panel via a competitive process, conduct the research in each of these programs. CRP programs had 300 active research projects and completed more than 100 projects in 2018. Many of these products were featured in TRB's webinar program.

TRB also curates and maintains the largest transportation research database in the world. The TRID database has more than 1.4 million records on virtually any topic related to transportation and includes not only completed research reports and articles but also research in progress and problem statements for potential research. One of the responsibilities of TRB's standing technical committees is to develop research problem statements that can be used by TRB's CRPs as well as by other research programs in the United States and around the world.

Publications

Each year TRB publishes approximately 900 articles in its journal, the *Transportation Research Record: Journal of the Transportation Research Board* (TRR). Each summer, TRB issues a call for papers; about 6,000 papers are submitted and peer reviewed by standing technical committees. Approximately half of these papers are selected for presentation at the TRB Annual Meeting and approximately 15% of the submitted papers are selected to be published in the TRR. In 2018, TRB engaged Sage Publications to perform the editing, publication, marketing, and distribution of the TRR. Working with Sage should enable faster publication of papers as well as more-extensive marketing and distribution.

In addition to the TRR, TRB publishes the bimonthly publication *TR News*, featuring timely articles on subjects of interest to the TRB stakeholder community, as well as Special Reports, CRP research products, Transportation Research E-Circulars, Conference Proceedings, and miscellaneous publications.

Advising

The Consensus and Advisory Studies Division issued a number of reports in 2018, several in fulfillment of congressional mandates. In response to a provision in the Fixing America's Surface Transportation (FAST) Act of 2015, a committee advised on whether transit agencies should be allowed to shield from litigation the records generated by their safety management programs. Another committee, tasked with

studying the safety of propane pipeline distribution systems, recommended ways to improve the regulation of these systems in line with the risks they pose. Another FAST Act study examined the challenges that lie ahead in preparing the Interstate Highway System for the growing and shifting demands of the 21st century. The study committee called for a national campaign to renew and modernize the system, executed via a dedicated federal construction program.

One committee, formed to advise the Federal Transit Administration (FTA) regularly on its research and development program, released a report in the form of a “strength, weaknesses, opportunities, and threats” assessment of FTA’s efforts to develop a roadmap for transit automation research. A similar committee advising the Federal Highway Administration’s (FHWA’s) Office of Research, Development, and Technology issued a report recommending ways to develop a more strategic research program and to coordinate and partner with state DOTs, other modal agencies, and the private sector. A committee created to advise the U.S. Coast Guard on its ship stability regulations published a report identifying options for making the regulations more coherent, consistent, and functional by ship builders, designers, operators, and enforcement personnel.

Inclusion and Diversity

In January 2018, the TRB Executive Committee adopted an inclusion and diversity strategic plan. The Executive Committee recognized that an inclusive and diverse environment enhances innovation and creativity in all areas of TRB and is important for cultivating an equitable and supportive atmosphere. As a matter of policy, TRB seeks to engage a pool of transportation stakeholders that is representative of the diverse transportation



An early meeting of the Future Interstate Study Committee. The study recommended actions needed to upgrade and restore the National Highway System to the demands of the 21st century.

workforce and of the greater population that TRB serves. The plan includes strategies to create a more inclusive environment and to increase participation by underrepresented groups in TRB's committees and panels and among TRB contractors and staff.

The plan also focuses on how TRB can better address issues of diversity and equity in its programs and activities. The degree to which various groups are underrepresented varies by program—and even within programs—but applies to minorities, women, persons with disabilities, and young professionals. To ensure successful implementation, the Executive Committee created a Special Committee on the Implementation of the TRB Inclusion and Diversity Strategic Plan. Chaired by Carol Lewis, Texas Southern University, this special committee is monitoring and facilitating actions proactively to ensure progress in this important area.

One strategy is to increase awareness of and participation in TRB among transportation-related and other organizations that traditionally have a more diverse membership than TRB. In 2018, TRB signed memoranda of understanding with the Council on Minority Transportation Officials and with the Women's Transportation Seminar. The memoranda contain provisions for TRB to partner more closely with these organizations.

International Activities

The TRB Executive Committee also adopted a new strategic plan for international activities in



A welcome session for Minority Student Fellows at the 2018 Annual Meeting. Ensuring inclusion and diversity across all aspects of TRB is part of the Board's strategic plan to broaden perspectives, enhance innovation, and increase participation. (Photo: Risdon Photography)

2018, proactively encouraging TRB to increase international participation in its activities, to leverage bilateral international cooperative benefits through joint convening activities, to support new joint international activities, and to enter into memoranda of understanding with international transportation organizations. TRB jointly sponsored many international conferences and workshops during 2018 and has signed memoranda of understanding with several international transportation organizations. TRB also proactively seeks opportunities for twinned research with organizations from other nations. By conducting activities with international partners and involving participants from across the globe, TRB can benefit and can share all that it has to offer.

Communications

TRB is expanding its reach by adding subscribers to its newsletter and increasing engagement with its social media followers. TRB now reaches 70,000 subscribers each week with the E-Newsletter and interacts with nearly 21,000 followers on Twitter, 7,500 on Facebook, and 5,100 on LinkedIn. TRB also is producing 90-second videos to help promote meetings and publications on these social media channels.

In addition to its digital communications, TRB is increasing its partnerships with other transportation agencies and organizations. Whether via memoranda of understanding, conference exhibits, or presentations at other



The TRB communications team produced a video to promote meetings and publications.

organizations, TRB uses in-person and online networks to share information.

Plans for TRB's Centennial

TRB turns 100 on November 11, 2020. In April 2018, the TRB Centennial Task Force developed a Centennial Celebration plan that established the goals for the celebration as well as a primary set of activities to help promote and commemorate the 100th anniversary of TRB.

The goal of the TRB's Centennial Celebration is to promote the value of transportation research and TRB's critical role in the process. In addition, TRB will strive to use the centennial as an opportunity to recognize and honor volunteers, sponsors, major contributors, and staff; highlight TRB's accomplishments and its sponsors' roles in those accomplishments; celebrate and promote the TRB community; and elicit pride in TRB participation.

The Centennial Celebration includes a website, brochure, videos, centennial booths at both the 2020 and 2021 Annual Meetings, and a roaming exhibit. Perhaps the most visible and longest-lasting legacy of the anniversary program will be a book on TRB's first 100 years, documenting the extraordinary impacts of TRB in promoting innovation through research. The book will be available to all full-meeting registrants of the 2020 TRB Annual Meeting.

TRB's Finances

TRB's financial statement for 2018, which shows its revenue sources and expenditures, appears on pages 10 and 11.

TRB's core program consists of its convening activities, publications, and library services. Total revenues for the core program in 2018 are estimated to be \$16.1 million, with total expenditures estimated at \$15.8 million. State DOTs funded 48% (\$7.6 million) of total core program expenditures; federal agencies, 15% (\$2.4 million, with FHWA supplying more than half of total federal funds); other sponsors, 1% (\$0.2 million); and TRB sales and fees, 36% (\$5.7 million). Another \$1.4 million came from conference and workshop fees and was used to cover the majority of the costs associated with these activities.

In 2017, the TRB Executive Committee approved a new Global Affiliate program, which allows organizations that wish to help financially support TRB to participate at one of six different levels in exchange for involvement



Sarah Jo Peterson speaks about the history of TRB at the Annual Meeting. Peterson is writing a book on TRB's first 100 years for its upcoming centennial celebration. (Photo: Risdon Photography)

in various programs and recognition for their support. In its first 12 months, this program raised \$0.7 million.

Expenditures for all CRP-funded activities in 2018 are estimated to be \$62.8 million. The largest portion of CRP program funding goes to NCHRP (\$41.6 million from state DOTs), followed by ACRP (\$15 million from the Federal Aviation Administration), TCRP (\$5.2 million from FTA), and BTSCR (\$0.3 million from the National Highway Traffic Safety Administration).

TRB's expenditures on the Second Strategic Highway Research Program are estimated to be \$4.6 million in 2018. These funds come from FHWA.

Expenditures for TRB's advisory studies are estimated to be \$4.4 million in 2018 and come from each individual study's sponsors, the vast majority of which (95%) are federal agencies.

Total expenditures for all of TRB's programs in 2018 are estimated to be \$90.4 million: 54% from state DOTs, 36% from federal sources, and 10% from other sources.

TRB is ending 2018 in good financial condition and currently is projected to end 2019 in good financial shape. A great deal of uncertainty is associated with future federal funding, however—both in 2020, during the last year of the current surface transportation authorization legislation, and in 2021, when a new authorization act is scheduled to be enacted. Recognizing the uncertainty, the Executive Committee and TRB staff are starting contingency planning for this possibility.

STATEMENT OF ACTIVITIES

Funding Support by Program and Expenditures, Calendar Years 2017 and 2018

	2017 (Actual)	2018 (Projected)*
Core Technical Activities		
State Highway and Transportation Departments (State DOTs)	\$7,395,000	\$7,563,000
Federal Government		
Federal Highway Administration (FHWA)	1,450,000	1,450,000
Office of the Assistant Secretary of Transportation for Research and Technology (OST-R)	300,000	100,000
Federal Transit Administration (FTA)	250,000	250,000
National Highway Traffic Safety Administration (NHTSA)	212,000	70,000
Department of the Interior	85,000	85,000
Federal Motor Carrier Safety Administration (FMCSA)	75,000	75,000
Department of Energy (DOE)	65,000	70,000
Environmental Protection Agency (EPA)	65,000	70,000
Federal Aviation Administration (FAA)	65,000	70,000
Federal Railroad Administration (FRA)	65,000	70,000
U.S. Air Force Civil Engineer Center	65,000	70,000
U.S. Army Corps of Engineers	75,000	0
Subtotal, Federal Government	\$2,772,000	\$2,380,000
Other		
American Public Transportation Association	65,000	70,000
Association of American Railroads	65,000	70,000
California Air Resources Board	65,000	70,000
Fees and Sales	5,872,000	5,950,000
Subtotal, Other	\$6,067,000	\$6,160,000
Total, Core Technical Activities	\$16,234,000	\$16,103,000
Marine Board Core Program		
U.S. Coast Guard	75,000	75,000
U.S. Army Corps of Engineers	75,000	75,000
National Oceanic & Atmospheric Administration	40,000	40,000
Bureau of Safety and Environmental Enforcement	30,000	30,000
Maritime Administration	19,000	19,000
U.S. Navy	12,000	12,000
Total, Marine Board Core Program	\$251,000	\$251,000
Cooperative Research Programs (CRP)		
National Cooperative Highway Research Program (State DOTs)	38,203,000	41,636,000
Airport Cooperative Research Program (FAA)	15,288,000	15,047,000
Transit Cooperative Research Program (FTA)	5,618,000	5,232,000
National Cooperative Freight Research Program (OST-R)	847,000	564,000
National Cooperative Rail Research Program (FRA)	45,000	1,000
Behavioral Traffic Safety Cooperative Research Program (Governors Highway Safety Administration, NHTSA)	42,000	330,000
Hazardous Materials Cooperative Research Program (Pipeline and Hazardous Materials Safety Administration)	49,000	35,000
Total, Cooperative Research Programs	\$60,092,000	\$62,845,000

* Calendar Year 2018 comprises actual data through October and estimates for the rest of the year.

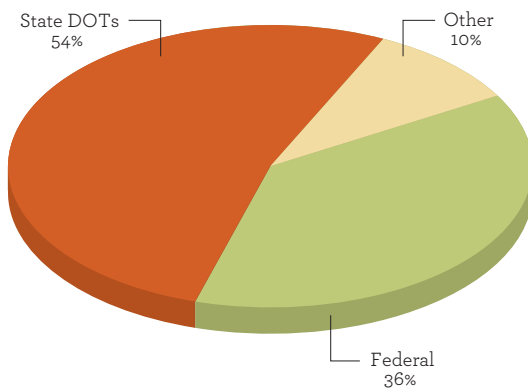
	2017 (Actual)	2018 (Projected)*
Rail Safety IDEA Program	\$436,000	\$227,000
Strategic Highway Research Program 2 Safety Data Phase 1	\$4,464,000	\$4,571,000
Policy Studies	\$4,935,000	\$4,401,000
Conferences and Workshops	\$1,626,000	\$2,050,000
TRB TOTAL	\$88,038,000	\$90,448,000
Sources of Funds		
Federal	34,326,000	33,111,000
State DOTs	45,598,000	49,199,000
Other	8,114,000	8,138,000
	\$88,038,000	\$90,448,000
Expenditures by Major Cost Category		
Salaries (including fringe benefits)	15,180,000	15,534,000
Travel and Meetings	4,708,000	5,166,000
Editing, Abstracting, and Publishing	1,944,000	1,653,000
Consultants and Contracts	45,979,000	46,724,000
Other Direct Costs	1,907,000	1,894,000
Indirect Costs	17,913,000	19,212,000
Total Expenditures	\$87,631,000	\$90,183,000

TRB Reserve Fund

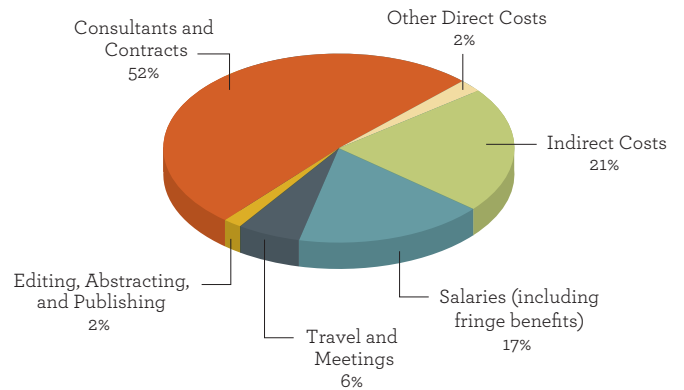
Fund balance, end of previous fiscal year	\$16,734,000	\$17,141,000
Plus (minus) current fiscal year income over (under) expenditures	407,000	265,000
Balance, current fiscal year	\$17,141,000	\$17,406,000

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.

TRB Funding Support



Distribution of TRB Expenditures



TRANSPORTATION RESEARCH BOARD

Chair: Katherine F. Turnbull, Executive Associate Director and Research Scientist, Texas A&M Transportation Institute, College Station

Vice Chair: 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.

Executive Director: Neil J. Pedersen, Transportation Research Board

Scott E. Bennett, Director, Arkansas Department of Transportation, Little Rock

Carlos Braceras, Executive Director, Utah Department of Transportation, Salt Lake City

Ginger Evans, President, Tower Consulting, LLC, Arlington, Virginia

Nathaniel P. Ford Sr., Executive Director-CEO, Jacksonville Transportation Authority, Jacksonville, Florida

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

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

Steve Heminger, Executive Director, Metropolitan Transportation Commission, San Francisco, California

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Roger B. Huff, President, HGLC, LLC, Farmington Hills, Michigan

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

Melinda McGrath, Executive Director, Mississippi Department of Transportation, Jackson

Patrick K. McKenna, Director, Missouri Department of Transportation, Jefferson City

Brian Ness, Director, Idaho Transportation Department, Boise

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

Leslie Richards, Secretary, Pennsylvania Department of Transportation, Harrisburg

Mark L. Rosenberg, Executive Director, The Task Force for Global Health, Inc., Decatur, Georgia

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

Pat Thomas, Senior Vice President of State Government Affairs, United Parcel Service, Washington, D.C. (retired)

James M. Tien, Distinguished Professor and Dean Emeritus, College of Engineering, University of Miami, Coral Gables, Florida

Dean H. Wise, Consultant, Dean Wise LLC, Winchester, Massachusetts

Charles A. Zelle, Commissioner, Minnesota Department of Transportation, Saint Paul

Ronald Batory, Administrator, Federal Railroad Administration, Santa Fe, New Mexico (ex officio)



Turnbull



Arroyo



Pedersen



Bennett



Braceras



Evans



Ford



Fotheringham



Hanson



Heminger



Hendrickson



Holt



Hu



Huff



Knatz



McGrath



McKenna



Ness



Redeker



Richards



Rosenberg



G. Thomas



P. Thomas



Tien

2018 EXECUTIVE COMMITTEE*



Wise



Zelle



Batory



Brooks



Buzby



Chalk



Cliff



Elliott



Elwell



Farley



Gishi



Gray



Hendrickson



Ivanov



Jackson



King



Martinez



Nelson



Rutland



Schultz



Simon



Skoutelas



Sperling



Williams

Mary R. Brooks, Professor Emerita, Dalhousie University, Halifax, Nova Scotia, Canada, and Chair, TRB Marine Board (ex officio)

Mark H. Buzby (Rear Admiral, U.S. Navy), Maritime Administrator, Maritime Administration, U.S. Department of Transportation (ex officio)

Steven Chalk, Deputy Assistant for Secretary for Transportation, U.S. Department of Energy (ex officio)

Steven Cliff, Deputy Executive Officer, California Air Resources Board, Sacramento (ex officio)

Howard R. Elliott, Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation (ex officio)

Daniel K. Elwell, Acting Administrator, Federal Aviation Administration, U.S. Department of Transportation (ex officio)

Audrey Farley, Associate Administrator for Administration, Pipeline and Hazardous Materials Safety Administration, Washington, D.C. (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)

Brandye Hendrickson, Acting Administrator, Federal Highway Administration, U.S. Department of Transportation (ex officio)

Nikola Ivanov, Director of Operations, Center for Advanced Transportation Technology Laboratory, University of Maryland, College Park, and Chair, TRB Young Members Council (ex officio)

Donald Jackson (Major General, U.S. Army), Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers, Washington, D.C. (ex officio)

Heidi King, Deputy Administrator and Acting Administrator, National Highway Traffic Safety Administration, U.S. Department of Transportation (ex officio)

Raymond Martinez, Administrator, Federal Motor Carrier Safety Administration, Washington, D.C. (ex officio)

Keith Nelson, Senior Advisor to the Secretary, Office of the Assistant Secretary for Research and Technology, U.S. Department of Transportation (ex officio)

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

Karl Schultz (Admiral, U.S. Coast Guard), Commandant, U.S. Coast Guard (ex officio)

Karl Simon, Director, Transportation and Climate Division, U.S. Environmental Protection Agency (ex officio)

Paul Skoutelas, President and CEO, American Public Transportation Association, Washington, D.C. (ex officio)

Daniel Sperling, Professor of Civil Engineering and Environmental Science and Policy; Director, Institute of Transportation Studies, University of California, Davis (ex officio, Past Chair, 2015)

K. Jane Williams, Acting Administrator, Federal Transit Administration, U.S. Department of Transportation (ex officio)

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



Wright

* Membership as of November 2018.



TECHNICAL ACTIVITIES

The Technical Activities Division of the Transportation Research Board provides opportunities for transportation professionals and researchers to advance the knowledge and practice of the many disciplines that support all modes of transportation.

Comprising specialists in each mode and in several disciplines, the division's staff works with thousands of volunteers serving on more than 200 TRB standing committees to share information, identify research needs, and implement other initiatives on behalf of TRB sponsors and the transportation community.

The Technical Activities Council coordinates the activities of the TRB standing committees. Hyun-A C. Park, President of Spy Pond Partners, LLC, chairs the council. TRB representatives in each of TRB's sponsoring organizations serve as liaisons to the committees and to division activities.

The Technical Activities Division underwent a marked transformation in 2018. The process of publishing its peer-reviewed journal, *Transportation Research Record: Journal of the Transportation Research Board*, was moved from the Executive Office and placed under the auspices of the Technical Activities Division so that responsibility for all aspects of the journal now reside within the division. The services of a commercial publisher were sought through a proposal process, so TRB partnered with Sage Publications to assume the publishing and marketing responsibilities for the journal. This new arrangement offers TRB a professional marketing program for the journal and will produce state-of-the-art analytics detailing research citations, media mentions, and policy study references. The partnership with Sage also will provide detailed metrics on individual journal articles—a feature TRB has not yet been able to offer to authors.



Technical Activities Director Ann Brach welcomes new and young attendees to the 2018 TRB Annual Meeting in Washington, D.C. (Photo: Risdon Photography)

The Technical Activities division also moved its peer review process to a commercial article submission and peer review coordination system. This arrangement will provide a higher level of security as well as ensure authenticity of author and reviewer identities, thereby maintaining and enhancing the integrity of the journal.

To facilitate these changes, TRB reorganized its publications staff by hiring a managing editor whose sole responsibility is to manage the content production and publication of the journal and by reorganizing other staff positions to support that effort. These staff and institutional changes will increase the quality,



The Annual Meeting offered opportunities for participants to connect with transportation research and colleagues. (Photo: Risdon Photography)

subscription base, and impact of the journal significantly.

The Technical Activities Division continues to focus on three hot topics identified by the TRB Executive Committee: transformative technologies, transportation resilience and sustainability, and transportation and public

health. In 2018, the experience and interests of Technical Activities standing committees advanced the discussion and knowledge of these strategic topics via conferences, TRB Annual Meeting events, and other committee activities.

Highlights of Technical Activities groups and sections throughout 2018 include the following:

Policy and Organization

MANAGEMENT AND LEADERSHIP

In July, TRB sponsored the 12th National Conference on Transportation Asset Management in San Diego, California. The conference covered a broad range of topics on surface transportation modes of interest to agencies both in the early stages of implementation of asset management and in the later stages of the implementation process. It provided a forum for transferring asset management initiatives into practice as well as a venue for a wide range of public and private and university researchers to share knowledge and sponsor peer-to-peer learning.



Organized by TRB, the 12th National Conference on Transportation Asset Management was held in San Diego and focused on moving asset management initiatives into practice. (Photo: Frank McKenna, Wikimedia)



Hyun-A C. Park
Council Chair
Technical Activities



Joseph L. Schofer
Chair
Policy and
Organization Group



Elizabeth Rushley
Chair
Planning and
Environment Group



Mark Reno
Chair
Design and
Construction Group



William S. Varnedoe
Chair
Operations and
Preservation Group



Fred R. Wagner
Chair
Legal Resources Group



David Harkey
Chair
Safety and Systems
Users Group



Dennis Hinebaugh
Chair
Public Transportation
Group



George Avery Grimes
Chair
Rail Group



Anne Goodchild
Chair
Freight Systems
Group



David Ballard
Chair
Aviation Group



C. James Kruse
Chair
Marine Group



Coco Briseno
State DOT
Representative



Nikola Ivanov
Young Members
Council
Representative



Ann M. Brach
Director
TRB Technical
Activities Division

DATA AND INFORMATION

TRB sponsored the National Household Travel Survey Data for Transportation Applications Workshop in August, which explored how these data have been used to support key transportation policy considerations such as energy use, congestion, highway finance, safety, and mode share.

RESILIENCE

TRB convened a Transportation Resilience Task Force to develop a strategic plan for addressing resilience at TRB in all its divisions. Technical Activities staff coordinated and supported this initiative, which included the active participation of several TRB standing committees focused on resilience and sustainability in transportation. The Transportation Systems Resilience Section and other standing committees organized a tabletop exercise at the TRB Annual Meeting in which supply-chain disruption scenarios were hypothesized and leadership traits identified that would produce the quickest, most-complete recovery.

Planning and Environment

TRANSPORTATION SYSTEM PLANNING

In October TRB conducted a webinar, organized by the Standing Committee on Statewide Multimodal Transportation Planning, examining the challenges for transportation agencies in attracting, developing, training, and retaining a planning workforce for the 21st century.

In June TRB sponsored the 7th International Conference on Innovations in Travel Modeling in Atlanta, Georgia, which explored the integration of social issues, land use, transportation supply, and technology into the modeling process. Also addressed were ways travel modelers can respond to the rapidly changing transportation environment given sociodemographic shifts in travel preferences and the integration of new modes and infrastructure—including shared mobility and automated and connected vehicles. TRB also sponsored the 16th National Tools of the Trade Transportation Planning Conference in Kansas City, Missouri. This biannual conference convenes practitioners and researchers to address the practical applications of transportation planning for small and medium-sized communities.

ENVIRONMENT, ENERGY, AND CLIMATE CHANGE

Environment and energy concerns were the focus of several conferences and meetings of the Environment and Energy Section committees during the year, on such topics as introducing new Federal Highway Administration (FHWA) noise measurement handbook guidance; trends in on-road transportation energy and emissions; opportunities to harvest energy from pavements; and improving the efficiency of environmental reviews for major transportation projects.

SOCIAL, ECONOMIC, AND CULTURAL ISSUES

TRB sponsored the International Transportation and Economic Development Conference in Washington, D.C., in June. The conference focused on economic development and its social impacts; transit-oriented development; linkages of international trade, economic development, and transportation corridors; and transportation improvements and market competitiveness.

Design and Construction

DESIGN

The Standing Committee on Roadside Safety Design gathered in Austin, Texas, along with partners in the American Association of State Highway and Transportation Officials (AASHTO) Committee on Roadside Safety. Key topics included collecting nationwide in-place performance data, crashworthiness of roadside



Subway passengers in the Metropolitan Atlanta Rapid Transit Authority system. Held in Atlanta in June, the International Conference on Innovations in Travel Modeling Responses explored the rapidly changing transportation environment. (Photo: Scott Ehardt, Wikimedia)

safety hardware, and continued implementation and future enhancements of manuals that guide how agencies design highway roadsides. The Standing Committee on Geospatial Data Acquisition Technologies met to discuss many concerns related to the use of 3-D scanning, small unmanned aerial systems, and other advanced technologies for data acquisition.

The Standing Committee on Stormwater presented the webinar “Water Finance Clearinghouse for Transportation Stormwater Infrastructure,” which discussed the U.S. Environmental Protection Agency’s Water Finance Clearinghouse, a web-based portal that provides real-time updates and information about the financing options for stormwater infrastructure.

PAVEMENTS

The Standing Committees on Concrete Pavement Design and Rehabilitation and Concrete Construction and Rehabilitation met with the Wisconsin Department of Transportation (DOT) in 2018 in Madison, Wisconsin, to discuss advances in the agency’s concrete research. This included a presentation on the effects of deicers on concrete durability and several updates on other ongoing research. Research needs and the formulation of a statement for new research were discussed. The committees also took a field trip to view a new section of I-39 south of Madison, which features stringless paving and performance-engineered mixtures (PEM) for concrete pavements. The committee members also visited an onsite batch plant set up to produce PEM in large quantities.

STRUCTURES

The Standing Committees on Seismic Design and Performance of Bridges and Foundations of Bridges and Other Structures conducted a webinar on the fundamental behavior of piles subject to downdrag. Many bridges are constructed in areas in which the compressible or liquefiable soil necessitates the consideration of downdrag forces and associated settlement.

CONSTRUCTION AND MATERIALS

The Standing Committees on Quality Assurance Management and Project Delivery Methods sponsored a TRB Annual Meeting workshop titled “Quality Management Systems for Design-Build Projects: Case Studies,” which brought together experts—an owner, a quality



Bioswales remove pollutants and debris from runoff water. A webinar presented by the Stormwater Committee examined a U.S. Environmental Protection Agency web portal for stormwater infrastructure financing options. (Photo: NACTO)

management firm, and a design-build firm—to discuss the necessity of and best practices for quality management in design-build projects.

The TRB Section on Concrete Materials organized an Annual Meeting session and webinar that demonstrated the techniques agencies use to minimize cracking that can develop in the later stages of the life of large concrete structures; that is, controlling temperature excursions during the curing process in the construction phase. The Standing Committees on Structural Requirements of Asphalt Mixtures, Nonbinder Components of Asphalt Mixtures, and Design and Rehabilitation of Asphalt Pavements hosted a joint webinar illustrating case examples of asphalt mixtures specifically designed to meet situations in which conventional design approaches are not appropriate with specially formulated materials.

The Standing Committee on Critical Issues and Emerging Technologies in Asphalt met for two days in Massachusetts and produced Transportation Research E-Circulars on new techniques to proportion asphalt paving mixes and ways to condition those mixes in the laboratory to better represent weathering on the roadway and achieve more meaningful test results.

GEOTECHNICAL ENGINEERING

The Geological and Geoenvironmental Engineering and Geotechnical Engineering Sections conducted a workshop on geotechnical asset management in conjunction with the annual Highway

Geologist Symposium in September. Discussed were advances and lessons learned in slope management programs, remote sensing tools, and legislating geotechnical asset management plans. The Standing Committees on Transportation Earthworks and Geosynthetics conducted a webinar on design equations for predicting the maximum lateral deformation and settlement of geosynthetic reinforced soil under various configurations and service loads. This webinar explored bridge abutments and reinforced soil foundation for pier support and showcased a graphical user interface that was developed based on the proposed equations.

The Standing Committee on Subsurface Soil-Structure Interaction published a Transportation Research E-Circular, *Culverts and Soil-Structure Interaction: Fifty Years of Change and a Twenty-Year Projection*, which documents the significant changes in materials used, structure sizes, shapes, and joint capabilities, as well as design methodologies that have reached new levels of sophistication, in the pipe industry.

Operations and Preservation

The development of connected and automated vehicle technologies has progressed from research and development to advanced engineering. Committees in the Operations Group and nearly all of the Technical Activities



U.S. Transportation Secretary Elaine Chao addresses the 2018 Automated Vehicles Symposium, cosponsored by TRB, in July.



Rapidly changing aviation technology and its effects on the industry are topics of

groups have tracked and contributed to this progress. More than 40 sessions at the 2018 Annual Meeting addressed a wide array of issues associated with automation and connectivity. In addition, the Standing Committees on Intelligent Transportation Systems and on Vehicle-Highway Automation developed technical content for the 2018 Automated Vehicle Symposium in July, sponsored by the Association of Unmanned Vehicle Systems International and cosponsored by TRB.

In addition, all operations-related committees held midyear meetings or conferences in 2018:

- The Standing Committees on Managed Lanes, Freeway Operations, and Transit Management and Performance cosponsored the Managing Roadways and Transit Together to Move People into a New Age of Technology Conference in Bellevue, Washington, in September.
- The Standing Committee on Regional Transportation Systems Management and Operations met jointly with the AASHTO Committee on Transportation Systems Operations in Atlanta, Georgia.
- The Standing Committee on Access Management cosponsored the 12th Access Management Conference in Madison, Wisconsin, in July.

Safety and Systems Users

Committees in the Safety and Systems Users Group support research and information sharing to address the unacceptable numbers of fatalities and serious injuries related to motor vehicle crashes. Several committees held midyear meetings to discuss a range of topics:



examination by Aviation Group standing committees. (Photo: Kent Wien, Flickr)

highway safety performance and research supporting the *Highway Safety Manual*, implications of marijuana legalization on the safe mobility of older persons, the effects of rapid technological changes on young drivers' safety, crash avoidance for all novice drivers, improving occupant protection for those experiencing crashes, and truck and bus safety. The Standing Committee on Alcohol, Other Drugs, and Transportation organized a joint workshop with AAA to examine traffic safety implications and research needs related to driving under the influence of prescription and over-the-counter drugs.

The Standing Committee on Transportation Safety Management focused its midyear meeting on various "zero" safety initiatives and the potential for a safe systems approach in the United States. Webinars on roundabouts regularly draw more than 700 participants from around the United States and the world.



Among the topics studied by Safety and Systems Users Group committees are the mobility and safety of older persons. (Photo: Ed Yourdon, Flickr)

Legal Resources

This summer, the Legal Resources Group sponsored the 57th Annual Workshop on Transportation Law in Boston, Massachusetts. Among the more than 170 registrants were representatives from federal, state, and local transportation agencies as well as from the private sector. The workshop opened with a plenary session featuring the chief counsels of FHWA, the Federal Transit Administration, and the Federal Railroad Administration, each of whom spoke about critical legal issues and developments at their agencies. More than 55 speakers presented at 17 breakout sessions, followed by a plenary session on legal ethics. Each of the seven committees comprising the Legal Resources Group held their midyear meetings at the event, and an early evening event at U.S. DOT's Volpe Center featured several presentations on the important research being conducted by the center.

Aviation

The Aviation Group organized several meetings and a conference to further discussions in key areas of interest: aviation system planning, environment, airspace, and safety. Additional attention was paid to the rapidly changing technologies that will affect future mobility in urban areas, as discussed by the helicopter, commercial airline, and business aviation subcommittees.

Marine

Marine Group standing committees placed particular emphasis on maritime technology and data challenges and opportunities during 2018. A central theme in sessions and conferences was the potential value of vessel probe data obtained via shipboard automated identification systems for use in freight network analytics and safety trend analysis. Autonomous vessels and automated seaport technologies also featured strongly in discussions and activities.

TRB's Ports and Channels Committee initiated subcommittees to focus specifically on port automation and port performance. TRB also organized the 5th Biennial Marine Transportation System Research and Development Conference on the theme of Transforming the Marine Transportation System Through Multimodal Freight Analytics.



Road to Zero, a national road safety leadership initiative of FHWA, the National Highway Traffic Safety Administration, Federal Motor Carrier Safety Administration, and National Safety Council, is an example of a "zero" safety initiative at the federal level. (Image: FHWA)



John Butler, World Shipping Council, discusses regulatory change in marine shipping at the fall meeting of the Marine Board.

The Marine Board’s 2018 spring meeting was held at the Port of Savannah, Georgia, with technical tours and sessions focused on Savannah’s port and trade corridor growth strategies, the Savannah Harbor Expansion Project, perspectives on beneficial cargo owner port and trade gateway choices, and inland distribution trends and technologies. The Marine Board fall meeting in Washington, D.C., included focus sessions on Future Marine Navigation Technology: Advantages and Challenges and Paths Toward Zero-Emissions Shipping Operations.

Rail

Despite more than a century and a half of successful service, the essence of rail—the interaction of the railcar steel wheel with the steel rail surface—still is the subject of in-depth



Rail Group standing committees conducted a workshop at the Annual Meeting focused on wheel-rail interaction. (Photo: Ildar Sagdejev, Wikimedia)

study and research. The Rail Group committees concerned with railroad track design and maintenance organized an all-day workshop at the 2018 Annual Meeting that highlighted the latest research in wheel-rail interaction. The Rail Group also organized a session that discussed public-private partnerships examining the circumstances under which private funding could be successfully utilized to support public transportation projects across all modes.

Freight Systems

Standing committees in the Freight Systems Group focused on the potential impacts of large-scale, game-changing issues including automation in freight systems, the effect of changing trade policy on intermodal freight, the continued explosion of last mile e-commerce and food delivery in urban areas, and freight systems resiliency in the face of extreme weather events. In 2018, the Freight Systems Group organized Freight Day, a full day of well-attended, high-profile sessions at the Annual Meeting that addressed freight issues. Many committees also aligned midyear meetings with the 5th Biennial Marine Transportation System Research and Development Conference on the theme of Transforming the Marine Transportation System Through Multimodal Freight Analytics. In September, leading freight transportation researchers and practitioners gathered at the Keck Center in Washington, D.C., for the third FHWA-sponsored conference on freight fluidity measurements. This event resulted in a Transportation Research E-Circular featuring the highlights of the conference.

Public Transportation

Committees from the Public Transportation Group helped organize the 23rd National Conference on Rural Public and Intercity Bus Transportation in Breckenridge, Colorado, in September. The conference explored practices and showcased research in rural public and intercity bus transportation. TRB also sponsored the 6th National Bus Rapid Transit (BRT) Conference in Los Angeles. The conference focused on all aspects of BRT, including its evolution, funding considerations, synergies between BRT and managed lanes, international systems, and current research and innovation. The conference also included a half-day tour of regional BRT systems.



The 6th National Bus Rapid Transit (BRT) Conference in Los Angeles examined a wide range of BRT issues, from funding to international systems. (Photo © Metro 2009)

SHRP 2 Safety Data Program

The SHRP 2 Safety Data Program continued to stimulate a high level of activity. More than 265 data use licenses have been issued to researchers. Results of research using the SHRP 2 safety data have included more than 75 studies published in journals or public domain reports. In addition, 26 presentations using the data were presented at the 7th International Symposium on Naturalistic Driving Research in Blacksburg, Virginia, in August; roughly half the presentations at the symposium utilized SHRP 2 data. The SHRP 2 dataset is the largest naturalistic driving dataset ever collected.

The SHRP 2 Naturalistic Driving Study (NDS) Dataverse is a repository of user-developed datasets, research data, and documentation that enables researchers to reuse datasets without the cost normally associated with dataset development. Established in 2016, Dataverse is linked to the safety data web portal InSight and contains more than 63 datasets. More than 50 requests to reuse these existing datasets have been fulfilled.

The second of two SHRP 2 safety data paper competitions for graduate students has been underway since 2017 and will be wrapping up in early 2019. Nine student abstracts were selected by an independent panel of judges to

be presented at the 2019 TRB Annual Meeting. From these, a smaller number of student papers eventually will be selected for publication by TRB.

The Safety Data Implementation Program is more than halfway completed; the Safety Data Oversight Committee is considering plans to extend access to the safety data beyond the term of the cooperative agreement with FHWA, which expires in August 2020.

Staff News

- **Patti Lockhart** joined TRB as Managing Editor of the *Transportation Research Record: Journal of the Transportation Research Board* (TRR).
- **Jennifer J. Weeks** transferred from the Executive Office publications group to the Technical Activities Division's TRR publication office as Publishing Projects Manager, TRR.
- **Kisna Quimby** joined TRB as Peer Review Production Editor in the Technical Activities Division's TRR publication office.

MAJOR AWARDS PRESENTED IN 2018



The 2018 Roy W. Crum Award for outstanding transportation research leadership was presented to **Susan A. Shaheen**, Co-Director, Institute of Transportation Studies Transportation Sustainability Research Center, and Adjunct Professor, Civil and Environmental Engineering, University of California (UC), Berkeley, and faculty scientist at the Lawrence Berkeley National Laboratory. Shaheen is an internationally recognized leader in shared mobility and environmentally

friendly transportation, breaking new ground in ridesharing, bike sharing, and shared services.

Shaheen served for two decades as chair and member of TRB groups, standing committees, and subcommittees, as well as policy study committees and Cooperative Research Programs panels. She was a member of the committee that produced TRB Special Report 319, *Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services*, which analyzed how shared-ride services are changing mobility.

Shaheen also served as Policy and Research Program Leader at California Partners for Advanced Transit and Highways, special assistant to the Director's Office of the California Department of Transportation, and editor and board member for several transportation journals.

Michael F. Trentacoste received the 2018 W. N. Carey, Jr., Distinguished Service Award in recognition of his outstanding contributions to TRB and transportation research. Before retiring in 2017, Trentacoste spent more than 40 years working in transportation, most recently serving as Associate Administrator for Research, Development, and Technology at the Federal Highway Administration (FHWA).

A transportation safety advocate, Trentacoste served and chaired TRB's Standing Committee on Transportation Safety Management and was a member of the Safety Section, overseeing nine committees and two task forces. He also participated in other TRB panels, committees, and task forces. Trentacoste worked with the second Strategic Highway Research Program (SHRP 2) as a federal liaison and was a key player in developing strategies to implement SHRP 2's research results.

At FHWA Trentacoste also served as Director in the Office of Safety Research and Development, in the Office of Motor Carrier Standards, and in the Office of Motor Carrier Field Operations, including enforcement of the Federal Motor Carrier Safety Regulation and the Motor Carrier Safety Assistance Program to the states. Previous awards include the President's Meritorious Senior Executive Award and Administrator's Superior Achievement Awards from the FHWA and Federal Railroad Administration.



Patricia L. Mokhtarian, Susan G. and Christopher D. Pappas Professor of Civil and Environmental Engineering at the Georgia Institute of Technology, was the 2018 recipient for the Thomas B. Deen Distinguished Lectureship. She presented her lecture, “The Times, They Are A-Changing: What Do the Expanding Uses of Travel Time Portend for Policy, Planning, and Life?” at the TRB Annual Meeting in January.

An active TRB volunteer since 1988, Mokhtarian has chaired or served on six standing committees and subcommittees and is an emeritus member of the standing committees on Effects of Information and Communication Technologies on Travel Choices and on Traveler Behavior and Values. She also was a member of the committee that produced TRB Special Report 298, *Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO₂ Emissions*.

Before joining the Georgia Institute of Technology, Mokhtarian served on the faculty at UC Davis, where she was Associate Director



for Education of the Institute of Transportation Studies. Along with civil and environmental engineering classes, Mokhtarian teaches classes on transportation survey methods, discrete choice modeling, and probability and statistics, and has authored or coauthored more than 200 refereed journal articles,

technical reports, and other publications. She is one of the top five most highly cited scholars in transportation research.

The Sharon D. Banks Award for Humanitarian Leadership in Transportation was presented to **William W. Millar**, past president of the American Public Transportation Association (APTA), in recognition of his mentorship and leadership in people-oriented initiatives in transportation over the past four decades.

Millar was active in TRB since 1976, when he joined the Standing Committee on Transportation for the Transportation Disadvantaged. His service includes two decades on the TRB Executive Committee, which he chaired in 1992. He was instrumental in establishing the Transit Cooperative Research Program, later serving alongside Sharon Banks—for whom the award was named—on the Transit Oversight Project Selection Committee.



In his years at APTA, Millar forged partnerships with an emphasis on diversity, strengthening relationships with organizations including transit workers unions, the Conference on Minority Transportation Officials (COMTO), and the Women’s Transportation Seminar.

Among Millar’s many awards and honors are lifetime achievement awards from the American Association of State Highway and Transportation Officials, COMTO, and the Council of University Centers; TRB’s W. N. Carey, Jr., Distinguished Service Award; and the Thomas B. Deen Distinguished Lectureship.



CONSENSUS AND ADVISORY STUDIES

The Consensus and Advisory Studies Division conducts studies examining complex and controversial transportation issues at the request of the U.S. Congress, executive branch agencies, states, and other sponsors.

Studies address a variety of safety, economic, environmental, energy, and research policy issues affecting all modes of transportation. In addition, studies involving TRB's Marine Board examine offshore engineering and regulatory issues, some of which are not directly related to transportation.

The studies are performed by special committees drawn from the nation's leading subject matter experts. 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 TRB Executive Committee's Subcommittee on Planning and Policy Review provides oversight for TRB's portfolio of consensus studies, under the leadership of former Executive Committee Chair Daniel Sperling, University of California, Davis.

The study committees issue their findings and recommendations in full-length reports or shorter letter reports, which are peer-reviewed

according to institutional procedures. The U.S. Congress and the executive branch have adopted many recommendations from TRB consensus reports, attesting to the substantive value of the study process. All completed reports are posted on the TRB website.¹

Completed Reports

The following consensus reports were issued during 2018:

- ***Admissibility and Public Availability of Transit Safety Planning Records***

Although the public transit industry in the United States generally has a strong safety record, several high-profile incidents in recent years have raised concerns about an absence of safety management systems within transit agencies. The Federal Transit Administration (FTA) has proposed that transit systems be required to develop comprehensive safety and risk management plans. Transit agencies have expressed concern that the records generated by such planning could be used against them as evidence in civil litigation, exposing them to significant financial liabilities that could in turn deter rigorous safety planning.

Special Report 326 concludes that to enable public transit agencies to engage in more effective safety management, their safety planning records should not be admissible as



Daniel Sperling
Chair
Subcommittee on
Planning and Policy
Review



Thomas R. Menzies
Director
Consensus and
Advisory Studies

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



A 2017 collision between two SEPTA trains in Upper Darby, Pennsylvania. Special Report 326 addresses the admissibility and availability of transit safety planning records in court cases. (Photo: National Transportation Safety Board)

evidence in court. State highway agencies and commuter railroads have been granted such admissibility protections, and the committee that conducted the study found no compelling reason for Congress to treat transit agencies differently.

The report recommends, however, that any protected records be made freely available to the public. Because they could not be admitted as evidence, the publicly disclosed records would not create a legal liability that might deter transit agencies from engaging in rigorous safety planning. The accountability from public disclosure should have the effect of making transit agencies even more likely to engage in rigorous safety planning.

■ **Safety Regulation for Small LPG Distribution Systems**

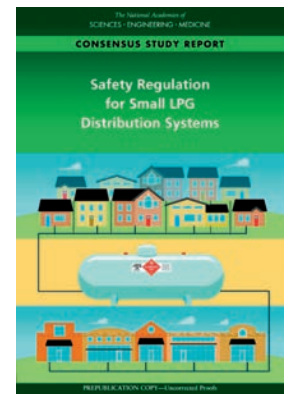
Special Report 327 examines the regulatory framework for gas pipeline systems that transport propane and other types of liquefied petroleum gas (LPG) for service to 100 or fewer customers. Of the more than 12 million households and businesses that use LPG, most are on single-customer systems but a small number—about 5,000—are served by multiuser systems. These systems may be subject to federal safety regulations administered by the U.S. Department of Transportation’s Pipeline and Hazardous Materials Safety Administration (PHMSA).

The report reviews the safety regulatory framework that applies to small LPG distribution systems, reviews what is known about their safety performance, and provides recommendations on ways to make their regulatory requirements more risk-based. The report recommends that PHMSA take actions leading to more uniform interpretations of regulatory requirements and more complete

information on the location, condition, and safety record of small LPG systems. Also recommended is allowing states to develop and seek PHMSA approval for waiver programs that permit small systems to opt out of certain federal regulatory requirements not applicable to their risks.

■ **Truck Size and Weight Research Road Map**

Sponsored by the Federal Highway Administration (FHWA), Special Report 328 recommends a research roadmap to address gaps and uncertainties in estimating the impacts of changes in truck size and weight limits. The report defines a program of more than two dozen research projects and for each project provides a problem statement identifying the product, its relationship to the overall objective of evaluating truck size and weight regulations, possible research



Special Report 327, *Safety Regulation for Small LPG Distribution Systems*, scrutinizes the regulatory framework for gas pipeline systems that transport liquid petroleum gas.



I-81 in Virginia is a major freight route. Special Report 328 addresses the challenges of changing truck size and weight limits. (Photo: Virginia Department of Transportation)

approaches, and anticipated duration and cost. The projects are grouped according to their criticality and practicality: core projects are likely to produce useful results within a practical time period and budget and would help reduce uncertainty in truck size and weight limit evaluations significantly, and long-term projects have value but either are less critical in reducing uncertainties than core projects or are of long duration.

■ ***Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future***

Special Report 329 explores pending and future federal investment and policy decisions concerning the Interstate Highway System. Congress asked for recommendations on the “features, standards, capacity needs, application of technologies, and intergovernmental roles to upgrade the Interstate System.” The prospect of an aging, worn, unreliable Interstate System is concerning as the vehicle fleet continues to transform and as the vulnerabilities caused by climate change place new demands on the country’s transportation infrastructure.

Recent combined state and federal capital spending on the Interstates has been approximately \$20–\$25 billion per year. The estimates in this study suggest that this level of spending is too low and that \$45–\$70 billion annually over the next 20 years will be needed to undertake the long-deferred rebuilding of pavements and bridges and to accommodate and manage growing user demand.

The report recommends that Congress legislate an Interstate Highway System Renewal and Modernization Program (RAMP).

This program should focus on reconstructing deteriorated pavements—including their foundations—and bridge infrastructure; adding physical capacity and operations and demand management capabilities where needed; and increasing the system’s resilience. The report explores ways to pay for this program, including lifting the ban on tolling of existing general-purpose Interstate highways and increasing the federal fuel tax to a level commensurate with the federal share of the required RAMP investment.

■ ***Improving the Clarity, Harmony, and Accuracy of Vessel Stability Regulations: Letter Report***

The U.S. Coast Guard (USCG) has safety regulatory oversight over vessels registered in the United States, and one of its oldest regulatory functions is to ensure that these vessels comply with minimum standards for stability. USCG has made major changes to its stability regulations over the past 30 years, most notably by consolidating most of the regulations into a single subchapter. Despite these consolidations, however, USCG believes there may be opportunities to make further improvements to the regulations, particularly with regard to their usability by vessel designers, classification societies, operators, and inspectors.

Sponsored by USCG, this study report provides a high-level review of stability regulations to identify options for improving their clarity, harmony, and accuracy. The report notes several options that can be implemented quickly because they do not require formal regulatory changes and options that likely will take more time because of the restrictions and limitations of the federal rulemaking process.



Massachusetts deployed bridge-in-a-backpack materials in a Fitchburg bridge replacement. Bridge-in-a-backpack technology was among those funded by a federal innovative bridge research program. (Photo: Massachusetts Department of Transportation)

A second phase of the study, to be conducted in 2019, will provide a more detailed review of these options and address other issues that were not considered in the first phase.

Ongoing Studies

- **Review of the Innovative Bridge Research and Construction Program**, called for in surface transportation authorization legislation and sponsored by FHWA, considers the usefulness and promise of the technologies and construction techniques that were part of the federally funded innovative bridge research program. The goal of the program was to develop innovative materials to reduce the cost of constructing, maintaining, and rehabilitating bridges.
- **Study of the Offshore Oil and Gas Operations Inspection Program**, sponsored by the Bureau of Safety and Environmental Enforcement, is examining options for improving the effectiveness of inspections and other methods for enforcing federal safety requirements that apply to offshore operators.
- **Study on USCG's Ship Stability Regulations: Phase 2** will provide more detailed advice on the options outlined in the Phase 1 report for making vessel stability requirements current, better aligning them with international standards, and improving their consistency and clarity.
- **Review of the Office Naval Research's Naval Engineering Program** will examine the status of the program's effort to ensure that a healthy science and technology and educational enterprise exists and is capable of meeting the future technology needs of the U.S. Navy in the development of highly capable, affordable sea systems.



Future policy studies will explore the impacts of emerging mobility options such as scooters and bike sharing. (Photo: Portland Bureau of Transportation)



Norman Augustine, chair of the Future Interstate Highway System Study Committee, introduces the high-profile report *Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future* at a press event December 6.

- **Mobility as a Service Study** will examine the role of new and expanding shared mobility options—such as transportation network companies, taxis, car sharing, bike sharing, scooter sharing, and microtransit—in the provision of transportation services; specifically, the relationship to and impact of these services on public transit operators.

Other committees provide ongoing peer review of the research and technology programs of FHWA, FTA, and the Federal Railroad Administration, as well as major FHWA research activities, such as the Long-Term Infrastructure Performance Program. The committees that review these programs issue letter reports, available on TRB's website.²

Assistance with National Academies Studies

In addition, Consensus and Advisory Studies staff assisted the National Academies' Board on Energy and Environmental Systems on projects evaluating motor vehicle fuel conservation technologies for the National Highway Traffic Safety Administration.

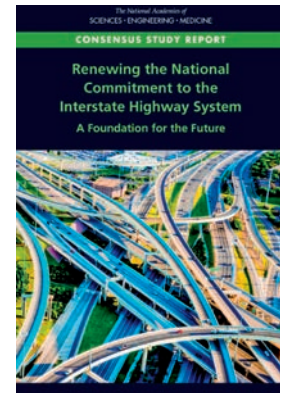
Staff News

Thomas R. Menzies was named Division Director.

Anusha Jayasinghe was promoted to Associate Program Officer.

Micah Himmel was promoted to Senior Program Officer.

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



The consensus study report *Renewing the National Commitment to the Interstate Highway System* is available at <https://www.nap.edu/catalog/25334/renewing-the-national-commitment-to-the-interstate-highway-system-a-foundation-for-the-future>.



COOPERATIVE RESEARCH PROGRAMS

In the early 1960s, decision makers in federal and state governments and academia realized that much highway research was duplicative of other efforts—multiple departments of transportation (DOTs) were all researching the same subjects at the same time with no knowledge of each other’s efforts.

There had to be a better way of doing things. States agreed to pool resources for a cooperative program that would address national issues, and in 1962, the National Cooperative Highway Research Program (NCHRP) was founded. NCHRP has served as the model for the six more cooperative research programs (CRPs) formed between 1992 and 2018.

The most important factor in the success of these programs is continuous stakeholder involvement, from identification of topics to implementation of results. Ultimately, these stakeholders are the research users; their ongoing involvement ensures accountability for research that is relevant and implementable. Rather than conducting fundamental research, each CRP administers applied research projects to produce practical results.

NCHRP and all subsequent CRPs involve partnerships between TRB, a federal agency, and an industry association representing research users. Common interests foster trust and collaboration and provide effective governance and oversight of each CRP, and TRB’s position in the National Academies of Sciences, Engineering, and Medicine provides objectivity and credibility. CRP staff members are specialists in project management and facilitation, experts in working with research teams and volunteer panels and are motivated to provide services and develop products that meet the needs of sponsors and practitioners.

Of the seven CRPs created to date, three no longer are active. Research programs in freight and hazardous materials were funded in 2005 transportation reauthorization legislation but were not reauthorized in subsequent



Deborah Flint
Chair
ACRP Oversight
Committee



Tom Glass
*Chair, Research
Committee*
Governors Highway
Safety Association



**Christopher J.
Hedges**
Director
Cooperative
Research Programs



Paul Jablonski
Chair
TCRP Oversight and
Project Selection
Committee



Brian Ness
Chair
AASHTO Special
Committee on
Research and
Innovation

legislation. A program in rail transportation was authorized as part of the Passenger Rail Investment and Improvement Act of 2008 and funded for just one year.

As of 2018, four CRPs are active: NCHRP, the Transit Cooperative Research Program (TCRP), the Airport Cooperative Research Program (ACRP), and the Behavioral Traffic Safety Cooperative Research Program (BTSCR).

National Cooperative Highway Research Program

A forum for coordinated and collaborative research, NCHRP addresses issues integral to the functions of state 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. The American Association of State Highway and Transportation Officials (AASHTO) Special Committee on Research and Innovation (R&I) serves as the governing board for NCHRP.

Support for NCHRP comes from voluntary contributions from state DOTs. NCHRP's close association with AASHTO and position within the National Academies have enabled the program to carry out research with sound, practical, and nationally important results. Stakeholder involvement throughout the NCHRP process guarantees that the program addresses high-priority research needs and develops products that are implementation-ready for transportation practitioners.

NCHRP manages projects in research areas ranging 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 are published in the NCHRP *Research Report* and NCHRP *Synthesis of Highway Practice* series, as *Research Results Digests* and *Legal Research Digests*, as well as other documents published electronically.

In 2018, AASHTO selected 11 continuing projects and 49 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



TRB Executive Director Neil Pedersen (*far right*), at a meeting of the Special Committee on Research and Innovation, which determines the projects that will be funded and the level of funding for those projects.

ensures the credibility of the research findings, facilitating adoption by AASHTO, state DOTs, and other organizations.

NCHRP panels convened for more than 180 project meetings in 2018. More than 2,600 volunteers offered their time, energy, and expertise as panel members, attending meetings and reviewing materials for more than 300 active research projects—primarily for the challenges and 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.



TRB Senior Program Officer Jo Allen Gause (*left*) and Valerie Southern, VJS-TC, LLC, engage the NCHRP Synthesis panel on information related to highway practices.



CRP Director Chris Hedges oversees the four active cooperative research programs.

Highlights of 2018

CONNECTED AND AUTOMATED VEHICLES

With the rapid development and deployment of connected and automated vehicle (CAV) technologies, state DOTs need research on the effects of these technologies and on preparing for their widespread use.

Related studies under way address challenges for truck freight operations, strategic communications planning, road markings for machine vision, implications for motor vehicle codes, dedicated and priority-use lanes, incorporating CAV impacts into regional transportation planning and modeling tools, cybersecurity implications, effects on travel demand, business models for deploying infrastructure, data needs and collection, and data management strategies for operations.

RESEARCH ROADMAPS

The use of research roadmaps to identify near-term research needs in a targeted area continue to be an effective way for AASHTO committees and councils to create prioritized, multiyear research agendas. In 2017, two new research roadmaps were initiated, one on rural transportation issues and one on workforce development and retention.

Completed in 2018, NCHRP Project 20-114, Multimodal Freight Transportation Roadmap, produced a prioritized portfolio of potential NCHRP research problem statements and

identified five priority themes: 1) the lack of quantitative methods to measure system performance of national supply chains, 2) the lack of granular data and data analytics to support freight policy and planning efforts, 3) the emergence of autonomous and cooperative multimodal delivery equipment, 4) ways to address the impacts of e-commerce in urban areas, and 5) ways to achieve resiliency and recovery of the multimodal freight system.

Implementation Planning

At R&I's request, NCHRP is deploying a variety of strategies to encourage state DOTs and other transportation agencies to put NCHRP research into practice: developing products to convey research results in different formats for specific target audiences, engaging stakeholders through workshops and peer exchanges, and supporting "early adopter" state DOTs. Since 2015, R&I has provided \$2 million annually for communication and implementation activities from NCHRP project panels, state DOTs, and AASHTO councils and committees.

NCHRP's implementation support program has three main elements: 1) targeted communication and dissemination of research results, 2) administration of pilot projects, and 3) surveys of research products and assessments of their impact. In 2018, NCHRP significantly increased efforts to identify which of its research products were implemented by state DOTs and others.¹ NCHRP also initiated a research project, NCHRP Project 20-44(09), Measuring the Value of NCHRP Research, to develop methods to measure the impacts of NCHRP research over time.

Research Results

Following is a sample of NCHRP reports published in 2018 that have particular importance to AASHTO. All reports are available on the TRB website.² General information on all projects is available in the NCHRP Annual Report of Progress of December 31, 2018,³ and on the web.

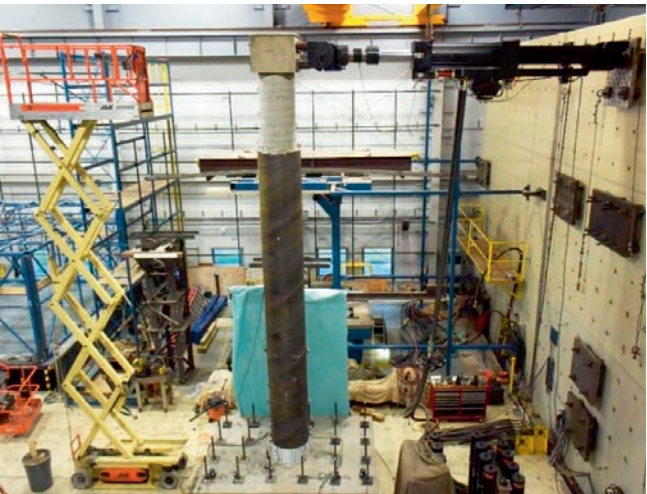


The impact of e-commerce in urban areas is one of five priorities identified in NCHRP Project 20-114, "Multimodal Freight Transportation Research Roadmap." (Photo: shopblocks, Flickr)

¹ A preliminary impacts report is available at http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP_ImpactReport2018.pdf.

² www.trb.org

³ www.trb.org/nchrp



Research on steel casings is conducted in a Buffalo, New York, lab in NCHRP Research Report 872: *Contribution of Steel Casings to Single Shaft Foundation Structural Resistance*.

ADMINISTRATION

- NCHRP Research Report 865: *Guidance for Development and Management of Sustainable Enterprise Information Portals*, and
- NCHRP Research Report 866: *Return on Investment in Transportation Asset Management Systems and Practices*.

CONNECTED AND AUTOMATED VEHICLES

- NCHRP Research Report 891: *Dedicating Lanes for Priority or Exclusive Use by Connected and Automated Vehicles*.

DESIGN

- NCHRP Research Report 872: *Contribution of Steel Casing to Single Shaft Foundation Structural Resistance*.



The Arizona Department of Transportation conducts pavement preservation activities along the Apache Trail. Pavement preservation treatments are the subject of NCHRP Research Report 858. (Photo: Arizona DOT)

ENVIRONMENT

- NCHRP Research Report 882: *How Weather Affects the Noise You Hear from Highways*.

FREIGHT

- NCHRP Research Report 897: *Tools to Facilitate Implementation of Effective Metropolitan Freight Transportation Strategies*.

PAVEMENTS AND MATERIALS

- NCHRP Research Report 858: *Quantifying the Effects of Preservation Treatments on Pavement Performance*, and
- NCHRP Research Report 877: *Performance-Based Mix Design of Porous Friction Courses*.

PLANNING

- NCHRP Research Report 868: *Cell Phone Location Data for Travel Behavior Analysis*, and
- NCHRP Research Report 896: *Updating Regional Transportation Planning and Modeling Tools to Address Impacts of Connected and Automated Vehicles*.

PROJECT DELIVERY

- NCHRP Web-Only Document 242: *Recommended AASHTO Guide Specifications for ABC Design and Construction*, and
- NCHRP Research Report 884 and Web-Only Document 247, *Guidelines for Managing Geotechnical Risks in Design-Build Projects*.

TRAFFIC MANAGEMENT

- NCHRP Research Report 888: *Development of Roundabout Crash Prediction Models*, and
- NCHRP Web-Only Document 252: *A Strategic Approach to Transforming Traffic Safety Culture to Reduce Deaths and Injuries*.

SAFETY AND SECURITY

- NCHRP Research Report 869 and Web-Only Document 240, *Estimating the Safety Effects of Work Zone Characteristics and Countermeasures: A Guidebook*, and
- NCHRP Synthesis Report 515: *Practices for Preventing Roadway Departures*.



President and CEO of the American Public Transportation Association Paul Skutelas speaks at the inaugural Transit on the Terrace event in Washington, D.C., in June, part of the nationwide TCRP Day.



Vincent Valdes (far right), Federal Transit Administration, leads discussion at the TCRP Oversight and Project Selection meeting.

Transit Cooperative Research Program

In June 2018, the inaugural TCRP Day enhanced awareness of the program and the invaluable research it provides to the public transportation industry. Initially authorized by the Intermodal Surface Transportation Efficiency Act and initiated under TRB management in July 1992, TCRP is supported by annual grants from the Federal Transit Administration (FTA). In operation for more than 26 years, TCRP has undertaken more than 700 research studies that span a comprehensive array of public transportation topics.

The TCRP Oversight and Project Selection Committee selects research for the program and serves as a subcommittee of the board of directors of the Transit Development Corporation (TDC), a nonprofit educational and research affiliate of the American Public Transportation Association. A three-way memorandum of agreement by FTA, TDC, and TRB outlines TCRP’s operating procedures. Details on the program’s advancement since 1992 can be found in the 2018 TCRP Annual Report of Progress.⁴

The current surface transportation authorization legislation—the Fixing America’s Surface Transportation (FAST) Act—passed in December 2015 and reauthorized TCRP for 5 years from Fiscal Year (FY) 2016 through FY 2020 at \$5 million per year. The FAST Act also consolidated TCRP, moving it from

49 U.S.C. Chapter 53, Section 5313, as a standalone section, into Section 5312, Public Transportation Innovation, and changed its funding source from the General Fund to the Mass Transit Account of the Highway Trust Fund.

TCRP produced 23 publications in 2018, bringing the total to more than 677 since the program’s inception. The following TCRP publications of particular interest were completed during the year.

ADMINISTRATION

The two volumes of *TCRP Research Report 200: Contracting Commuter Rail Services*, offer guidance on and real-world examples of approaches to commuter rail services contracting:

- *Volume 1: Guidebook* evaluates potential approaches to providing commuter rail service, including the primary functions for commuter rail delivery—train operations, dispatch, maintenance of way, and maintenance of equipment. Included are key system attributes: passenger miles, train miles, revenues, infrastructure ownership, and other criteria. The guidebook contains a decision tree analysis and discusses trends and innovations.
- *Volume 2: Commuter Rail System Profiles* describes the delivery approaches of the 31 commuter rail services in North America and documents a broad range of strategies for managing the operation and maintenance issues associated with commuter rail services contracting.

LEGAL

TCRP Legal Research Digest 53: Legal Considerations in Relationships Between Transit Agencies and Ridesourcing Service Providers examines topics related to technology-based transportation network companies (e.g., Uber and Lyft). States and municipalities have differed in their regulatory responses to ridesourcing service providers (RSPs), resulting in a patchwork of rules and regulations.

Transit agencies have partnered with RSPs in varying capacities, both contractually and noncontractually. Such connections with public transit present potential regulatory, liability, procurement, and other legal concerns. This digest explores these issues and other topics.



TCRP Manager Gwen Chisholm Smith briefs the Executive Committee at the 2018 Annual Meeting. (Photo: Risdon Photography)

⁴ www.trb.org/terp



TCRP Report 130 evaluates the benefits and complexities of implementing battery electric transit. (Photo: Metropolitan Transportation Authority of the State of New York)

OPERATIONS, SAFETY, AND SECURITY

- *TCRP Research Report 193: Tools and Strategies for Eliminating Assaults Against Transit Operators, Volume 1—Research Overview* offers countermeasures and strategies to prevent or mitigate assaults against transit operators and documents the materials used to develop *Volume 2—User Guide*, which includes an operator assault risk management toolbox. *Volume 2* provides guidance to transit agencies for deploying the vulnerability self-assessment tool and route-based risk calculator and includes supportive checklists, guidelines, and methodologies.
- *TCRP Synthesis Report 130: Battery Electric Buses—State of the Practice* documents transit system practices planning, procuring, installing, operating, and maintaining battery electric buses for transit agencies interested in understanding the potential benefits and challenges of these vehicles, as well as for manufacturers; federal, state, and local funding agencies; and policy makers.

POLICY AND PLANNING

- *TCRP Research Report 201: Understanding Changes in Demographics, Preferences, and Markets for Public Transportation* was developed to help transit managers, planners, and communities understand how changes in demographics, traveler preferences, and markets for public transportation affect transit ridership. The report includes seven appendices.

- *TCRP Research Report 197: Tools for a Sustainable Transit Agency* presents the research that went into the development of two practical tools for improving sustainability at transit agencies: 1) Sustainability Routemap, an interactive PDF similar to a website that guides users through the process of improving a transit agency’s sustainability program and incorporates a checklist of possible actions to help users prioritize strategies and track progress, and 2) the S+ROI Calculator, an Excel workbook that quantitatively evaluates potential sustainability projects in terms of financial, social, and environmental returns.⁵

SERVICE CONFIGURATION

TCRP Research Report 195: Broadening Understanding of the Interplay Among Public Transit, Shared Mobility, and Personal Automobiles extends the research presented in *TCRP Research Report 188: Shared Mobility and the Transformation of Public Transit*. By exploring how shared modes—particularly transportation network companies—are incorporated into the mix of transportation options, the report broadens understanding of the interplay between emerging and established modes of transportation and will help transit agencies and other public entities understand opportunities and challenges related to technology-enabled mobility services.

⁵ Both tools are available for download at www.trb.org/Publications/Blurbs/177296.aspx.



The two-volume *TCRP Research Report 199: Transit Technical Training* analyzes training programs that work and offers practical strategies and free resources for agencies to use in implementing training for frontline employees. (Photo: Metro Transit, Flickr)

WORKFORCE DEVELOPMENT

TCRP Research Report 199: Transit Technical Training is a two-volume set that presents guidance on technical training programs and their implementation:

- *Volume 1: Guide to Applying Best Practices and Sharing Resources* documents the best models of technical training programs serving U.S. and international transportation agencies and related industries. The report also includes a training resource catalog to help transit agencies provide technical training for their employees.⁶
- *Volume 2: Guide to Overcoming Barriers to Implementing Best and Innovative Training* offers public transportation agencies best practices, strategies, and resources to assist in the implementation of effective, innovative training programs and techniques for frontline employees. The research products will be useful to senior managers and public transportation frontline employees, including operators and maintenance personnel.

Airport Cooperative Research Program

Airports are not merely portals linking destinations but are an indispensable feature of a globalized, interconnected world, facilitating the movement of goods and

⁶ Training resource available at <https://ntrb.enotrans.org>.

travelers, sustained commerce and economic growth, idea exchange, political problems and solutions, public health threats and relief, and more. In addition, airports directly spur local and regional economic development, energy and environmental innovation, job creation, emergency preparedness, and placemaking relevance to make surrounding communities more desirable, sustainable, adaptive, and enriching.

Established in 2006, sponsored by the Federal Aviation Administration, and managed by TRB, ACRP was founded to conduct applied research to help airports overcome day-to-day challenges. Offering hundreds of publications, compelling and well-attended events, and a series of engaging initiatives, ACRP promotes the exchange of knowledge and best practices throughout the airport industry. Its programs encourage collaboration to address shared challenges, professional networking activities, and timely information and tools to identify and address emerging challenges.

To date, ACRP has directed millions of dollars to fund more than 500 research projects spanning the spectrum of airport disciplines: airport design, construction, sustainability, finance, law, maintenance, operations, safety, policy, planning, human resources, and administration. Guided by a panel of experts, each research project addresses a specific industry need identified by public- and private-sector stakeholders such as airport practitioners, academics, consultants, advocates, and students. The research findings fill gaps in knowledge and practice, address persistent problems, identify best practices, and offer practical tools for practitioners. ACRP research is published and posted online as research reports, guidebooks, legal digests, syntheses of practice, and more.

IDEAHUB

Significant milestones during the past year include a full annual cycle of generating and harvesting problem statements using IdeaHub, ACRP's new user-friendly, web-based research idea portal. As of fall 2018, more than 600 industry practitioners had joined the IdeaHub community, working collaboratively to create nearly 150 research ideas. More than 80 of these ideas were refined further and submitted as problem statements, synthesis topics, or legal topics for funding consideration. Twenty-two of these submissions were included among the projects receiving funding for the FY 2019 program year.



Members of the ACRP standing panel on Legal Aspects of Airport Programs at a meeting in October.

We can solve more with better collaboration...

Sharing practical and accurate information, understandable guidance, helpful tools, and effective practices are the backbone of lasting improvements throughout the aviation industry. Each year, the Airport Cooperative Research Program (ACRP) finds new high-value research projects to expand our useful contributions and facilitate such industry improvements. Yet, it is the flow of new ideas from YOU, the airport industry practitioner, and your measure of the utility and value of these potential projects that make this possible!



What is IdeaHub?
 ACRP's problem statement process encourages airport industry practitioners to share their problems, pose questions that address current challenges, and suggest ways in which research can improve airports and help industry practitioners nationwide. The process includes collaboration with subject matter experts (SMEs) and recommendations from the airport industry. Yet, we have always wanted to expand participation and make it easier for more people to contribute.

So, to encourage broader participation and even more collaboration, ACRP is building the **IdeaHub**, a web-based tool that presents your ideas and helps you collaborate with other, like-minded practitioners to grow your idea into a quality problem statement. Through **IdeaHub** you will be able to vote up/down ideas, provide constructive comments, and watch as ideas develop into quality problem statements and new research projects. Best of all, you can watch it all as it happens.



IdeaHub, a web-based tool, allows industry experts to easily submit problem statements and create research ideas for ACRP funding.

INSIGHT EVENTS

ACRP also hosted its first series of Insight Events, innovative venues for interdisciplinary, face-to-face idea exchange among airport practitioners and leaders from other industries on topics that are either immediately challenging or beyond the scope of ACRP's traditional research timetable and process. The first Insight Event focused on the airport role in reducing the transmission of communicable diseases. Over two days, experts in international public health, emergency management, security, and airport operations presented global perspectives on disease transmission and shared lessons learned from real-life examples of how airports handled outbreaks.

ACRP also hosted Insight Events on economic and social sustainability and on challenges to implementing successful land use strategies at airports.



ACRP's first Insight Event, Airport Roles in Reducing Transmission of Communicable Diseases, was held in March and brought together airport and public health experts from around the world.

IMPLEMENTATION

In 2018 ACRP also crafted an implementation plan to identify and recommend tactical approaches for greater practical application of ACRP research results. By soliciting input from airport practitioners, aviation associations, and other stakeholders via interviews, surveys, and more, ACRP collected ideas to inform the implementation plan, such as

- Partnering with trade associations to produce training for practitioners,
- Conducting focused outreach to state associations and their conferences,
- Delivering presentations and training workshops on key ACRP products, and
- Planning a roadshow to engage universities and encourage the integration of ACRP products into their aviation curricula.

ACRP will review and analyze these ideas as it concludes the first phase of this effort.

WHAT TO EXPECT IN 2019

Through engagement with stakeholders and a well-established research process, ACRP will continue to offer relevant, valuable guidance and tools to help practitioners successfully manage their daily operations, avoid potential threats, and leverage new opportunities for growth and innovation. Specifically, ACRP will ensure that IdeaHub is optimized to encourage airport practitioners to submit ideas and to leverage the community to provide feedback, encouragement, and refinements that lead to high-quality problem statements.

Building on the success of its first three Insight Events, ACRP will host two additional events: one focused on public-private partnerships and another on blockchain technology and its impacts on and applications to airports. 2019 also will see the completion of ACRP's efforts to develop an implementation plan that integrates and reflects the findings and recommendations collected from stakeholder input.

ACRP also will continue to disseminate information about its ever-expanding, easily accessible, and free library of research products. Through the acclaimed webinar, Ambassador, and Champion programs, ACRP will bring awareness of its research products and opportunities. By enhancing its website design and functionality based on user feedback, ACRP also will improve its digital presence.



Preparing for connected airports and using emerging technologies like the internet of things to enhance user experience is the subject of *ACRP Research Report 191*.

Synthesis of Practice and IDEA Programs

NCHRP, ACRP, and TCRP each produce *Synthesis of Practice* reports, using a common approach to documenting and publishing information on the current state of practice in any given topic. TRB also manages three Ideas Deserving Exploratory Analysis (IDEA) programs for NCHRP, TCRP, and the Federal Railroad Administration (FRA). IDEA provides funding to entrepreneurs and researchers to advance the development of innovative solutions for the highway, transit, and railroad operators.

SYNTHESIS PROGRAMS

Practitioners and researchers make extensive use of *Synthesis of Practice* reports. A panel for each of the programs selects study topics. In 2018, a total of 32 new synthesis studies were initiated: 10 airport, 15 highway, and 7 transit. Each

synthesis report is researched and written by a consultant with experience in the topic area and with guidance from an expert panel that includes agency practitioners.

A list of reports published in the past 12 months appears on pages 52–55. Approximately 600 copies of each ACRP and NCHRP synthesis report are published in hard copy for distribution to state DOTs, airport operators, and TRB topic-area subscribers.

Since 2014, TCRP has published synthesis reports on the TRB website only; ACRP and NCHRP synthesis reports also are available on the website. A list of synthesis reports published in 2018 appears on pages 52–55.

IDEA PROGRAMS

IDEA programs fund early-stage investigations of potential

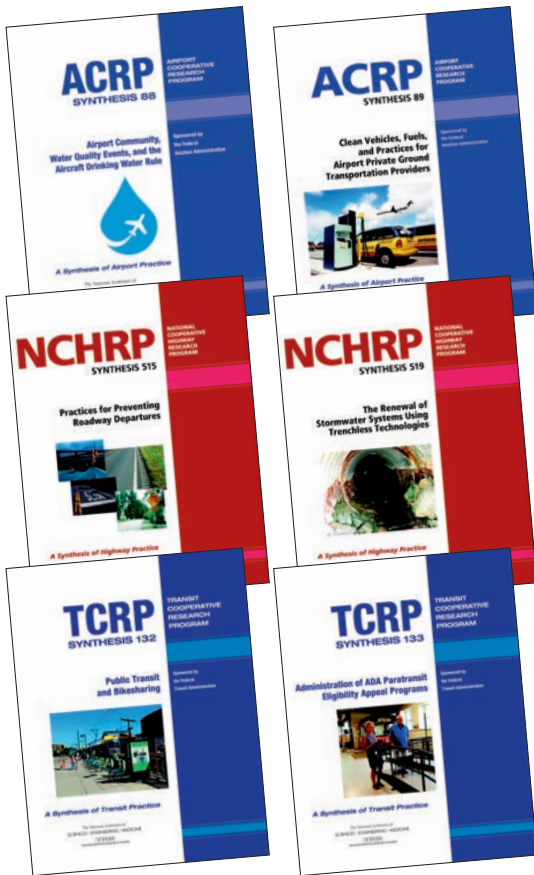
breakthroughs in transportation technology. Through small projects, researchers investigate the feasibility of innovative concepts that could advance transportation practice. IDEA programs sponsor high-risk research that is independent of the immediate mission concerns of public agencies and of the short-term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

Three IDEA programs operated in 2018:

- 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, for projects to improve the safety of railroad operations.

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. 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 2018 TRB Annual Meeting, the transit, highway, and safety programs conducted poster sessions highlighting 27 of the most promising current projects. Each session attracted a constant stream of interested visitors, who interacted directly with the inventors.



Members of the NCHRP IDEA panel meet to discuss promising research in Washington, D.C., in December. (Photo: Hilary Freer)

The box on page 38 lists recently completed IDEA projects. 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. Contractor final reports for completed IDEA projects are posted on the TRB website.

IDEAL-CT, a simple indirect tension asphalt cracking test for asphalt mix design and quality assurance and control, developed in a current IDEA project (Highway IDEA Project 195) and sparked interest among state DOTs. The test requires minimal operator training; is sensitive to asphalt mix composition; shows good repeatability, with a coefficient of variation of less than 20%, and good correlation to field performance; takes less than a minute to complete; and needs no instrumentation, cutting, gluing, drilling or notching of the test specimen. State DOTs in Georgia, Missouri, Minnesota, New Jersey, Oklahoma, Texas, and Virginia are evaluating the test for potential implementation, and the ASTM D04.26 Fundamental-Mechanistic Test Committee is in the process of standardizing the test procedure.

Behavioral Traffic Safety Cooperative Research Program

The newest CRP originated with the creation of a National Cooperative Research and Evaluation

Program administered by the National Highway Traffic Safety Administration (NHTSA) and jointly managed by the Governors Highway Safety Association (GHSA) and NHTSA. Funding was set at \$2.5 million and is withheld from the Section 402 grant program each federal fiscal year (FFY). Project selection began in FFY 2014 and continues annually.

Beginning in FFY 2018, TRB took on the management of the program's research activities. The name of the program was changed to the Behavioral Traffic Safety Cooperative Research Program (BTSCRCP) in 2017 to clarify its purpose and to distinguish it from other TRB research programs. A forum for coordinated, collaborative research to address issues integral to GHSA, NHTSA, and traffic safety professionals at all levels of government and the private sector, BTSCRCP provides practical, ready-to-implement solutions to save lives, prevent injuries, and reduce costs of road traffic crashes associated with unsafe behaviors.

The GHSA Research Committee serves as the governing board for BTSCRCP. The Research Committee reports to the GHSA Executive Board. The board consists of representatives of the 10 NHTSA regions and appoints the GHSA Research Committee, which monitors and facilitates the program's activities. The ultimate goal is to oversee a quality research program that is committed to addressing research issues facing state highway safety offices and to promote research findings that improve highway safety.



IDEAL-CT asphalt cracking test developed by Highway IDEA Project 195. The test is simple, rapid, reliable, and sensitive to asphalt mix design. It needs no instrumentation, cutting, gluing, drilling or notching of the test specimen. (Photo courtesy Inam Jawed)



TRB Senior Program Officer Bill Rogers (*far left*) leads the first panel meeting on the Guide for Behavioral Traffic Safety Messaging on Variable Message Signs—research conducted under the newest CRP program.

FIRST PROJECTS

Contracts awarded for the first four BTSCRCP projects include

- BTSCRCP Project 01, Guidance for Employer-Based Behavioral Traffic Safety Programs for Drivers in the Workplace;
- BTSCRCP Project 02, Guide for Behavioral Traffic Safety Messaging on Variable Message Signs;
- BTSCRCP Project 03, Examining the Implications of Legislation and Enforcement on Electronic Device Use while Driving; and
- BTSCRCP Project 04, Tracking State Traffic Citation and Adjudication Outcomes.

The four new research projects selected by the GHSA Executive Board include

- BTSCRCP Project 06, Guide for MPO and HSO Coordination on Behavioral Traffic Safety Countermeasures;
- BTSCRCP Project 07, Assessing the Impacts of Connected, Automated, and Autonomous Vehicles on the Future of Transportation Safety (jointly funded with NCHRP Project 17-91);
- BTSCRCP Project 08, Use of SHRP 2 Naturalistic Driving Study Database to Improve Teen Driving Safety: Phase 1 Proof of Concept; and
- BTSCRCP Project 09, The Influence of Infrastructure Design on Distracted Driving.

Staff News

Natalie Barnes was promoted to Associate Director of Publications.

Jennifer Correro was promoted to Assistant Editor.



Four contracts were awarded as the first Behavioral Traffic Safety Cooperative Research Program studies, including the implications of legislation on electronic device use while driving.

Keyara Dorn was hired as TCRP Program Coordinator.

Doug English and **Margaret Hagood** were promoted to Senior Editor.

Luwam Ermias of Cardozo Education Campus in Washington, D.C., joined the CRP staff in summer 2018 as TransSTEM Academy intern.

Daniel Magnolia and **Robert Turner** took on the newly created positions of CRP Travel Specialists.

Jarrel McAfee was hired as Senior Project Assistant.

Recently Completed IDEA Projects

- Highway IDEA Project 185, CurvePortal for Automated Identification and Extraction of Horizontal Curve Information
- Highway IDEA Project 186, Development of an Electrical Probe for Rapid Assessment of Ground Improvement
- Highway IDEA Project 187, A Low-Cost Mobile Proximity Warning System in Highway Work Zone Safety
- Highway IDEA Project 188, A Class of V-Connectors for Bridge Deck-Pier and Pier-Footing Joints with Combined Advantage of Integrated Design and Seismic Isolation While Enabling Accelerated Bridge Construction
- Highway IDEA Project 189, A Novel Vision Sensor for Remote Measurement of Bridge Displacement
- Highway IDEA Project 193, DART Field Validation and Prototype Refinement
- Rail Safety IDEA Project 31, Modeling and Validation of Standards for a Sleeper Compartment on Accessible Passenger Rail Vehicles
- Transit IDEA Project 84, Development of a Mass-Based Automated Passenger Counter
- Transit IDEA Project 86, Advanced Neutral Temperature Estimation Using Solitary Waves



EXECUTIVE OFFICE

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 the Division Committee; and provides support and direction for human resources issues, staffing needs, information technology services, and the TRB Minority Student Fellows Program.

In addition, the Executive Office develops and directs the Board's communications and outreach efforts; oversees efforts to expand TRB's stakeholder community; 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.

Oversight Activities

The Executive Office supports the work of the TRB Executive Committee, which provides strategic 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, to pursue the following goals:

1. Develop and implement processes to identify and address emerging and critical transportation issues in a strategic and proactive manner.
2. Involve a broader cross section of stakeholders and constituencies in TRB programs and activities.
3. Conduct strategic reviews of the portfolio of TRB legacy programs and products and introduce activities to meet critical marketplace needs.
4. Apply systematic approaches for identifying and tracking the impacts of TRB's research programs.
5. Strengthen the long-term financial stability of TRB by augmenting traditional federal and federally derived sources of funding.
6. Develop and implement coordinated approaches to communicate information on TRB activities and products that address emerging and critical issues.



TRB Executive Director Neil Pedersen presents the strategic plan to the Executive Committee at the TRB 2018 Annual Meeting. (Photo: Risdon Photography)



Susan Hanson
Chair, Division Committee



Chris Hendrickson
Vice Chair, Division Committee



Neil J. Pedersen
Executive Director



Russell W. Houston
Associate Executive Director



Division Committee members (left to right) James M. Crites; Chris Hendrickson; Kathleen Turnbull; Scott Bennett; Susan Hanson, Division Committee Chair; Malcolm Dougherty; Victoria A. Arroyo; Neil Pedersen; and Daniel Sperling. (Photo: Risdon Photography)

7. Provide TRB staff with the knowledge, resources, and tools necessary to meet and exceed the expectations of TRB stakeholders and customers.

In 2018, the Executive Office also initiated a SWOT analysis—that is, an examination of strengths, weaknesses, opportunities, and threats—in preparation for the development of an updated TRB strategic plan in 2019.

Appointments and Report Review

The Executive Office processes the Board’s large volume of committee and panel appointments and maintains committee membership records. It also manages the

institutional report review process according to established guidelines. Oversight of committee and panel appointments and of report review is the responsibility of the TRB Division Committee, which ensures that TRB meets institutional standards and that its activities are appropriate for the National Academies of Sciences, Engineering, and Medicine. The name now is consistent with the oversight committees of the other divisions in the National Research Council. As part of its oversight, the Division Committee monitors the Board’s progress in expanding the participation of minorities, women, and young professionals on TRB committees and panels.

In January 2019, Susan Hanson will complete her second 3-year term as chair of the Division Committee. During her 6 years of service as chair, Hanson oversaw the approval of approximately 750 TRB reports and publications and the creation of some 422 TRB committees and panels. She also was a strong leader and advocate for TRB’s efforts to continue to advance inclusion and diversity in its activities and programs. Chris Hendrickson will take over as chair of the Division Committee.

Minority Student Fellows Program

With support from the U.S. Federal Highway Administration and other organizations and individuals, the TRB Minority Student Fellows Program seeks to increase the participation of students of different racial and ethnic groups that are underrepresented in the Annual Meeting, on TRB committees and activities,



The Minority Student Fellows Program actively explores research, ideas, and solutions from diverse perspectives and provides support and presentation opportunities for students at the TRB Annual Meeting. (Photo: Risdon Photography)

and in transportation research.¹ The program provides expenses for students from select Minority-Serving Institutions to attend the Annual Meeting and present research. Since the program began in 2010, 126 graduate and undergraduate students have participated, with 24 selected for the 2019 Annual Meeting.

Communications

TRB, along with the National Academies of Sciences, Engineering, and Medicine, is transforming its approach to communicating transportation issues and is making enhancements to the dissemination of research findings worldwide. Communications milestones for 2018 included the following:

- Exceeding 70,000 subscribers to the National Academies TRB E-Newsletter;²
- Increasing engagement and growth on Twitter, with nearly 21,000 followers;³ Facebook, with 7,500 likes; and LinkedIn, with 5,100 followers;
- Attracting an average of 780,000 page views per month on TRB's website, www.TRB.org;
- Production of more than 100 webinars viewed by more than 21,000 people;⁴ and
- Creation of eight TRB Straight to Recordings—on-demand webinars—that collectively had more than 3,000 views.⁵

¹ www.trb.org/abouttrb/minoritystudent.aspx

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

³ www.trb.org/ElectronicSessions/Twitter.aspx

⁴ www.trb.org/ElectronicSessions/ConferenceRecordings.aspx

⁵ www.trb.org/electronicsessions/str.aspx

Expanding the Stakeholder Community

In 2018, TRB continued working to become more diverse in its partnerships, more inclusive of new stakeholders, and more global in its outlook. As one of six major program divisions of the National Academies of Sciences, Engineering, and Medicine, TRB's mission is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal.

This innovation cannot occur without the participation of more than 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 by participating on TRB committees, panels, and task forces. Others support TRB activities as Global Affiliates; by participating in TRB-sponsored conferences, workshops, and webinars; and by authoring technical papers, contract research reports, and much more.

This year TRB sought to launch and support new programs and initiatives to bring additional value to the TRB community: the revamped Global Affiliate program, a new Career Fair, and enhanced sponsorship opportunities. As TRB approaches its centennial in 2020, it seeks to expand its organizational tent and strengthen its mission in some very deliberate ways: by engaging new or nontraditional entrants to the transportation field; ensuring that volunteers and staff are reflective of and attuned to industry trends; and proactively working with stakeholders to address impending challenges in the field, such as workforce preparedness, technology deployment, and resilience.

GLOBAL AFFILIATE PROGRAM

Through its recently revamped Global Affiliate program, TRB continues to expand its network of affiliated organizations by providing new and innovative ways for universities, public agencies, nonprofits, consultants, and technology and other private-sector firms to engage further with TRB and with the extended community of multimodal transportation experts. Participating organizations can select a package of benefits from six levels of support commensurate with the benefits they value most.

The Global Affiliate program now boasts more than 20 benefits offering knowledge and resources, participation, networking, and exposure and lays the foundation to attract new



New communications efforts include using social media to highlight research and innovation by state departments of transportation; for example, the impact of bike lane and sidewalk projects in Shady Cove, Oregon. (Photo: Oregon Department of Transportation)

modes, segments, and entrants for continued invigoration, growth, and leadership among the stakeholders that have become increasingly critical to the expanding role of transportation.

FORUM ON PREPARING FOR AUTOMATED VEHICLES AND SHARED MOBILITY

The National Academies–TRB Forum on Preparing for Automated Vehicles and Shared Mobility held a kickoff meeting in February 2018. Forum participants also met in conjunction with the Automated Vehicle Symposium in July 2018 in San Francisco, California. These two in-person meetings were supplemented with webinars in the spring and fall.

The Forum brings together organizational partners to share perspectives on the critical issues surrounding the deployment of automated vehicles and shared mobility. Emphasized is the discussion, identification, and facilitation of the fact-based research required to deploy these technologies in a manner and timeframe that informs policy to meet long-term goals. The Forum receives support from more than 30 sponsoring and participating organizations from the public, private, and academic sectors. Other Forum participants include representatives from certain TRB and National Academies’ committees and boards, as well as from partner associations.

The Forum’s 2018 activities included the following:

- Publishing the white paper “National Academies–TRB Forum on Preparing for Automated Vehicles and Shared Mobility,” which makes the case for a strategic research effort and was published as Transportation Research Circular E-C236;
- Producing a catalogue of critical research needs, with more than 100 research topics across five categories;
- Ranking the top ten issues of critical concern to Forum participants;
- Producing a directory of information resources that relate directly to the objectives of the Forum;
- Launching a website and online community to enable Forum participants to post resources, notices, questions, topics for discussion, events, funding opportunities, and other information between meetings; and
- Making presentations on Forum activities and products at many conferences and meetings sponsored by TRB and other organizations.



The Automated Vehicle Symposium in San Francisco drew a packed audience and allowed members of the Forum on Preparing for Automated Vehicles and Shared Mobility to exchange information and ideas about the rapidly evolving technology. (Photo: Steven Andreadis)

For more information on the Forum, visit <https://trb.org/AVSMForum>.

CAREERS IN MOTION INITIATIVE

At the 2018 Annual Meeting, TRB hosted special programming sessions to engage attendees at all career levels in the professional development opportunities available through the TRB network and at the Annual Meeting. TRB also debuted the Careers in Motion Networking Fair, which included employer tables, quick-fire talks, a resume critique area, and opportunities and tips for networking. The



Narelle Haworth, Queensland University of Technology, speaks with an Annual Meeting attendee. New in 2018, the Careers in Motion Networking Fair brought together transportation professionals and potential employers. (Photo: Risdon Photography)



event allowed prospective employers from a wide range of sectors and modes to meet with transportation professionals.

The event coincided with the launch of TRB's Careers in Motion Job Center, an online platform developed in response to impending challenges of the broader transportation industry to attract and retain its professional workforce. The website curates professional transportation jobs from multiple employers and disciplines based around the world and connects these jobs to the broader TRB community. TRB will continue to add more features and networking opportunities to this growing platform.

GIVING PROGRAM

In 2018, TRB continued to expand opportunities for individuals and organizations who desire to support TRB through philanthropic contributions. These contributions help to

- Support activities being developed to help mark the 100th anniversary of TRB, which is November 11, 2020;
- Provide fellowships for young people and other targeted groups to travel to participate in TRB meetings and activities;
- Address new and emerging transportation issues;
- Self-initiate TRB policy studies;
- Establish special programs, such as a Leadership Development Program in Transportation Research; and

- Fund the National Academies' Mirzayan Fellows program or other fellowships for short-term internships at TRB.

Additional information can be found by clicking on the "Support" button on the TRB home page (www.TRB.org).

Information Technology and Research Services

The responsibilities of the Information Technology (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; producing and managing Transportation Research Information Services (TRIS) databases; and managing the TRB Library.

INFORMATION TECHNOLOGY

TRB relies on several software systems to meet program requirements: to maintain committee records, build and maintain TRB's extensive website, build and make available TRIS databases, support the TRB Bookstore and the webinar program, support the Annual Meeting, and help manage and monitor the progress of CRP projects and products.

In 2018, TRB continued to develop and enhance the MyTRB site, incorporating feedback from internal and external users. MyTRB provides technical standing committee leaders with a suite of online tools to manage committee membership, helps Annual Meeting participants manage sessions and events, allows users to register for TRB Webinars, and assists publications subscribers in managing claims for publications not received. MyTRB also allows committee members and other volunteers to maintain their own user profiles and contact information. The most recent enhancements include an update to the MyTRB profile page that makes it easier to use and an update to the Online Directory that includes new filtering, sorting of search results, and unique URLs for pages containing detailed information about committees and panels.

TRANSPORTATION RESEARCH INFORMATION SERVICES

TRIS continues to develop and maintain the TRIS databases and in 2018 rolled out an



TRB Senior librarian Alexandra Briseno leads a training session on maximizing online web searches.

updated, responsive interface for the Research in Progress (RiP) database.

- **TRID** is a comprehensive bibliographic database containing more than 1.2 million records of citations and abstracts of transportation research in all modes and disciplines.⁶ The records comprise published or ongoing research in English, German, French, or Spanish; more than 256,000 records link to full-text publications. All the TRIS databases are available free of charge on TRB's website.
- The **Publications Index** includes 77,000 citations and abstracts for all TRB, Highway Research Board (HRB), Strategic Highway Research Program (SHRP), and Marine Board publications since 1923.⁷ Records contain links to available full-text documents and to ordering information.
- The **Research Needs Statements** database is a dynamic collection of highest-priority topics developed by TRB technical standing committees.⁸ The database serves as a tool for reviewing research needs, setting research priorities, and identifying gaps in current research. Approximately 1,300 statements are posted.

⁶ <http://trid.trb.org>

⁷ <http://pubsindex.trb.org>

⁸ <http://rms.trb.org>

- **Research in Progress** is a database of more than 13,600 records of active or recently completed research projects.⁹ The current awareness service notifies users about new and updated project records in specified subject areas. TRID offers users an option for searching the RiP database or the RiP and TRID databases simultaneously.

TRB LIBRARY

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

Centennial Anniversary Planning

TRB turns 100 on November 11, 2020.

In 2017, the TRB Executive Committee appointed a task

force to develop a plan to commemorate the milestone. The plan was completed and approved in the spring of 2018, and work began immediately to fulfill the components of the plan: a book, website, brochures, videos, and exhibits. A primary goal of the celebration will be to promote the value of transportation and TRB's critical role in the process.

Details on the Centennial Celebration are available at www.TRB.org/Centennial.



Staff News

Mark Norman, past Technical Activities Division Director and Director, Development of Strategic Initiatives, retired as a full time employee in 2018. He has continued to serve in a more limited capacity as a Resident Scholar.

⁹ <http://rip.trb.org>



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 \$90 million for the calendar year 2018. A statement of income and expenditures appears on pages 10–11.

designation for organizations that seek to shape the way the world travels, ships goods, and connects. Global affiliate organizations receive a wide range of benefits, including copies of TRB printed publications; agencywide access to TRR Online, the web posting of papers from the *Transportation Research Record: Journal of the Transportation Research*

Affiliate and Sponsor Services

TRB's core programs have four main levels of support: student affiliates, individual affiliates, global affiliates, and sponsors. All affiliates and sponsors contribute to the support of TRB activities through annual contributions 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*, TRB's magazine, which features articles on innovative and state-of-the-art research and practice in all modes of transportation; discounts on most TRB books and reports; and use of the TRB library.

In 2017, TRB launched its Global Affiliate program, which replaced the organizational affiliate program and offers a new TRB



TRB's Global Affiliate program offers benefits including complimentary registration at the TRB Annual Meeting. (Photo: Event Photography of North America)

Board; and complimentary registrations—as well as marketing and exhibit opportunities—at the TRB Annual Meeting. The Global Affiliate program allows organizations to choose a level that best matches their specific interests and needs—from the Copper Contributor level, at \$5,000, to the Inconel Icon level, at \$75,000.

Organizations that are members of the Global Affiliates Sustaining Circle are entitled to complimentary registration for all employees to TRB webinars. In 2018, TRB conducted approximately 100 webinars on a variety of topics, with a total of more than 20,000 registrants. The webinars offered more than 100 professional development hours for professional engineers, and certified planners had the opportunity to earn more than 40 hours of certification maintenance credits from the webinars approved by the American Institute of Certified Planners. The minimum annual contribution to become a member of the Global Affiliates Sustaining Circle is \$25,000, with a 20 percent discount for nonprofit organizations and educational institutions.

Sponsors are the major source of financial support for TRB’s core programs. Federal, state, and local government agencies and professional societies and organizations that represent industry groups are eligible to participate as TRB sponsors. Fees and services are negotiated to fit each sponsor’s needs and to assure fundamental support for the Board’s programs and activities of interest to the entire transportation community. Each sponsor places a representative on the TRB Executive Committee. The current minimum annual contribution to become a TRB sponsor is \$71,750. (See pages 47–48 for a list of TRB sponsors and members of the Global Affiliates Sustaining Circle.)

Publication Sales and Distribution

TRB disseminates the results of transportation research and technology worldwide through the timely distribution of its publications. In



TRB sponsors, global affiliates, and subscribers can receive all publications released by TRB or can receive publications tailored to selected transportation modes or areas of interest. (Photo: Risdon Photography)

addition to printed editions, TRB publishes almost all publications—some exclusively—in electronic format. The *Transportation Research Record: Journal of the Transportation Research Board* ceased producing a print edition after the 2016 series and is now available only in electronic format.

Sponsors, global affiliates, and subscribers have the option to receive all publications released by TRB or to receive only those publications in a particular transportation mode or select area of interest. A complete listing of TRB publications issued from January 1 through December 31, 2018, appears on pages 52–55.



Gary J. Walker
Director
Finance and Business
Operations

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

Dianne Kresich

Arkansas State Highway and Transportation Department

Elisha C. Wright-Kehner

California Department of Transportation

Jim Appleton

Colorado Department of Transportation

Amanullah Mommandi

Connecticut Department of Transportation

Colleen Kissane

Delaware Department of Transportation

Drew Boyce

District Department of Transportation

Stephanie Dock

Florida Department of Transportation

James D. Dockstader

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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

Barry K. Partridge

Iowa Department of Transportation

Peggi S. Knight

Kansas Department of Transportation

Richard Kreider

Kentucky Transportation Cabinet

Jason Siwula

Louisiana Department of Transportation and Development

Samuel Cooper

Maine Department of Transportation

Dale Peabody

Maryland State Highway Administration

Allison R. Hardt

Richard Y. Woo

Massachusetts Department of Transportation

Stephen Woelfel

Michigan Department of Transportation

Carol Alrich

Minnesota Department of Transportation

Linda Taylor

Hafiz Munir

Mississippi Department of Transportation

Cynthia Smith

Missouri Department of Transportation

Jennifer Harper

Montana Department of Transportation

Susan C. Sillick

Nebraska Department of Roads

Mick S. Syslo

Nevada Department of Transportation

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New Hampshire Department of Transportation

Ann Scholz

New Jersey Department of Transportation

Amanda Gendek

New Mexico Department of Transportation

Vicent Lujan

New York State Department of Transportation

Donald Streeter

North Carolina Department of Transportation

Neil Mastin

North Dakota Department of Transportation

Matthew Linneman

Ohio Department of Transportation

Vicky Fout

Oklahoma Department of Transportation

David Ooten

Oregon Department of Transportation

Michael Edward Bufalino

Pennsylvania Department of Transportation

Douglas Zimmerman

Rhode Island Department of Transportation

Colin A. Franco

South Carolina Department of Transportation

Terry Swygert

South Dakota Department of Transportation

David L. Huft

Tennessee Department of Transportation

Larry McGoogin

Texas Department of Transportation

Rocio Perez

Utah Department of Transportation
Cameron T. Kergaye

Vermont Agency of Transportation
Emily Parkany

Virginia Department of Transportation
Catherine McGhee

Washington State Department of Transportation
Rhonda Brooks

West Virginia Department of Transportation
Gehan Elsayed

Wisconsin Department of Transportation
Diane Gurtner

Wyoming Department of Transportation
Timothy McDowell

Federal Government

U.S. Department of Transportation
Federal Aviation Administration
Federal Highway Administration
Federal Motor Carrier Safety Administration
Federal Railroad Administration
Federal Transit Administration
National Highway Traffic Safety Administration
Office of the Assistant Secretary of Transportation for
Research and Technology

U.S. Air Force Civil Engineer Center
U.S. Coast Guard
U.S. Department of Energy
U.S. Department of the Interior
U.S. Environmental Protection Agency

Other Organizations

**American Association of State Highway and Transportation
Officials**
American Public Transportation Association
Association of American Railroads
California Air Resource Board

Marine Board Sponsors

Bureau of Safety and Environmental Enforcement
Maritime Administration
National Oceanic and Atmospheric Administration
Office of Naval Research
Office of the Supervisor of Salvage & Diving, U.S. Navy
U.S. Army Corps of Engineers
U.S. Coast Guard

Global Affiliates Sustaining Circle

American Transportation Research Institute
Applied Research Associates, Inc.
Bentley Systems, Inc.
Caliper Corporation
Cambridge Systematics
Econolite
EXP US Service
HDR
HNTB Corporation
Jacobs Engineering Group, Inc.
Kittelson & Associates
National Transportation Safety Board
Port Authority of New York and New Jersey
Texas A&M Transportation Institute
U.S. Army Corps of Engineers
U.S. Department of Agriculture
VHB
WSP

Calendar and Fiscal Year 2018 Financial Support Provided by

- 90 Sponsors and Sustaining Global Affiliates
- 70 Organizational Global Affiliates from 10 nations
- More than 1,000 individual affiliates

TRB WEBINARS, WEBCASTS, AND STRAIGHT-TO-RECORDING SESSIONS

(January 1, 2018–December 31, 2018)

January

- 18 Uses of Social Media During an Airport Emergency
- 23 Vizguide: Data Visualization for Transportation Agencies
- 29 Standardizing Truck GPS Data to Evaluate Truck Freight Bottlenecks
- 29 Funding Industrial Aviation
- 31 Transportation Network Companies: Challenges and Opportunities for Airport Operators

February

- 5 A New Functional Classification System to Aid Contextual Design
- 7 Runway Protection Zone Risk Assessment Tool
- 14 Roller-Compacted Concrete Pavements State of the Practice
- 15 Leveraging Transportation Mode Expertise for Community Resiliency
- 26 Data Management and Governance Practices at Transportation Agencies
- 27 Spatial Modeling for Highway Performance Monitoring System Data: Part 1
- 28 Considerations for Pavement Applications and Maintenance at Airports

March

- 6 Spatial Modeling for Highway Performance Monitoring System Data: Part 2
- 8 Assessing Community Annoyance with Helicopter Noise
- 12 Improving the Resilience of Transit Systems Threatened by Natural Disasters
- 14 Modeling the Relationship Between Vehicle Speed and Fuel Consumption
- 15 Permeable Concrete Pavements: State of the Practice
- 20 Intersection Control Evaluation for Roundabouts and Alternative Intersections
- 21 Interpreting the Results of Airport Water Monitoring
- 22 Cold Recycled and Reclaimed Asphalt Concrete Properties for Pavement Design
- 26 Pavement Maintenance Programming Using 3-D Laser Technology

- 27 Specifying and Measuring Asphalt Density to Ensure Pavement Performance
- 29 Pavement Marking Maintenance: Practices and Proposed Standards

April

- 2 The Future of Airport Surface Management Tools and Benefits to Operational Efficiency
- 3 Quality Assurance and Quality Control for Pavement Preservation
- 5 Addressing Significant Weather Impacts on Airports
- 9 Road Safety and Vulnerable Road Users in Low- and Middle-Income Countries
- 11 Modern Traffic Signal Preemption at Highway–Rail Grade Crossings
- 16 Public-Private Partnerships and the Mobility on Demand Sandbox Program
- 17 Bases/Subbases for Concrete Pavements
- 24 Design Guidelines for Bridges Subjected to Light Rail Transit Loads
- 25 Technology Changes Influencing the Decline of Vehicle Emissions
- 26 Generating Revenue from Commercial Development on or Adjacent to Airports
- 30 Design for Stream Restoration and Channel Stability at Stream Crossings

May

- 1 The Transportation Research Thesaurus
- 2 Development and Management of Sustainable Information Portals
- 3 Air Cargo Facility Planning and Activities
- 7 Return on Investment in Asset Management Systems and Process Improvements
- 15 Who's Riding Transportation Network Companies and What Does It Mean for Public Agencies?
- 17 Preventative Maintenance at General Aviation Airports
- 21 Case Studies: The Diversity of Roundabouts
- 22 Organizational Change for Performance and Asset Management

- 24 Internal Curing of Concrete Pavements: State of the Practice
- 30 Resiliency in Practice: Strategies for Knowledge, Information, and Data

June

- 5 Tools for a Sustainable Transit Agency
- 7 Classifying Fracture Critical Members
- 13 Legally Defensible Disadvantaged Business Enterprise Disparity Studies
- 18 Nail it or Fail it: How to Build a Successful Mobility-as-a-Service Story
- 21 Field Performance of Corrugated Pipes Manufactured with Recycled Materials

July

- 10 Using Pavement Management to Set and Analyze Targets for Federal Reporting
- 11 Seismic Design and Accelerated Bridge Construction
- 12 Practices for Establishing Contract Time for Highway Projects
- 16 Water Finance Clearinghouse for Transportation Stormwater Infrastructure
- 17 Structural Design of Porous Asphalt Pavements
- 18 Preparing and Using Airport Design Day Flight Schedules
- 23 Port Data Portals for 21st-Century Shipping
- 26 Strategic War Games
- 31 Bridge Superstructure Tolerance to Foundation Movements

August

- 2 Cell Phone Location Data for Travel Behavior Analysis
- 6 Construction of Mass Concrete Transportation Infrastructure
- 7 Current and Evolving Practices in Asset Management for Highway Agencies
- 14 Emergency Preparedness Against Infectious Diseases on Public Transit
- 15 Optimal Replacement Cycles for Highway Operations Equipment
- 20 Observation Method for Scour: A Tool for the Bridge Engineer

- 23 Pavement Design Role Reversal: Mixtures Before Design and Construction
- 28 Workforce of the Future: Educating, Training, and Retraining the Freight Industry
- 29 Beyond Volume: Investment Prioritization Methods for Low-Volume Roads
- 30 Hacks and Attacks: Keeping Critical Transportation Infrastructure Resilient

September

- 6 Disruptive Technologies: Impacts on Transportation Revenues
- 10 Performance-Based Mix Design of Porous Friction Courses
- 12 Service Life and Durability of Steel Culverts and Buried Bridges, Part 1
- 14 Passenger Value of Time, Benefit-Cost Analysis, and Airport Capital Investment Decisions
- 17 Predicting Deformations of Geosynthetic Reinforced Soil for Bridge Support
- 18 How to Process Automatic Identification System Data to Maximize Utility and Overcome Data Challenges
- 20 Continuous Access Priced Managed Lanes: What Have We Learned So Far?
- 25 Meteorological Effects on Roadway Noise

- 26 Establishing a Coordinated Local Family Assistance Program for Airports
- 27 Practices in Rural Regional Mobility: Case Studies and Lessons Learned

October

- 2 Guidelines for Resurfacing, Restoration, and Rehabilitation Projects
- 4 Static and Seismic Design of Piles for Downdrag
- 9 Building a 21st Century Transportation Planning Workforce
- 10 Federal Environmental Case Law Update on Transportation Matters
- 11 Understanding the Challenges of Airport Drinking Water Quality Events
- 15 Successful Mobility Management Practices in Small Urban and Rural Areas
- 23 Designing Pavement Subsurface Drainage Using DRIP Software
- 24 Wildlife-Vehicle Collision Mitigation: Data to Decisions
- 25 Examining the Effects of Nonemergency Medical Transportation Brokerages on Transportation Coordination
- 30 Reducing Pavement Damage Due to Spring Thaw
- 31 Moisture Damage in Asphalt Pavements: Forensic Analyses and Research Needs

November

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TRB CONFERENCES AND WORKSHOPS

(January 1, 2018–December 31, 2018)

January

- 7–11 TRB 97th Annual Meeting
30–31 Planning for Shifting Trade Workshop*

March

- 6–7 Airport Cooperative Research Program Insight Event: Airport Roles in Reducing Transmission of Communicable Diseases
21 2018 Ferry Safety and Technology Conference*
29 4th Annual Contra Costa Redefining Mobility Summit

April

- 16–18 International Conference on Advances in Materials and Pavement Performance Prediction*
16–19 Transport Research Arena 2018*

May

- 2–4 8th Symposium on Pavement Surface Characteristics 2018*
16–18 Road Safety on Five Continents*
20–22 10th National Aviation System Planning Symposium
22 ITF Summit: Transport and Security Research Day 2018*
27–30 4th GeoShanghai International Conference*

June

- 1–4 3rd International Conference on Infrastructure and Materials*
6–8 International Transportation and Economic Development Conference
18–20 6th National Bus Rapid Transit Conference
18–21 2018 World Transport Convention*
19–21 5th Biennial Marine Transportation System Research and Technology Conference

- 20 Workshop on Future *Highway Capacity Manual* Updates
24–27 7th International Conference on Innovations in Travel Modeling
25 Transportation-Related Noise and Vibration Committee Summer Conference

July

- 9–12 Automated Vehicles Symposium*
9–13 9th International Conference on Bridge Maintenance, Safety, and Management*
14–17 12th National Conference on Transportation Asset Management
15–18 American Society of Civil Engineers International Conference on Transportation and Development*
15–18 57th Annual Workshop on Transportation Law
17–19 12th Access Management Conference
22–24 Geospatial Data Acquisition Technologies in Design and Construction
23–25 GeoChina 2018 International Conference*
29–Aug. 1 Association for Commuter Transportation International Conference*

August

- 1–3 2018 Summerail Conference*
7–9 3rd International Greenshield's Conference on Traffic Flow Theory
8–9 National Household Travel Survey Data for Transportation Applications Workshop
22–24 16th National Tools of the Trade Transportation Planning Conference
28–31 National Hydraulic Engineering Conference*

September

- 5–6 Freight Fluidity Performance Measurements Implementation

- 10–13 TRB Workshop at the 69th Highway Geology Symposium 2018*

- 16–18 Disrupting Mobility Summit*

- 19–21 Annual Conference of the Florida Association of Environmental Professionals*

- 25–27 2018 Workshop on Managed Lanes

- 30–Oct. 3 23rd National Conference on Rural Public and Intercity Bus Transportation

October

- 4 2018 Chinese Overseas Transportation Association International Symposium on Emerging Trends in Transportation
4–6 23rd National Conference on Rural Public and Intercity Bus Transportation
9–10 Transportation Resilience Innovations Summit and Exchange
22–24 European Road Congress: Corridors for Shared Prosperity and Sustainable Mobility*

November

- 5–7 1st International Conference on Stone Matrix Asphalt*
7–8 Forum on the Impact of Vehicle Technologies and Automation on Users: Vulnerable Road Users and Driver Behavior and Performance*
12–15 15th International Conference on Mobility and Transport for Elderly and Disabled Persons
24–28 GeoMEast International Conference: Sustainable Civil Infrastructures—Structural Integrity*
27–28 6th Florida Automated Vehicles Summit*

December

- 2–5 6th International Symposium on Nanotechnology in Construction*

*TRB was cosponsor of the meeting.

PUBLICATIONS

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Transportation Research Records (online)

- 2672:1 Systems Security, Resilience, and Emergency Management 2018
- 2672:2 Climate Change and Decarbonization 2018
- 2672:3 Socioeconomic, Sustainability, Health, and Human Factors 2018
- 2672:4 Revenue and Economics 2018
- 2672:5 Finance and Pricing 2018
- 2672:6 Socioeconomic, Sustainability, and Human Factors in Transit 2018
- 2672:7 Transportation Policy
- 2672:8 Public Transportation 2018
- 2672:9 Freight Systems
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- 2672:11 Marine Transportation and International Trade
- 2672:12 Maintenance and Operations
- 2672:13 Research and Education
- 2672:14 Freeway Operations; Regional Systems Management and Operations; Managed Lanes 2018
- 2672:15 Highway Capacity and Quality of Service 2018
- 2672:16 Visibility and Work Zone Traffic Control 2018
- 2672:17 Operational Effects of Geometric and Access Management 2018
- 2672:18 Traffic Signal Systems 2018
- 2672:19 Intelligent Transportation Systems 2018
- 2672:20 Traffic Flow Theory and Characteristics 2018
- 2672:21 Traffic Control Devices 2018
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- 2672:26 Construction
- 2672:27 Concrete Materials
- 2672:28 Asphalt Mixtures and Materials
- 2672:29 Public-Sector Aviation: Graduate Research Award Papers, 2018
- 2672:30 Highway Safety Performance and Statistical Methods 2018
- 2672:31 Developing Countries
- 2672:32 Transportation Safety Management 2018
- 2672:33 Operator Education and Regulation; Safe Mobility for Older Persons; Traffic Law Enforcement; and Occupant Protection 2018
- 2672:34 Roundabouts, Truck Safety, Motorcycles, and Mopeds 2018
- 2672:35 Pedestrians 2018
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- 2672:37 User Performance 2018
- 2672:38 Safety Data, Analysis, and Evaluation 2018
- 2672:39 Highway Design 2018
- 2672:40 Pavement Management 2018
- 2672:41 Structures 2018
- 2672:42 Data and Methods to Understand Travel
- 2672:43 Traffic Monitoring: Automobiles, Trucks, Bicycles, and Pedestrians
- 2672:44 Managing Performance and Assets; Freight Data and Visualization
- 2672:45 Information Technology, Geospatial Information, and Advanced Computing
- 2672:46 Transportation Planning Applications
- 2672:47 Travel Behavior and Values
- 2672:48 Transportation Network Modeling
- 2672:49 Transportation Demand Forecasting
- 2672:50 Effects of Information and Communications Technology on Travel Choices
- 2672:51 Transportation Planning, Program and Investment Decision Making
- 2672:52 Geological, Geoenvironmental, and Geotechnical Engineering

Special Reports¹

- 326 Admissibility and Public Availability of Transit Safety Planning Records
- 327 Safety Regulation for Small LPG Distribution Systems
- 328 Research to Improve Estimates of Impacts of Changes in Truck Size and Weight Regulations
- 329 Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future

Conference Proceedings¹

- 54 Decarbonizing Transport for a Sustainable Future: Mitigating Impacts of the Changing Climate

Conference Proceedings on the Web (online)

- 22 Transforming the Marine Transportation System Through Multimodal Freight Analytics

Letter Reports (online)

- Transit Research Analysis Committee Letter Report, August 24
- Review of U.S. Coast Guard Vessel Stability Regulations Letter Report, September 12
- Research and Technology Coordinating Committee Letter Report, November 9

Transportation Research E-Circulars (online)

- 228 Rebuilding and Retrofitting the Transportation Infrastructure
- 229 10th SHRP 2 Safety Data Symposium: From Analysis to Results
- 230 Culverts and Soil-Structure Interaction: Fifty Years of Change and a Twenty-Year Projection

231	U.S. Department of Transportation's Mobility on Demand Initiative
232	Automated Vehicles Symposium 2017: Summary of a Symposium
233	Applying Census Data for Transportation
234	Relationships of Laboratory Mixture Aging to Asphalt Mixture Performance
235	Glossary of Transportation Construction Quality Assurance Terms: Seventh Edition
236	National Academies-TRB Forum on Preparing for Automated Vehicles and Shared Mobility
237	Innovations in Asphalt Mixture Design Procedures
238	National Household Travel Survey Workshop
239	Arterial Roadways: Research Needs and Concerns
240	Workshop on Implementing a Freight Fluidity Performance Measurement System

TR News

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TRB Transportation Research E-Newsletter

Miscellaneous Publications

TRB Security, Emergency Management, and Infrastructure Protection Research Status Report

Airport Cooperation Research Program (ACRP) Research Reports²

155	Guidebook for Advanced Computerized Maintenance Management System Integration at Airports
183	User Guides for Noise Modeling of Commercial Space Operations—RUMBLE and PCBoom
184	Executive Summary for the Guidebook on Understanding FAA Grant Assurance Obligations
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188	Using Existing Airport Management Systems to Manage Climate Risk
189	Design Considerations for Airport EOCs
190	Common Performance Metrics for Airport Infrastructure and Operational Planning Reference Guide
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87	Airport Participation in Oil and Gas Development
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90	Incorporating ADA and Functional Needs in Emergency Exercises
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35	State of the Industry Report on Air Quality Emissions from Sustainable Alternative Jet Fuels
36	Enhanced AEDT Modeling of Aircraft Arrival and Departure Profiles, Volume 1: Guidance
44	Understanding FAA Grant Assurance Obligations <ul style="list-style-type: none"> • Volume 1: Guidebook • Volume 2: Technical Appendices • Volume 3: Research Report • Volume 4: Summary of AIP Grant Assurance Requirements

ACRP WebResources (online)

4	Airport Air Quality Resource Library
5	Tools and Case Studies for NextGen for Airports

National Cooperative Highway Research Program (NCHRP) Research Reports³

855	An Expanded Functional Classification System for Highways and Streets
858	Quantifying the Effects of Preservation Treatments on Pavement Performance
860	Assessing the Environmental Justice Effects of Toll Implementation or Rate Changes
865	Guidance for Development and Management of Sustainable Enterprise Information Portals
866	Return on Investment in Transportation Asset Management Systems and Practices
868	Cell Phone Location Data for Travel Behavior Analysis
869	Estimating the Safety Effects of Work Zone Characteristics and Countermeasures: A Guidebook
870	Field Performance of Corrugated Pipe Manufactured with Recycled Polyethylene Content
871	Long-Term Aging of Asphalt Mixtures for Performance Testing and Prediction
872	Contribution of Steel Casing to Single Shaft Foundation Structural Resistance

873 Guidebook to Funding Transportation Through Land Value Return and Recycling
874 The Transportation Research Thesaurus: Capabilities and Enhancements
875 Guidance for Evaluating the Safety Impacts of Intersection Sight Distance
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886 Field Evaluation of Reflected Noise from a Single Noise Barrier
887 Guidance for Underwater Installation of Filter Systems
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516 Tack Coat Specifications, Materials, and Construction Practices
517 Corrosion Prevention for Extending the Service Life of Steel Bridges
518 Staffing for Alternative Contracting Methods
519 The Renewal of Stormwater Systems Using Trenchless Technologies
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523 Integration of Roadway Safety Data from State and Local Sources
524 Aggregate Quality Requirements for Pavements
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NCHRP Web-Only Documents (online)

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237 Environmental Justice Analyses when Considering Toll Implementation or Rate Changes: Final Report
241 Development and Management of Sustainable Enterprise Information Portals
242 Recommended AASHTO Guide Specifications for ABC Design and Construction
243 Recommended Guidelines for Prefabricated Bridge Elements and Systems Tolerances and Recommended Guidelines for Dynamic Effects for Bridge Systems
245 Bridge Superstructure Tolerance to Total and Differential Foundation Movements
246 TRAQS (Transportation Air Quality System)

- Volume 1: TRAQS User Guide
- Volume 2: TRAQS—A Combined Interface for Project-Level Air Quality Analysis

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250 Use of Automated Machine Guidance within the Transportation Industry
251 Spot Painting to Extend Highway Bridge Coating Life

- Volume 1: Guidance
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252 A Strategic Approach to Transforming Traffic Safety Culture to Reduce Deaths and Injuries
253 Implication of Connected and Automated Driving Systems

- Volume 1: Legal Landscape
- Volume 2: State Legal and Regulatory Audit
- Volume 3: Legal Modification, Prioritization, and Harmonization Analysis
- Volume 4: Autonomous Vehicle Action Plan
- Volume 5: Developing the Autonomous Vehicle Action Plan
- Volume 6: Implementation Plan

254 Underwater Installation of Filter Systems for Scour and Other Erosion Countermeasures

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255 Improved Analysis of Two-Lane Highway Capacity and Operational Performance

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- 196 Private Transit: Existing Services and Emerging Directions
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- 130 Battery Electric Buses—State of the Practice

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- 54 Impact of the Americans with Disabilities Act on Transit Agency Liability

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- 114 Synthesis of Information Related to Transit Practices

TCRP Web-Only Document (online)

- 71 A Transit Agency Guide to Evaluating Secondary Train Detection-Protection Systems in Communications-Based Train Control Systems

¹ Available in print and online.

² Entire series available in print and online.

³ Publications released since 2001 available in print and online.

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