

# Transportation Research Board

2019 Annual Report



*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.

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# RESEARCH AND INNOVATION NEEDS FOR EVOLVING CHALLENGES

As the Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine enters its 100th year, dramatic changes in transportation promise major implications for society, the economy, and quality of life for decades to come. It is an exciting time to be involved in transportation, and research and innovation are more important than ever. Through its convening, research, and advising activities, TRB offers a unique venue for transportation professionals to help the nation and global community ensure that the many developments transforming transportation will produce the best results.

Advances in technology are expected to alter travel patterns and behaviors dramatically in ways that could create beneficial—and adverse—outcomes. Demographic changes, such as increases in the elderly population and the migration of people from rural areas to megaregions, will continue to create many new transportation demands.

The transportation industry must cut its emissions of greenhouse gases, evolve its energy sources, and ensure its systems are more resilient to natural and manmade

disasters. Fatalities and injuries on the transportation system remain unacceptably high. The topics of transportation’s adverse impacts to public health—and its potential to improve public health outcomes—are attracting increased attention, as is the topic of providing equitable access for people with disabilities and economic challenges.

Transformational changes present governance issues, particularly in places where decision-making has devolved to lower levels of government. Needed enhancements in transportation system performance and asset management have spurred an interest in improved processes, materials, designs, and construction techniques. As transportation revenue sources struggle to keep up with growing investment needs, new funding options are required. Advances in technology revolutionize the way freight is moved, changing the expectations of shippers.

Taken together, these developments create myriad research and innovation needs and challenges with economic, societal, institutional, and technological dimensions. There has never been a time in which TRB’s products, services, and work are more needed.

The TRB 2019 Annual Report documents TRB’s many activities and accomplishments during the past year and recognizes some of the more than 8,000 volunteers and 134 staff members who make TRB such an important



(Left to right:) 2019 TRB Executive Committee Vice Chair Leslie S. Richards, 2019 Chair Victoria A. Arroyo, and TRB Executive Director Neil Pedersen.

(Photo: Risdon Photography)



Aviation experts participate in the ACRP Oversight Committee meeting in July. TRB’s more than 8,000 volunteers on committees, panels, and task forces, along with its staff members, make the Board an important contributor to advances in transportation.



Katherine Turnbull chairs the Executive Committee's Subcommittee on Policy and Planning Review.

(Photo: Risdon Photography)

contributor to advances in transportation and the transportation profession nationally and globally. In 2019, TRB's Executive Committee developed and issued a new 5-year strategic plan for TRB. This annual report will discuss many of the priorities identified in the strategic plan and progress over the past year.

## Vision, Mission, and Goals

As part of the strategic plan, the TRB Executive Committee adopted a vision that "TRB is where the nation's leaders and the global transportation community turn for information exchange, research, innovations, and advice on current, emerging, and critical transportation issues to foster a high-performing multimodal transportation system that enhances society." TRB's mission is to "provide leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation." The vision and mission are supported by six goals that were adopted by the Executive Committee in 2019:

- **Information Exchange.** Provide an impartial forum for the sharing of information across all disciplines and modes on current and emerging transportation issues and related research and innovation, including transportation's relationship with social, economic, environmental, and other issues important to society.
- **Research.** Create and expand access to knowledge by conducting, sharing, and promoting research on current and future issues in transportation, particularly focused on innovative, implementable practices and technologies.
- **Advice.** Provide timely and trusted advice to inform the choices facing decision-makers across all modes of transportation.
- **Collaboration.** Promote collaboration on transportation research, education, and technology transfer at international, national, regional, state, and local levels; across public and private sectors; and among transportation providers, users, and other stakeholders.
- **Workforce Development.** Provide lifelong learning opportunities and foster and promote an environment that continually enhances the diversity, inclusivity, skills, and capacity of transportation professionals.
- **Communications.** Enhance the transportation community's knowledge of TRB activities and impacts, awareness of the contributions of research to transportation's value, and understanding of the importance of transportation to society.

These goals provide the broader context to the activities of TRB's programs, committees, volunteers, and staff and are supported by objectives and action items in the strategic plan.

## Organization

TRB is one of seven program divisions of the National Academies of Sciences, Engineering, and Medicine, a Congressionally chartered private, nonprofit institution established to provide 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. Because it is housed within the National Academies, TRB has access to members of the Academies and their expertise.

Oversight of TRB activities on behalf of the National Academies is performed by the TRB Division Committee. The committee ensures that TRB reports meet National Academies' standards for quality, objectivity, and independence and that there are no conflicts of interest. It also advances diversity among committee chairs and members and facilitates TRB's joint activities with other National Academies program divisions. Chris Hendrickson, Carnegie Mellon University professor and member of the National Academy of Engineering, is Chair of the TRB Division Committee.

TRB's Executive Committee provides strategic direction and oversight of TRB's programs and activities. The 26 appointed members of the Executive Committee are chosen from among public- and private-sector executives, prominent academicians, and members of the National Academies. In addition, 22 ex officio members—top executives from TRB's sponsoring agencies—serve on the Executive Committee. In January, the Executive Committee released *Critical Issues in Transportation 2019*. Identification of critical issues was the first stage of the process of developing a new TRB strategic plan, which was adopted by the Executive Committee at its June meeting. Both the Division Committee and the Executive Committee are supported by staff in the TRB Executive Office.

The Executive Committee's Subcommittee on Policy and Planning Review (SPPR) consists of 13 appointed members of the Executive Committee, plus the Chair of the TRB Technical Activities Council. SPPR acts on behalf of the Executive Committee between meetings and

provides strategic oversight of Consensus and Advisory Studies Division activities. SPPR also led development of both the updated list of critical issues and the recently adopted strategic plan. It is chaired by Katherine Turnbull, Texas A&M University Transportation Institute. Lead staff support is provided by Thomas Menzies, Director, Consensus and Advisory Studies Division.

TRB's 220 standing technical committees and task forces cover all issues in transportation modes. Each committee can have up to 36 members, but many other volunteers can serve as friends of the committee. The standing committees discuss current and emerging issues related to their subject areas, identify gaps in knowledge and practice, and develop research problem statements.

These committees develop the program for the TRB Annual Meeting, held each January in Washington, D.C., as well as for TRB conferences and workshops. This year, committees reviewed more than 6,400 papers submitted for presentation at the 2020 Annual Meeting, publication in the *Transportation Research Record: Journal of the Transportation Research Board*, or both.

In 2019, 5,120 individuals served on TRB's standing technical committees and task forces. In addition, more than 11,000 volunteers contributed to committee activities as friends. The committees and task forces are organized into 11 groups; chairs of each group serve on the Technical Activities Council, which itself is chaired by Hyun-A Park, Spy Pond Partners. The council provides oversight and strategic direction for the standing technical committees and task forces. TRB's Technical Activities Division

provides staff support for the committees and task forces. Ann Brach is Director of the division.

TRB manages four research programs through its Cooperative Research Programs (CRP), but the actual research is conducted by contractors. For each project, an oversight panel selects the contractors and peer-reviews their work. Each program is a result of a cooperative agreement among a U.S. Department of Transportation (DOT) modal agency, industry association partners, and TRB. Each program's oversight panel, comprised of practitioners who are the ultimate users of the research products, selects the research projects for and provides strategic direction to that program. TRB uses open competition to procure contractors and to ensure the quality of the work and the involvement of many researchers and research organizations.

Oversight and project selection for the National Cooperative Highway Research Program (NCHRP) is the responsibility of the Special Committee on Research and Innovation of the American Association of State Highway and Transportation Officials, which consists of executives and research managers from state DOTs. The Transit Cooperative Research Program (TCRP) is overseen by the TCRP Oversight and Project Selection Commission, which consists of general managers of transit agencies and other transit experts. Oversight of the Airport Cooperative Research Program (ACRP) is provided by the ACRP Oversight Committee, which consists of airport managers and other airport experts. A subcommittee of the Board of the Governors Highway



The 2019 Technical Activities Council (TAC) provides oversight and strategic direction for the more than 5,000 volunteers on TRB's standing technical committees and task forces. (Photo: Risdon Photography)

Safety Association oversees the Behavioral Traffic Safety Cooperative Research Program (BTSCR). More than 3,200 volunteers serve on CRP oversight committees and project panels. The Cooperative Research Programs Division provides staff support for these research programs. Christopher Hedges is Director of the division.

TRB conducts advisory studies in accordance with procedures of the National Academies of Sciences, Engineering, and Medicine. These studies are performed by committees of volunteer experts supported by staff from the Consensus and Advisory Studies Division. Each study's committee is responsible for producing reports, subject to the Academies' rigorous report review process, with evidence-based conclusions and recommendations. TRB also conducts studies of policy issues requested by Congress or executive branch agencies, as well as self-initiated and self-funded studies. In addition, the Consensus and Advisory Studies division includes several standing committees that advise the research and development programs of various modal administrations in the U.S. Department of Transportation. Tom Menzies is Director of this 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 and advice concerning the ability of the nation's marine and maritime industries to operate safely and efficiently and in an environmentally responsible manner. The Marine Board identifies research needs and provides a forum for exchange of information on new technologies, laws



The Marine Board identifies research needs and provides a forum for exchange of information on issues that affect marine transportation and port operations. (Photo: Washington State DOT)

and regulations, economics, the environment, and other issues affecting the marine transportation system; port operations; coastal engineering; and marine governance. Edward Comstock, an independent consultant with expertise in naval architecture, is Marine Board Chair. Scott Brotemarkle provides lead staff support.

In 2019, the National Research Council (NRC) reorganized both the financial and communications staffs in the NRC program divisions so that they now report to the Chief Financial Officer and the Chief Communications Officer of the National Academies, respectively. Gary Walker leads the financial staff who support TRB and Paul Mackie leads the communications staff who support TRB.

## Critical Issues

In January 2019, TRB published *Critical Issues in Transportation 2019*, a product of the TRB Executive Committee. *Critical Issues* was published as two documents: one, a "policy snapshot," for policy and lay audiences and another, more-detailed document for TRB stakeholders and transportation professionals. The policy snapshot was intended to spur a conversation among policy-makers and citizens about how the country should respond to major challenges facing the transportation system. The detailed document provided strategic direction to TRB's programs and committees about issues that the Executive Committee believes are important to address over the next 5 to 10 years.

The topic areas identified in both documents are transformational technologies and services, serving a growing and shifting population, energy and sustainability, resilience and security, safety and public health, equity, governance, system performance



*Critical Issues in Transportation 2019* addresses interdependent transportation issues like safety and public health, system performance, growing and shifting populations, and asset management. (Photo: Oregon DOT)

and asset management, funding and finance, goods movement, institutional and workforce capacity, and research and innovation.

An objective in TRB's new strategic plan is to "address emerging and critical transportation issues in a strategic, forward-looking, proactive, and timely manner." To address these critical issues, TRB is developing and highlighting related webinars, Executive Committee policy sessions, and Annual Meeting sessions; pursuing sponsorship of conferences and workshops, as well as consensus and advisory studies, related to critical issues; and conducting research projects and disseminating findings to key stakeholders.

TRB also is using the critical issues in an effort to realign its technical committees to ensure that they are structured to address the most important future issues and is seeking opportunities to work with other transportation organizations and divisions of the National Academies.

## Technical Activities

TRB's core technical activities involve the largest number of volunteers and participants of any of the Board's programs. The 2019 Annual Meeting attracted 13,300 attendees, despite a snowstorm and a government shutdown that prevented many federal employees from attending. Attendees participated in more than 800 sessions and workshops and in more than 5,000 presentations. The Annual Meeting also hosted meetings of all 220 committees and task forces, as well as of many of the 370 subcommittees.

TRB's standing committees sponsored 22 conferences and cosponsored 29 conferences in 2019, both in the United States and abroad, on a wide range of topics, including

- Light rail and streetcars,
- Demand-responsive and innovative transit services,
- Transportation planning applications,
- Emerging issues for *Highway Capacity Manual* procedures,
- Harbor safety,
- Sustainable resource conservation and recovery,
- Transportation law,
- Women's issues in transportation,
- Low-volume roads,
- Performance and data and transportation decision making,
- Ecology and transportation,
- Visualization in transportation,
- Resilience to natural hazards and extreme weather events,
- 3-D printing and transportation, and
- Health and active transportation.



Standing committees sponsored or cosponsored 51 conferences in 2019, focusing on topics from light rail and streetcars to innovative transit to transportation planning applications. (Photo: Thomas Hawk, Flickr)

Technical committees peer-reviewed more than 5,850 papers submitted in a call for papers for the 2019 Annual Meeting. Of these, 60% were selected for presentation at the meeting, and 838 were published in the *Transportation Research Record*.

In 2019, an editorial board was established for the *Transportation Research Record*. The journal's distribution has increased from approximately 200 institutions to more than 9,000, including more than 7,000 institutions in the developing world. More than 90% percent of all papers submitted for publication in 2019 were published, much earlier than they had been in previous years.

TRB has commenced a strategic realignment of its technical activities, focusing on the mission, quality, and impact of these activities. The realignment will

- Review and update the committee structure,
- Improve committee processes and activities,
- Re-engineer conference processes,
- Re-engineer the *Transportation Research Record*, and
- Evaluate internal staff structure and processes.

A revised committee structure will be in place by spring 2020; the new committees will complete paper reviews and plan the sessions for the 2021 TRB Annual Meeting.

## Research

TRB manages four major research programs in the areas of highways, transit, airports, and behavioral traffic safety, with a total budget of more than \$60 million. All the CRP programs primarily focus on applied research that is useful to practitioners in the field. NCHRP is the oldest and largest of the CRP programs and is funded by state DOTs. The other three programs—ACRP, TCRP, and BTSCRP—are all funded by Congress.



Arizona’s DOT used accelerated bridge construction, one of the innovative bridge construction techniques examined in a TRB consensus study report, in its Sacramento Wash project. (Photo: Arizona DOT)

Each of these programs was active in 2019, with more than 300 ongoing research projects and more than 100 completed projects. Selected CRP 2019 publications included the following:

- NCHRP Report 905: *Measuring the Effectiveness of Public Involvement in Transportation Planning and Project Development*
- NCHRP Report 912: *Guidelines for Detection and Remediation of Soluble Salt Contamination Prior to Coating Steel Highway Structures*
- NCHRP Synthesis Report 531: *Automated Pavement Condition Surveys*
- NCHRP Synthesis Report 543: *Transportation Workforce Planning and Development Strategies*
- NCHRP Legal Research Digest 76: *Indian Transportation Law*
- TCRP Report 203: *Dialysis Transportation—The Intersection of Transportation and Healthcare*
- TCRP Report 204: *Partnerships Between Transit Agencies and Transportation Network Companies*
- TCRP Report 205: *Social and Economic Sustainability Performance Measures for Public Transportation*
- TCRP Report 207: *Fast-Tracked—A Tactical Transit Study*
- ACRP Report 197: *Guidebook for Developing a Comprehensive Renewable Resources Strategy*
- ACRP Report 199: *Climate Resilience and Benefit–Cost Analysis—A Handbook for Airports*
- ACRP Report 200: *Using GIS for Collaborative Land Use Compatibility Planning Near Airports*

The first reports from BTSCR are expected to be published in 2020. Current research topics include

- Highway safety strategies for rural communities,
- Communicating safe behavior practices to vulnerable road users, and
- State practices promoting older driver safety.

TRB also curates and maintains the largest transportation research database in the world. With more than

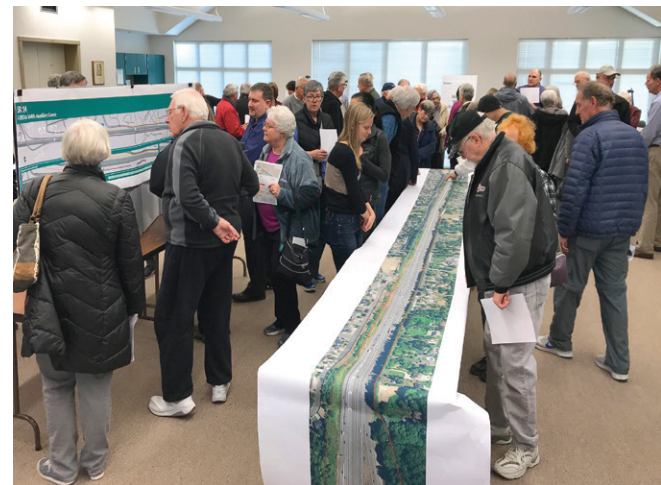
1.4 million entries on virtually any topic related to transportation, the TRID database includes not only completed research reports and articles, but also research in progress and problem statements for potential research.

## Advising

The Consensus and Advisory Studies Division issued several reports in 2019. One report, an examination of the Innovative Bridge Research and Construction program that was called for in the Fixing America’s Surface Transportation Act of 2015, analyzes the performance of bridges that received program funding, makes recommendations on innovative materials and technologies to help reduce costs, and recommends that Congress create a new federal program to provide incentives for innovation in bridge construction.

Another committee tasked with reviewing the Federal Highway Administration’s (FHWA’s) Long-Term Infrastructure Research Program issued a letter report advising on the importance of producing interim products of value to states, gathering data faster and more reliably, and reaching out to states and other key stakeholders to explain program goals.

The Research and Technology Coordinating Committee, which regularly advises FHWA on its research, development, and technology (RD&T) program, issued a report examining the vital federal role in meeting the highway innovation imperative. The report explains the work of FHWA and the Intelligent Transportation Systems Joint Program Office (ITS JPO) and identifies candidate topics for future RD&T, including automated-vehicle technology, energy and sustainability, growing and changing populations, resilience, goods movement, safety, and equity. The report observes that with



More than 200 people attended a Washington State Department of Transportation (DOT) open house on an auxiliary lanes project. NCHRP Research Report 905 examined the effectiveness of the agency’s open houses. (Photo: Washington State DOT)



sustained and adequate funding and modest additions and changes to RD&T portfolios, FHWA and ITS JPO will continue to serve and advance the national interest well into the future.

In a follow-up to an earlier study for the U.S. Coast Guard, a TRB–Marine Board committee recommended ways to make the agency’s vessel stability regulations more usable and complete in meeting the requirements of different types of vessels and in accounting for vessels that have undergone weight changes that can affect their stability. Another TRB–Marine Board committee reviewed the Office of Naval Research (ONR) program supporting naval engineering research, education, and workforce. The report proposes a strategic framework for guiding ONR’s choices about when the naval engineering program should take the lead in sponsoring research and workforce development initiatives and when it should leverage technical advancements and workforce programs from other domains.

TRB also launched a communications initiative to inform policy-makers and the public about the conclusions and recommendations of the report *Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future*.

## Marine Board

In keeping with its mission to identify research and development needs and provide a forum for information exchange concerning issues affecting the marine transportation system and offshore industries, the Marine Board engaged salient topics and many stakeholders and federal agency partners in 2019. Its spring meeting was held in Paducah, Kentucky, allowing for extraordinary access to information and activities related to America’s inland waterways system.

Through a series of focused panel sessions, discussions, and technical tours of barge operations, training facilities, and lock and dam systems, the Marine Board discussed institutional considerations, operation and resilience factors, and challenges and opportunities related to commercial activity and infrastructure. The fall meeting tackled automated ships and offshore wind energy.

The Marine Board uses its formal meetings, expert teams, and yearly federal agency outreach activities to maintain surveillance within relevant fields to develop initiatives that could help advance its work. Areas of current interest to the Marine Board include automated ships, vehicles, and shipping; safety culture; Arctic operations; cyber in marine transportation; the future of navigation; marine energy and propulsion toward zero-emissions shipping operations; human and intellectual capital; resilience improvements, including sea-level

rise and extreme weather impacts on coastal, port, and waterways infrastructure; and offshore wind energy development.

## Inclusion and Diversity

In 2018, TRB’s Executive Committee adopted a strategic plan for diversity and inclusion. Recognizing that an inclusive and diverse environment enhances innovation and creativity in all areas of TRB and helps to cultivate an equitable and supportive atmosphere, the Executive Committee engages a special subcommittee, chaired by Carol Lewis of Texas Southern University, to implement the strategic plan.

As a matter of policy, TRB aims to engage a pool of transportation stakeholders that is representative of the diverse transportation workforce and of the population. TRB is focused on recruiting, welcoming, and actively involving more women, minorities, persons with disabilities, young professionals, and professionals in transportation sectors that are currently underrepresented in TRB. The special subcommittee is developing guidance materials to assist TRB volunteer leaders and staff in this area. TRB is working with organizations that serve women and minorities involved in transportation, as well as sectors of transportation that currently are underrepresented, such as technology companies, to engage more of their members in TRB committees, panels, and activities. The Young Members Council is working on ways for TRB to recruit and better serve young transportation professionals.

A key element of TRB’s inclusion and diversity efforts is its Minority Student Fellows Program. The 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, and in the transportation profession. The program provides support for students from select minority-serving institutions to attend the TRB Annual Meeting and present research. Since the program began in 2010, 150 graduate and undergraduate students have participated, with 30 selected for the 2020 Annual Meeting. The program receives financial support from FHWA and from individual and organizational contributions. Lead staff support is provided by Karen Febey.

## International Activities

The first goal of the Executive Committee’s strategic plan for international activities is to engage non-U.S. colleagues and partners in TRB activities. At the 2019 Annual Meeting, 2,510 attendees—19% of total participants—were international. They came from 70



Wind turbines off Block Island, Rhode Island. (Photo: National Renewable Energy Labs)



Karen Febey (second from left) commemorates the 10th anniversary of the Minority Student Fellows Program at the 2019 Annual Meeting. (Photo: Risdon Photography)

nations and delivered several hundred presentations. One-third of the papers published in the *Transportation Research Record* in 2019 were written by authors based outside of the United States.

TRB has entered into memoranda of understanding or letters of intent with several international transportation organizations; participated in many collaborative activities, including information sharing and sponsored sessions at major conferences of international partners; and identified opportunities to coordinate international research on common topics. TRB also cosponsored nine conferences held outside the United States in 2019.

Strategic direction and oversight of TRB's international activities is conducted by the Executive Committee Subcommittee on International Affairs, which is chaired by Nathaniel Ford of the Jacksonville Transportation Authority.

## Communications

Along with increased emphasis on communications throughout the National Academies, a new TRB strategic communications plan is being developed that prioritizes digital communications strategies and proactive communications about reports and other products. Other plan goals include segmenting TRB's target audiences and developing alternative strategies by segment, using analytics to track the communications effectiveness, better communicating the value of TRB research and participation, equipping volunteers to act as communications ambassadors, and developing marketing plans for the Annual Meeting and other convening activities.

Although TRB is undertaking a major digital communications initiative, it currently is very active in this area. TRB's website attracted an average of 720,000 page views per month in 2019.<sup>1</sup> TRB has more than

70,000 subscribers to its weekly e-newsletter<sup>2</sup> and more than 22,000 followers on Twitter,<sup>3</sup> more than 8,600 on Facebook,<sup>4</sup> and more than 6,800 on LinkedIn<sup>5</sup> (a 31% increase over 2018).

In 2019, TRB hosted 89 live webinars, with an average attendance of 350 people. TRB also created 10 straight-to-recordings—on-demand webinars—that collectively were viewed more than 3,000 times.<sup>6</sup> TRB offers professional development hours for engineers and planners through its webinar program and in 2019 provided more than 145 credits. TRB's new Communications Director, Paul Mackie, joined the Board in 2019.

## Centennial Celebration

To celebrate its 100th anniversary on November 11, 2020, TRB will engage in a yearlong celebration, "Moving Ideas: Advancing Society—100 Years of Transportation Research," beginning at the 99th Annual Meeting in January 2020 and concluding at the 100th Annual Meeting in January 2021. The focus of the 2020 Annual Meeting will be TRB's history, and the focus of the 2021 meeting will be the future. The goal is to promote the value of transportation research and TRB's critical role; to recognize and honor volunteers, sponsors, major contributors, and staff; to highlight TRB and sponsor accomplishments; to celebrate the TRB community; and to elicit pride in TRB participation.

TRB is publishing a book documenting its history, key achievements, major programs, and important institutions and individuals and analyzing the impact of TRB's role in transportation research and innovation. The book will be ready for distribution in January 2020. TRB also has created a centennial website, brochure, videos, and a roaming exhibit. Celebrations will occur at locations throughout the United States, including one the week of November 11, 2020, in Washington, D.C.



## Finances

TRB's financial statement for 2019, which shows sources both of revenue and of expenditures, can be found on pages 10 and 11.

TRB's Core Program consists of its convening activities, publications, and library services. Total 2019 estimated revenues for the core program are \$16.7 million and total estimated expenditures are \$15.4 million. The difference will be placed in the Core Technical Program Reserve Fund, in accordance with TRB's long-term financial plan. State DOTs funded \$7.7 million (50%); federal agencies funded \$2.7 million (18%), with more than half of these funds from FHWA; other sponsors funded \$0.2 million (1%); and TRB sales and fees funded \$4.8 million (31%) of total core program expenditures. Another \$1.6 million was generated 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. Organizations can participate at one of six different levels in exchange for participating in various programs and receiving recognition for their support of TRB. In 2019, an estimated \$0.7 million was raised through this program.

Estimated expenditures for all 2019 Cooperative Research Programs—funded activities are \$64.1 million. The largest portion of this funding is for NCHRP at \$43.9 million (from state DOTs), followed by ACRP at \$14.1 million (from the Federal Aviation Administration), TCRP at \$5.0 million (from the Federal Transit Administration), and BTSCRCP at \$0.8 million (from the National Highway Traffic Safety Administration).

TRB's 2019 expenditures in the Second Strategic Highway Research Program (SHRP 2) program are estimated at \$4.3 million. These funds come from FHWA. SHRP 2 will end in 2020.

Estimated 2019 expenditures for TRB's consensus and advisory studies are \$3.6 million. Sponsors for each individual study provide funding; the vast majority of these funds (95%) come from federal agencies.

Total estimated expenditures for all of TRB's 2019 programs is \$90 million. Of this, 57% comes from state DOTs, 35% comes from federal sources, and 8% comes from other sources.

TRB's Core Technical Program Reserve Fund is intended to be used primarily in the case of an unanticipated revenue shortfall. The anticipated reserve fund balance at the end of 2019 will be \$19.6 million. TRB is being conservative in its Reserve Fund balance because of reductions in federal contributions to the core technical program in 2020 and tremendous uncertainty in future funding for the core technical program, as discussed below.

TRB is ending 2019 in good financial condition; however, there is a great deal of uncertainty associated with future federal funding, beginning in 2020, when U.S. DOT will reduce its contributions to the core technical program by \$900,000 per year.

Revenues are unclear into 2021, when new surface transportation legislation will be enacted. Recognizing this, the Executive Committee and TRB staff are being conservative in the Board's expenditures and are beginning contingency planning for dealing with this uncertainty.

<sup>1</sup> [www.trb.org](http://www.trb.org)

<sup>2</sup> [www.trb.org/Publications/PubsTRBENewsletter.aspx](http://www.trb.org/Publications/PubsTRBENewsletter.aspx)

<sup>3</sup> <https://twitter.com/NASEMTRB>

<sup>4</sup> [www.facebook.com/NASEMTRB](http://www.facebook.com/NASEMTRB)

<sup>5</sup> [www.linkedin.com/company/transportation-research-board-of-the-national-academies](http://www.linkedin.com/company/transportation-research-board-of-the-national-academies)

<sup>6</sup> [www.trb.org/Webinars](http://www.trb.org/Webinars)



An autonomous bus was on display at the 2019 Annual Meeting. (Photo: Risdon Photography)

# STATEMENT OF ACTIVITIES

Funding Support by Program and Expenditures, Calendar Years 2018 and 2019

	2018 (Actual)	2019 (Projected)*
<b>Core Technical Activities</b>		
<b>State Highway and Transportation Departments</b> (State DOTs)	<b>\$7,563,000</b>	<b>\$7,730,000</b>
<b>Federal Government</b>		
Federal Highway Administration (FHWA)	1,450,000	1,450,000
Office of the Assistant Secretary of Transportation for Research and Technology (OST-R)	100,000	300,000
Federal Transit Administration (FTA)	250,000	250,000
National Highway Traffic Safety Administration (NHTSA)	70,000	216,000
Department of the Interior	85,000	85,000
Federal Motor Carrier Safety Administration (FMCSA)	75,000	75,000
Department of Energy (DOE)	70,000	72,000
Environmental Protection Agency (EPA)	70,000	72,000
Federal Aviation Administration (FAA)	70,000	72,000
Federal Railroad Administration (FRA)	70,000	72,000
U.S. Air Force Civil Engineer Center	70,000	72,000
<b>Subtotal, Federal Government</b>	<b>\$2,380,000</b>	<b>\$2,736,000</b>
<b>Other</b>		
American Public Transportation Association	70,000	72,000
Association of American Railroads	70,000	72,000
California Air Resources Board	70,000	72,000
Fees and Sales	5,950,000	6,062,000
<b>Subtotal, Other</b>	<b>\$6,160,000</b>	<b>\$6,278,000</b>
<b>Total, Core Technical Activities</b>	<b>\$16,103,000</b>	<b>\$16,744,000</b>
<b>Marine Board Core Program</b>		
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
<b>Total, Marine Board Core Program</b>	<b>\$251,000</b>	<b>\$251,000</b>
<b>Cooperative Research Programs (CRP)</b>		
National Cooperative Highway Research Program (State DOTs)	41,726,000	43,874,000
Airport Cooperative Research Program (FAA)	15,150,000	14,144,000
Transit Cooperative Research Program (FTA)	6,028,000	4,984,000
National Cooperative Freight Research Program (OST-R)	725,000	222,000
National Cooperative Rail Research Program (FRA)	1,000	0
Behavioral Traffic Safety Cooperative Research Program (Governors Highway Safety Administration, NHTSA)	323,000	817,000
Hazardous Materials Cooperative Research Program (Pipeline and Hazardous Materials Safety Administration)	33,000	0
MVA Cooperative Research Program (American Association of Motor Vehicle Administrators)	3,000	32,000
<b>Total, Cooperative Research Programs</b>	<b>\$63,989,000</b>	<b>\$64,073,000</b>
<b>Rail Safety IDEA Program</b>	<b>\$282,000</b>	<b>\$248,000</b>

	2018 (Actual)	2019 (Projected)*
<b>Strategic Highway Research Program 2 Safety Data Phase 1</b>	<b>\$4,497,000</b>	<b>\$4,328,000</b>
<b>Policy Studies</b>	<b>\$3,872,000</b>	<b>\$3,613,000</b>
<b>Conferences, Workshops, Forums, and Centennial</b>	<b>\$2,589,000</b>	<b>\$2,878,000</b>
<b>TRB TOTAL</b>	<b>\$91,583,000</b>	<b>\$92,135,000</b>
<b>Sources of Funds</b>		
Federal	33,805,000	31,733,000
State DOTs	49,289,000	51,604,000
Other	8,489,000	8,798,000
	<b>\$91,583,000</b>	<b>\$92,135,000</b>

**Expenditures by Major Cost Category**

Salaries (including fringe benefits)	15,405,000	15,637,000
Travel and Meetings	5,142,000	5,073,000
Editing, Abstracting, and Publishing	1,796,000	1,485,000
Consultants and Contracts	47,235,000	47,174,000
Other Direct Costs	1,896,000	2,012,000
Indirect Costs	19,290,000	19,436,000
<b>Total Expenditures</b>	<b>\$90,764,000</b>	<b>\$90,817,000</b>

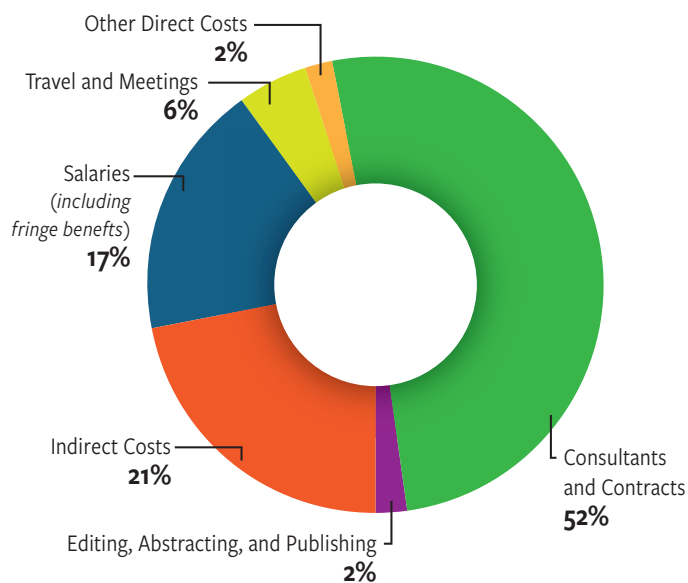
**TRB Reserve Fund**

Fund balance, end of previous fiscal year	<b>\$17,141,000</b>	<b>\$17,960,000</b>
Plus (minus) current fiscal year income over (under) expenditures	<b>819,000</b>	<b>1,318,000</b>
Balance, current fiscal year	<b>\$17,960,000</b>	<b>\$19,278,000</b>

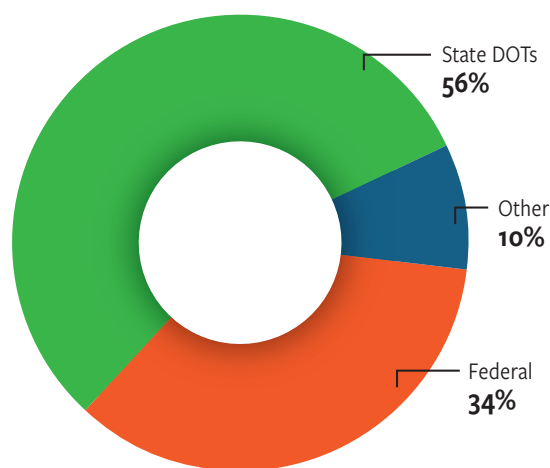
In 1965, the TRB Executive Committee approved a reserve fund to provide for orderly adjustments in the event of a temporary shortfall in anticipated revenues for TRB technical activities. This fund, built up over the years from surplus income in excess of expenditures from nonfederal sources for any one fiscal year, is reserved for expenditures in excess of income for any later fiscal year under a fixed budget approved triennially by the TRB Executive Committee.

\* Calendar Year 2019 comprises actual data through October and estimates for the rest of the year.

**Distribution of TRB Expenditures**



**TRB Funding Support**



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Knatz



Kruger



Lorenz



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



McGrath



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Ness



Shaheen

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

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**Susan A. Shaheen**, Adjunct Professor, Co-Director, Transportation Sustainability Research Center, University of California, Berkeley

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



Tien



Wilson

**Shawn Wilson**, Secretary, Louisiana Department of Transportation and Development, Baton Rouge

\* Membership as of November 2019.

## 2019 EXECUTIVE COMMITTEE\*



Batory



Berube



Buzby



Cliff

**Ronald Batory**, Administrator, Federal Railroad Administration, U.S. Department of Transportation, Washington, D.C. (ex officio)

**Michael R. Berube**, Acting Assistant Secretary for Sustainable Transportation, U.S. Department of Energy, Washington, D.C. (ex officio)

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

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

**Edward N. Comstock**, Independent Naval Architect, Sunbury, Maryland (ex officio)

**Stephen Dickson**, Administrator, Federal Aviation Administration, Washington, D.C. (ex officio)

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

**Diana Furchtgott-Roth**, Assistant Secretary for Research and Technology, Office of the Secretary of Transportation, Washington, D.C. (ex officio)

**LeRoy Gishi**, Chief, Division of Transportation, Bureau of Indian Affairs, U.S. Department of the Interior, Germantown, Maryland (ex officio)

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

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

**Nicole Nason**, Administrator, Federal Highway Administration, Washington, D.C. (ex officio)

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**Leslie S. Richards**, General Manager, SEPTA, Philadelphia, Pennsylvania (ex officio)

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**Karl Schultz** (Admiral, U.S. Coast Guard), Commandant, U.S. Coast Guard, Washington, D.C. (ex officio)

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

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**Katherine F. Turnbull**, Executive Associate Director and Research Scientist, Texas A&M Transportation Institute, College Station (voting, ex officio)

**Jim Tymon**, Executive Director, American Association of State Highway and Transportation Officials, Washington, D.C. (ex officio)

**K. Jane Williams**, Acting Administrator, Federal Transit Administration, U.S. Department of Transportation

\* Membership as of November 2019.



Comstock



Dickson



Elliott



Furchtgott-Roth



Gishi



Gray



Ivanov



Martinez



Nason



Owens



Richards



Rutland



Schultz



Simon



Skoutelas



Spellmon



Turnbull



Tymon



Williams



## TECHNICAL ACTIVITIES

The Technical Activities Division (TAD) provides a forum for transportation professionals and researchers to address emerging issues and collaborate on potential solutions and approaches to transportation needs. TAD is using the Transportation Research Board (TRB) centennial as an opportunity to take a fresh look at how the division carries out this mission through a strategic alignment initiative. This initiative involves reviewing structures, processes, and key activities to ensure that they address critical and emerging transportation issues and reflect best practices with respect to quality and efficiency.

One focus of the strategic alignment in 2019 was a review and revision of TAD's volunteer structure of its 212 standing technical committees and more than 370 subcommittees addressing topics across all modes of transportation and many disciplines. For the past 3 years, the Technical Activities Council (TAC) has explored ways to prepare for TRB's centennial, to quickly address new and emerging areas in an environment of rapid change and constrained resources, and to ensure the high quality of the committees' work.

The idea of restructuring the committees gradually emerged from these efforts as it became apparent that the organic growth of the committee structure had made it somewhat difficult for newcomers to understand. The current structure also has become increasingly challenging to manage. Much good work is being done, but is not always easy to find. It also is not easy to know if TAD is addressing all the issues it needs to be addressing, to communicate the work being done and its value, or to ascertain the impact of the committees' efforts on transportation. The image that has been used to describe the situation is that of a healthy, mature tree that has become overgrown and needs careful pruning to continue to be healthy.

As of this writing, the new structure has not been finalized, but a few characteristics of the structure can be described. TAD standing committees are organized into groups and sections. The new structure maintains the combination of discipline- and mode-focused groups and adds a new type of group, aimed at a set of major issues—sustainability and resilience related to transportation—that involve all transportation modes and require multiple disciplines to arrive at implementable solutions.

The new structure also will provide additional visibility to the work of selected subcommittees, which to date have been buried within the committee activities. This greater visibility will highlight the variety of topics that



2019 Technical Activities Council Chair Hyun-A Park addresses new and young attendees at the TRB Annual Meeting in Washington, D.C. (Photo: Risdon Photography)



TAD volunteers are working on. It also may attract new volunteers and sponsors who may not have realized the breadth of scope and opportunity at TRB.

Over the next few years, TAC will review all the committee scopes, activities, and memberships; refine the committee strategic planning process; and develop ongoing procedures for assessing and adjusting the committee structure so that TAD committees remain fresh. Training for volunteer leaders and improved communications approaches also are planned to help achieve strategic alignment goals.

The new structure will be finalized and in place by the spring of 2020, in time for the new committees and the newly elevated subcommittees to plan the 100th TRB Annual Meeting in 2021.

Highlights of pursuits undertaken by TAD groups and sections throughout 2019 include the following:

## Policy and Organization

### Data and Information

TRB organized the second Innovations in Freight Data Workshop in April. The workshop explored evolving requirements for freight data sources and analytical tools. The focus was on meeting real requirements of transportation agencies. The attendee list reflected a robust mix of employer types, with a preponderance of state departments of transportation (DOTs).

The 9th International Visualization in Transportation Symposium was held in November. The goal of the conference was to show how visualization can dramatically change the way people view the world, influence problem-solving abilities, increase



The Young Members Council meets at the 2019 Annual Meeting. A TAD restructuring effort aims to create greater visibility of volunteers and their work and to attract new volunteers and sponsors. (Photo: Risdon Photography)

communication effectiveness, and assist in discovering new insights and informing decisions.

### Resilience and Sustainability

In October 2018, TRB convened the Transportation Resilience Innovation and Summit Exchange in Denver, Colorado. The conference brought together nearly 350 attendees with 43 state transportation agencies represented. Technical Activities staff provided coordination and subject matter expertise to support the development of the conference program and dissemination of the 2020–2025 Resilience Research Roadmap, the Transportation Agency Resilience Self-Assessment Tool, and the Resilience Majority Model. These were products of National Cooperative Highway Research Program Project 20-117, “Deploying Transportation Resilience Practices in State DOTs.”



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



Michael Griffith  
Chair  
Safety and Systems Users Group



Brendon Hemily  
Chair  
Public Transportation Group



George Avery Grimes  
Chair  
Rail Group



Richard Bornhorst  
Chair  
Freight Systems Group



David Ballard  
Chair  
Aviation Group



C. James Kruse  
Chair  
Marine Group



Caroline Alméras  
Cochair  
International Cooperation Committee



Christos Xenophontos  
Cochair  
International Cooperation Committee



Nikola Ivanov  
Young Members Council Representative



Ann M. Brach  
Director  
TRB Technical Activities Division



Environment and Energy Section committees provide insight into ecological concerns, energy consumptions, resource conservation, and alternative technologies. (Photo: Bureau of Safety and Environmental Enforcement)

At the TRB Annual Meeting 2019, the Joint Subcommittee on Resilience and Sustainability Collaboration held its inaugural meeting. The Transportation Systems Resilience Section and various other standing committees organized a tabletop exercise at the Annual Meeting, hypothesizing supply chain disruption scenarios and identifying leadership traits that would produce the quickest and most complete recovery.

## Planning and Environment

### *Transportation System Planning*

TRB continues to focus on the use of performance measures, data, and analytics to inform transportation analysis and decision making by state, regional, and local governments. The 17th TRB Conference on Planning Applications, branded TRB AppCon, brought together more than 430 professionals from academia and the public and private sectors for a June conference in Portland, Oregon. The conference provided a forum for demonstrating applications of innovation in the

use of data and analysis in a diverse array of decision contexts, including travel forecasting, economic analysis, equity, air quality and environmental analysis, and integration of new technology and modes into the transportation system.

TRB also hosted the Conference on Performance and Data in Transportation Decision-Making in Atlanta, Georgia, in September. This conference focused on decisions made at the highest levels of transportation organizations, including state DOTs and metropolitan planning organizations. The conference offered the chance to share techniques, research, and experiences in accessing, manipulating, and presenting big data in multimodal transportation systems and modal planning as well as project prioritization and selection.

### *Environment, Energy, and Climate Change*

Environment and Energy Section committees continued to sponsor and cosponsor conferences throughout the year that helped provide detailed insight into the latest issues of concern for their participants as well as for several TRB sponsors, including the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the California Air Resources Board. Discussions focused on specific areas of interest for the committees, including National Environmental Policy Act–related impact analysis; ecological concerns; air, noise, and vibration impacts; resource conservation; and energy consumption and alternative technologies, with a particular focus on a significantly changing environment and energy regulatory landscape.

### *Social, Economic, and Cultural Issues*

Eight Technical Activities committees formed a Joint Subcommittee on Transportation Equity, which convened for the first time at the 2019 Annual Meeting. The joint subcommittee, under the Standing Committee on Environmental Justice, formed to address critical



A series of earthquakes in Alaska destroyed highway infrastructure in 2018. New TRB subcommittees examine systems resilience and managing supply chain disruptions during and after natural disasters. (Photo: Alaska DOT)

issues related to providing equitable access and mobility in state, urban, suburban, and rural transportation systems. The joint subcommittee will convene a specialty conference in 2021 that will focus on research needs and current good practice in transportation equity.

## Design and Construction

### Design

The Standing Committee on Low-Volume Roads organized the 12th International Conference on Low-Volume Roads, which attracted more than 200 attendees from 19 countries to Kalispell, Montana, to explore solutions and advancements for engineered unpaved roads, timber bridge inspection, climate resiliency, unstable slope management tools, the use of unmanned aerial vehicles in low-volume road management, and low-cost safety improvements.

The Standing Committee on Roadside Safety Design gathered with partners in the American Association of State Highway and Transportation Officials (AASHTO) Technical Committee on Roadside Safety to discuss practices for determining crashworthiness of roadside safety hardware and the availability of solutions to satisfy new requirements in the AASHTO *Manual for Assessing Safety Hardware*.

The Standing Committee on Geometric Design met with the Standing Committees on Operational Effects of Geometrics and Highway Safety Performance. The committees addressed the topics of connected and automated vehicles, automated driving systems, and performance-based design in updating the AASHTO *Highway Safety Manual* and the new vision for the AASHTO *Policy on Geometric Design of Highway and Streets*.

The Committee on Geospatial Data Acquisition Technologies met to discuss advances and challenges in technology, practices, and policies with an emphasis on using unmanned aerial vehicles and the transition



Environment and Energy Section committees provide insight into ecological concerns, energy consumptions, resource conservation, and alternative technologies.

(Photo: Bureau of Safety and Environmental Enforcement)

from the North American Datum of 1983 to the 2022 Terrestrial Reference Frames.

### Pavements

The Standing Committees on Concrete Pavement Design and Rehabilitation and Concrete Construction and Rehabilitation held their midyear meeting in Orlando, Florida. The meeting included presentations on designing lower-cost, long-life concrete pavements, Florida DOT's concrete pavement test road, and an in-depth analysis of concrete pavement cracking as well as research needs and the formulation of statements for new research. On the second day of the meeting, the committees took a field trip to learn about I-4 Ultimate, a 21-mile project spanning two counties in central Florida.

### Structures

The Standing Committees on Subsurface Soil–Structure Interaction; Culverts, Buried Bridges, and Hydraulic Structures; and Low-Volume Roads conducted a webinar on the latest advances in large-span buried bridges. The webinar demonstrated how large-span buried bridges can be used as an alternative to conventional bridges. Advanced bridge construction applications, resilience, and project development were discussed.

The Standing Committee on Tunnels and Underground Structures, in collaboration with the Federal Highway Administration (FHWA) and AASHTO, conducted



The I-4 Ultimate project in central Florida was a focus of a joint midyear meeting of the Concrete Pavement Design and Rehabilitation and Concrete Construction and Rehabilitation Committees. (Photo: Xavier6984, Flickr)

a webinar on tunnel operations practices featuring the Hampton Roads Bridge–Tunnel in Virginia. The webinar discussed recent developments in tunnel management practices; specifically examining the Hampton Roads Bridge–Tunnel expansion and how the project’s design–build procurement method was structured to maximize value-generating innovation over risk-taking.

**Construction and Materials**

The Construction Section, via the Standing Committee on Construction Management, organized an Annual Meeting workshop to explore technologies for improving productivity in transportation construction and insights into revised productivity measures from the U.S. Bureau of Labor Statistics. Construction and materials subject-area committees hosted their first technical sessions covering the potential transformations from additive manufacturing (3-D printing) technologies in metal fabrication techniques and cement-based materials.

The Standing Committee on Critical Issues and Emerging Technologies in Asphalt met in Indianapolis, Indiana, over the summer. The committee tackled the issue of the abundance of plastic waste and its reuse in asphalt pavements, developing research needs for responsible recycling. The committee also organized an Annual Meeting workshop on how to attain a productive, engaged workforce by making careers in asphalt materials and road building attractive to young adults.

The Standing Committees on Quality Assurance Management and Asphalt Binders produced e-circulars

on the key elements of construction quality-assurance programs and future methods for more meaningful interpretation of asphalt rheological specification tests. The Concrete Materials Section organized a workshop in response to a strong demand for new sources of novel and unconventional pozzolans, or cements, highlighting how to reclaim and improve underused resources to produce high-performance concrete and to improve the reliability of current test methods conducted on these newer materials.

**Geotechnical Engineering**

The geology and geotechnical engineering committees addressed practitioners’ concerns and shared advances in practices and technology through workshops, specialty conferences, and webinars. In a half-day workshop, Looking Ahead at Informed Decision-Making for Engineering Geologists, the Standing Committee on Engineering Geology explored the growing ease of processing large amounts of data and how data can be used more readily to advance investigation, design, planning, and management.

Committee members developed technical content for several cosponsored conferences related to geosynthetics and geostructural aspects of pavements, airfields, and railways. Several geotechnical committees shared advances in theory and practice to a wide audience via webinars on design and construction of mechanically stabilized earth structures, practices for stabilized and recycled base and subgrade materials, and enhancing geotechnical asset performance by improving moisture measurement.

**Operations and Preservation**

**Operations**

Operations is a significant topic of transportation research, with almost 800 technical papers peer-reviewed by Operations Section committees for the 2019 Annual Meeting. More than 100 Annual Meeting sessions and more than 90 meetings addressed operations. The Standing Committees on Intelligent Transportation Systems and Vehicle–Highway Automation cosponsored the 8th Symposium on Automated Vehicles in Orlando, attended by nearly 1,400 participants from industry, academia, public agencies, and other organizations. In 2020, the Symposium will be held in San Diego, California.

In 2019, all operations-related committees held midyear meetings or conferences, including the Tolling Technology and Managed Lanes Business Summit in Orlando, cosponsored by the Standing Committee on Managed Lanes; the Standing Committee on Regional



A webinar conducted by TRB along with the Federal Highway Administration and the American Association of State Highway and Transportation Officials examined tunnel management practices, including the Hampton Roads Bridge–Tunnel expansion. (Photo: David Broad, Wikimedia)



A traffic control devices challenge at the 2019 Annual Meeting encouraged creativity in developing signs, lights, and pavement structures. (Photo: Beyond DC, Flickr)

Transportation System Management and Operations joint meeting with the AASHTO Committee on Transportation Systems Operations, in Jackson, Wyoming; and the Traffic Control Devices Challenge at the Annual Meeting, sponsored by the Standing Committee on Traffic Control Devices, encouraging creativity and innovation among engineering students who are interested in traffic control devices.

### **Maintenance and Preservation**

At the Annual Meeting, the committees of the Maintenance and Preservation Section highlighted the application of artificial intelligence to maintenance and operations data. The committees held a midyear meeting in conjunction with the AASHTO Maintenance Committee meeting in July, and because many attendees of the summer meeting had been unable to attend the Annual Meeting in January, committees highlighted presentations that had been given at that meeting.

### **Safety and Systems Users**

The Standing Committee on Transportation Safety Management restructured to reduce fragmentation and emphasize research to define and implement safe systems. The Standing Committee on Alcohol, Other Drugs, and Transportation published *Transportation Research Circular E-C250: Drug-Impaired Driving—Research Needs*.

The Standing Committee on Highway Safety Performance met jointly with the Standing Committees on Geometric Design and Operational Effects of Geometrics to review topics of common interest and identify shared research priorities. Several other committees held midyear meetings to discuss a range of topics, including mobility and aging quality of life, teen driver safety, occupant protection, truck and bus safety, and bicycle transportation. The many webinars hosted by this section in 2019 focusing on topics including

roundabouts, drug-impaired driving, technologies for visually impaired pedestrians, and safe systems.

### **Legal Resources**

The Legal Resources Group sponsored the 58th Annual Workshop on Transportation Law in Cleveland, Ohio, in July. The more than 140 registrants included representatives from federal, state, and local transportation agencies as well as from the private sector. The workshop opened with a plenary session featuring the U.S. DOT General Counsel, the chief counsels of FHWA and the Federal Transit Administration, and a senior counsel from the National Highway Traffic Safety Administration, each of whom spoke about critical legal issues and developments at their agencies.

More than 45 speakers presented at 15 breakout sessions, which were followed by a plenary session on legal ethics. Each of the seven committees comprising the Legal Resources Group also held their midyear meetings at the workshop. Among the many legal issues the group will focus on in the coming year are creating a legal framework for the regulation of and liability for autonomous vehicles, utilizing existing legal authority to advance climate-related and alternative fuel initiatives, and advancing legislation to fund future transportation projects.

### **Aviation**

In addition to participating in the Annual Meeting, several Aviation Group committees held midyear meetings to continue discussions on ongoing and emerging areas of interest related to intergovernmental relations among aviation constituent organizations; systems approaches to planning for new entrants to the aviation field, including the urban air mobility market; mitigating environmental impacts from and to aviation infrastructure; and economic outlooks for the helicopter, commercial airline, and business aviation markets.

### **Marine**

The standing committees of the TRB's Marine Group focused this year's programming and discussions on maritime technology, data challenges and opportunities, and sociotechnical implications for resilience and waterways safety. Autonomous vessels and automated maritime technologies once again were highlighted as part of many of these discussions.

The Marine Group's midyear meetings were held at Texas A&M University, Galveston, and included port tours of Galveston and Houston, a waterside tour of the



At their midyear meeting in Galveston, Texas, members of the Marine Group toured the Houston Ship Channel and discussed maritime technology, data challenges, and system resilience. (Photo: Roy Luck, Flickr)

Houston Ship Channel, and a tour of the Shell Refinery in Deer Park. TRB also organized the 17th National Harbor Safety Committee Conference with the theme of “Safe, Shared Waterways: From Conversation to Action.” Panels and discussions focused on the future of navigation safety, disaster resilience lessons learned, and innovations in mariner training and education. The closing keynote address was delivered by Admiral Karl L. Schultz, Commandant, U.S. Coast Guard.

The Marine Board’s spring meeting was held in Paducah, Kentucky. In addition to sessions on various topics related to inland waterways, the meeting also featured demonstrations of barge training simulators at the Seaman’s Church Institute, technical tours of the Kentucky and Olmsted Lock and Dam facilities, and interpreted tours of the James Shipyard and Ingram Barge facilities. The Marine Board fall meeting was held in November in Woods Hole, Massachusetts, and focused on the topics of offshore wind energy development and autonomous ships.

## Rail

The Standing Committee on Highway–Rail Grade Crossings produced *Transportation Research Circular E-C242: A Literature Review of Rail Trespassing and Suicide Prevention Research*. This publication reviewed and summarized available research reports and data sources related to the issues of railroad trespassing and suicide, focusing on research from 2013 to the present. The e-circular explored incidences of rail-related trespassing and suicide based on several factors, including lethality, age, gender, and risk factors, and also discussed trespassing and suicide countermeasure findings.

A workshop at the 2019 Annual Meeting explored

the use of big data in track condition inspection and monitoring. The Rail Group also sponsored a two-part Annual Meeting session on automated train technology.

## Freight Systems

Standing committees in the Freight Systems and Marine Groups organized a compelling and diverse series of Freight Day sessions at the Annual Meeting on technologies for multimodal freight corridor management, impacts of new technological and economic trends in freight transportation and land use activity, and making automated freight vehicles work in the cities of the future. Other high-profile topics this year included delivery by drone, cross-border operations and optimization, international trade dynamics, urban food deserts, and military deployment, mobilization and mobility challenges.

Freight Systems committees also aligned midyear meetings with the Innovations in Freight Data Conference, held in Irvine, California, in April.

## Public Transportation

At the 2019 TRB Annual Meeting, the Public Transportation Group sponsored a session titled *Transit Fightback: Pushback on Technology Hype for Stronger City Futures*. This session provided evidence that—contrary to the view that transit has no future—transit systems remain at the core of solutions for transportation issues in congested cities, despite the promotion of new technologies and shared new mobility modes.

Committees from the Public Transportation Group helped organize the International Conference on Demand-Responsive and Innovative Transportation Services in Baltimore, Maryland. The conference

explored the latest issues and trends in both research and practice related to the planning, design, construction, operation, and maintenance of demand-responsive transportation systems around the world.

TRB also sponsored the 14th National Light Rail and Streetcar Conference in Jersey City, New Jersey. The conference showed decision-makers how investments in light rail and streetcars can strengthen the entire transit network, contribute to regional mobility, and integrate successfully into the built environment.

## Safety Data Program

The second Strategic Highway Research Program (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 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 2018; roughly half the presentations at the symposium utilized SHRP 2 data. The SHRP 2 data set is the largest naturalistic driving data set ever collected.

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

The Safety Data Implementation Program is more than halfway completed; the Safety Data Oversight



TAD Director Ann Brach (*left*) and TAC Chair Hyun-A Park (*right*) led a town hall event in August addressing the divisional restructuring effort.

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. A major ongoing task of the cooperative agreement is the development of a long-term management plan for the next phase of the safety data.

## Staff News

- **John Dodson** joined the Technical Activities Division (TAD) as Deputy Managing Editor of the *Transportation Research Record: Journal of the Transportation Research Board*.
- **Keyara Dorn** transferred from Cooperative Research Programs to TAD as Associate Program Officer.
- **Rhonda Levinowsky** transferred from the Administration and Finance Division to TAD as Associate Program Officer.
- **Ashley Vaughan** joined TAD as Associate Program Officer.



The 14th National Light Rail and Streetcar Conference in New Jersey examined the relationship between light rail investments and a stronger transit network. (Photo: Wally Gobetz, Flickr)



## 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 the Marine Board examine offshore engineering and regulatory issues, some of which are not directly related to transportation.



Consensus and Advisory Studies Division Director Tom Menzies shares updates on current and upcoming policy studies with the TRB Executive Committee. (Photo: Risdon Photography)

The studies are performed by special committees drawn from the nation's leading subject matter experts. The parent organization of the Transportation Research Board (TRB), 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 Katherine Turnbull, Texas A&M Transportation Institute.

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.<sup>1</sup>

### Completed Reports

The following consensus reports were issued during 2019:

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

In the Fixing America's Surface Transportation (FAST) Act of 2015, Congress asked TRB to convene a study committee to make recommendations on the "features, standards, capacity needs, application of technologies, and intergovernmental roles to upgrade the Interstate System" and to advise on any changes in law and resources required to advance the recommended actions.

In *Special Report 329*, the committee identified a series of challenges, both long-standing and emerging, that confront the future of Interstate highways: rebuilding the system's pavements, bridges, and other aging assets before they become unserviceable and less safe; meeting demands for more traffic capacity and more active traffic management, especially on congested urban segments; ensuring the system's coverage keeps pace with changes in the location of the country's population and economy; improving safety as traffic throughput increases; adapting to changing vehicle technologies; adopting new, user-based funding mechanisms that will generate the needed reinvestment revenues; and incorporating changing climate conditions into infrastructure and operations planning and design.

The report explains how a major upgrade and modernization of the Interstate Highway System will require a concerted federal and state effort similar to the one that led to the planning and construction of the Interstates in the first place. Therefore, among





In response to the Fixing America's Surface Transportation Act of 2015, TRB convened a committee to tackle the challenges of upgrading the Interstate Highway System. (Photo: MaxPixel)

its central recommendations, the report calls for the creation of an Interstate Highway System Renewal and Modernization Program (RAMP) to reinforce a partnership in which the federal government provides leadership, vision, and most of the funding, and the states prioritize and execute projects in their continued role as owners, builders, and maintainers of the system.

To raise the additional revenue needed for system upgrades, the report recommends increasing the federal fuel tax in the near term and allowing states to impose tolls or per-mile charges on Interstate users. The report emphasizes that, by lifting the federal ban on tolling that applies to most general-purpose Interstate lanes, states and metropolitan areas would have more options for raising revenue for their share of RAMP investments and for managing the traffic demand on and operations of Interstate segments that offer limited opportunity for physical expansion.

- **Performance of Bridges That Received Funding Under the Innovative Bridge Research and Construction Program**

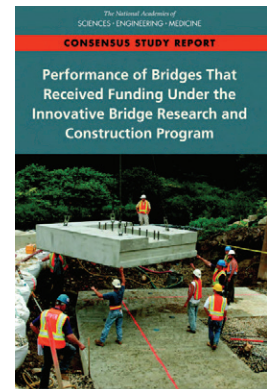
The FAST Act called on TRB to convene a study committee to examine the results of the Innovative Bridge Research and Construction (IBRC) program, which was created by Congress to promote innovation in highway bridge construction. Between 1999 and 2005, the program provided state departments of transportation with nearly \$130 million in grants to encourage the use of innovative materials and technology to construct or repair approximately 400 bridges. Projects funded by the IBRC program included the use of such materials as fiber-reinforced polymer composites, high-performance concrete, high-performance steel, and corrosion-resistant reinforcing bar, and techniques like accelerated bridge construction.

*Special Report 330* offers an analysis of the performance of bridges that received IBRC funding and the extent to which they met the goals of the program. The report also provides an analysis of the utility of the

innovative materials and technologies used in IBRC projects, compared with conventional materials and technologies, in meeting the needs of a sustainable transportation system with low life-cycle costs. The report contains a series of recommendations on how the installed and life-cycle costs of bridges may be reduced using innovative materials and technologies and recommends that Congress create a new federal program to provide incentives for innovation in bridge construction.

- **The Vital Federal Role in Meeting the Highway Innovation Imperative**

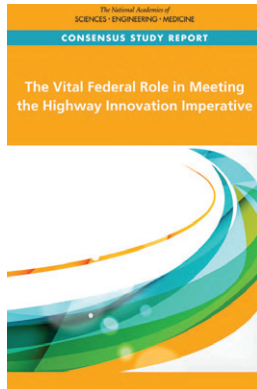
Issued by TRB's Research and Technology Coordination Committee, *Special Report 331* reviews the federal highway research and innovation enterprise, including the research, development, and technology (RD&T) programs of the Federal Highway Administration (FHWA) and the U.S. DOT Intelligent Transportation Systems Joint Program Office (ITS JPO). The report



Massachusetts DOT lifts a precast bridge deck into place. *Special Report 330* examines the success of innovative techniques like accelerated bridge construction. (Photo: Massachusetts DOT)



A U.S. Coast Guard vessel approaches a crab fishing boat in the Bering Sea to check regulation compliance. The Coast Guard requested a study from TRB on ways to better adapt regulations to vessels that have undergone stability-affecting weight changes. (Photo: Bill Colclough, U.S. Coast Guard)



explains how FHWA and ITS JPO programs are conducting nationally significant research, fulfilling congressional mandates, and addressing many significant gaps in highway research coverage.

The report also points to developments that are changing highway transportation in fundamental ways and could warrant even greater levels of RD&T investment by the two federal programs. Several candidate topics for future RD&T are identified, including research on automated vehicle technology, energy and sustainability, growing and changing populations, resilience, goods movement, safety, and equity. The report concludes by observing that with sustained and adequate funding and modest additions and changes to its RD&T portfolios, FHWA and the ITS JPO should continue to serve and advance the national interest.



Special Report 331 reviews national highway research, development, and technology programs and identifies gaps in highway research coverage. (Photo: Minnesota DOT)

- **Review and Update of U.S. Coast Guard Vessel Stability Regulations and Guidance**

The U.S. Coast Guard has safety regulatory jurisdiction over vessels registered in the United States. One of its oldest regulatory functions is to ensure these ships, boats, and other floating vessels remain upright as they encounter both expected and unexpected loading, operating, and weather conditions, including wind and wave conditions and unexpected failure of watertight integrity. The Coast Guard has made major changes to its stability regulations over the past 30 years, most notably by consolidating most of them into a single subchapter. Despite these consolidations, the Coast Guard is interested in making further improvements to the regulations, particularly with regard to their usability by vessel designers, classification societies, operators, and inspectors.

The Coast Guard asked TRB to convene a study committee to identify ways to make these stability regulations more usable and complete in meeting the requirements of different types of vessels and to account for vessels that have undergone weight changes that can affect their stability characteristics. In *Special Report 332*, the study committee explains how stability standards have been improved over time but still need to be kept updated based on the latest technical knowledge, well-aligned with international standards, and organized and presented in a manner that facilitates compliance and enforcement. The report identifies options to further these goals.

- **Toward New Naval Platforms: A Strategic View of Naval Engineering**

Naval engineering concerns the design, construction, operation, and maintenance of naval sea platforms. The Office of Naval Research asked TRB to form a

committee to review the status of its efforts under the National Naval Responsibilities: Naval Engineering (NNR-NE) program to ensure a healthy science and technology (S&T) and educational enterprise that can fulfill the future technology needs of the U.S. Navy in developing highly capable and affordable sea systems.

*Special Report 333* contains findings on the state of naval engineering research, workforce development, and research infrastructure critical to naval interests. The report recommends that ONR employ a strategic framework for making choices about how best to pursue these three pillars of the program in the fast-changing S&T landscape and in response to new Navy operational paradigms. In particular, the proposed framework emphasizes the importance of NNR-NE making deliberate choices about when it should take the lead in sponsoring basic research to further naval interests and when it should leverage and monitor critical S&T for this purpose.

## Ongoing Studies

- **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.
- **Mobility as a Service Study**, a TRB-initiated project, is examining 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.
- **Study on Lead in Aviation Gasoline** is examining options for reducing the concentrations of lead in gasoline used by the nation's fleet of general aviation aircraft, per request of Congress in the Federal Aviation Administration (FAA) Reauthorization Act of 2018.
- **U.S. Coast Guard's Use of Unmanned Technologies Study** is considering how the Coast Guard can make greater use of unmanned systems and how it should set priorities for developing, testing, and deploying them to meet its maritime domain awareness needs. The study was requested in the Coast Guard Authorization Act of 2018.
- **Study on the Technical Feasibility of In-Cabin Wheelchair Restraint Systems** will evaluate the conditions under which it may be technically

feasible to equip passenger aircraft with wheelchair restraint systems, including assessments of relevant aircraft and wheelchair design, engineering, and safety requirements. The study is being sponsored by the U.S. Access Board to comply with the FAA Reauthorization Act of 2018.

Other committees provide ongoing peer review of the research and technology programs of FHWA, the Federal Transit Administration, 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.<sup>2</sup>

## Assistance with National Academies Studies

In addition, Consensus and Advisory Studies staff assisted with studies and other initiatives led by other National Academies units, including the Board on Energy and Environmental Systems (on motor vehicle fuel economy technologies), the Board on Human–Systems Integration (on the diversity of FAA's cybersecurity workforce), and the Gulf Research Program (on offshore oil and gas safety).

## Staff News

**Joseph R. Morris** retired after more than 36 years of TRB service.

<sup>1</sup> [www.TRB.org/Publications/PubsPolicyStudiesSpecialReports.aspx](http://www.TRB.org/Publications/PubsPolicyStudiesSpecialReports.aspx)

<sup>2</sup> [www.TRB.org/Publications/PubsPolicyStudiesLetterReports.aspx](http://www.TRB.org/Publications/PubsPolicyStudiesLetterReports.aspx)



Ongoing Consensus and Advisory Studies include an examination of options for reducing lead in aviation fuel. (Photo: Ronnie Robertson, Wikimedia)



# 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. 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 seven 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 the Transportation Research Board (TRB), a federal agency, and one or more industry associations 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



Cooperative Research Programs (CRP) Director Chris Hedges (left) and TRB Executive Director Neil Pedersen confer at the Airport Cooperative Research Program (ACRP) Oversight Committee meeting. CRP oversight committees identify highest-priority projects, define project funding levels, and articulate expected research products.

credibility. CRP staff members are specialists in project management and facilitation, experts in working with research teams and volunteer panels, and motivated to provide services and develop products that meet the needs of sponsors and practitioners.

As of 2019, 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 (BTSCRCP).

## 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



**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  
Commission



**Brian Ness**  
Chair  
AASHTO Special  
Committee on Research  
and Innovation

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) is 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 has enabled the program to carry out research with sound, practical, and nationally important results. Stakeholder involvement throughout NCHRP process guarantees that the program addresses high-priority research needs and develops implementation-ready products.

NCHRP manages projects in research areas 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 and as *Research Results Digests* and *Legal Research Digests*, as well as other documents published electronically.

In 2019, AASHTO selected 11 continuing projects and 56 new projects. Each NCHRP project follows an approved research plan under the guidance of a panel of technical specialists and experienced practitioners. The panel defines the scope of work, selects the contractor through a competitive proposal process, and monitors the research from beginning to end. The panel's participation ensures the credibility of the research findings, facilitating adoption by AASHTO, state DOTs, and other organizations.



A National Cooperative Highway Research Program (NCHRP) project panel convenes for its first meeting to discuss implementation of big data analytics for traffic incident management.

NCHRP panels gathered for more than 180 project meetings in 2019. 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 contributing 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 collaborates with AASHTO to ensure that the state DOTs learn about and deploy the products.

### Highlights of 2019

**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 address challenges for truck freight operations, strategic communications planning, road markings for machine vision, implications for



Hedges delivers TRB updates to the the American Association of State Highway and Transportation Officials Special Committee on Research and Innovation, the governing board and oversight committee for NCHRP.



A workshop on integrated corridor management, based on a related NCHRP project, was conducted in Atlanta, Georgia, in October. Through communication and dissemination products, NCHRP’s implementation program supports transportation agencies as they put NCHRP research results into practice. (Photo courtesy Cambridge Systematics)

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 continues to be an effective way for AASHTO committees and councils to create prioritized, multiyear research agendas. In 2019, R&I made \$1.5 million available to AASHTO councils, committees, and subcommittees, to assist them in identifying critical research needs. Five projects are under way, addressing state DOT research needs in the areas of risk management, asset management, active transportation, performance-based management, and organizational development.

**NCHRP Implementation Program**

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 2016, R&I has made a total of \$8 million available for communication and implementation activities from NCHRP project panels, state DOTs, and AASHTO councils and committees.

NCHRP’s implementation program supports the implementation of NCHRP research results by state DOTs, monitors the use of NCHRP research results

and evaluates outcomes and impacts, and produces targeted communication and dissemination products that support implementation. In 2019, NCHRP funded implementation projects worth \$1.9 million, covering a range of activities such as pilot or demonstration projects, peer exchanges, trainings, and development of executive briefing materials.

NCHRP also completed a survey of state DOTs, project panels, and research team members on how research results published in 2015 were used and what benefits or impacts were experienced. More than 350 respondents reported benefits to state DOTs and the traveling public from the implementation of NCHRP research. In June, NCHRP Project 20-44(09), Quantitative and Qualitative Methods for Capturing the Impacts and Value of NCHRP Research, was launched with the goal of developing methods to measure the impacts of NCHRP research over time. Results are expected in 2022.

**Synthesis and IDEA Programs**

As the name suggests, NCHRP Synthesis of Practice reports specifically capture the state of practice by state DOTs on a narrow topic and are used routinely by state DOTs to learn from their peers. Fourteen Synthesis reports were published in 2019, and 19 new Synthesis Program projects were started.

The NCHRP Ideas Deserving Exploratory Analysis Program, commonly known as NCHRP IDEA, explores the feasibility of unproven technical concepts, novel applications of proven concepts, or advances that have not yet been tried or tested for application in transportation practice. The focus is on high-payoff



Lamar Sylvester, North Carolina DOT, participates in one of the more than 180 NCHRP project meetings held in 2019.



The TCRP Oversight and Project Selection Commission met in October to choose upcoming research topics.

concepts, products, systems, tools, or techniques that accelerate the development and deployment of advanced technologies, methods, or processes for highway and intermodal transportation systems.

### Research Results

All NCHRP reports are available on the TRB website.<sup>1</sup> General information on all projects is available in the NCHRP Summary of Progress of December 31, 2019,<sup>2</sup> and on the web. Offering an indication of the variety of topics addressed by NCHRP and reflecting many of the priorities of state DOTs, the list of NCHRP reports published in 2019 includes

- NCHRP Research Report 905: *Measuring the Effectiveness of Public Involvement in Transportation Planning and Project Development*,
- NCHRP Research Report 918: *Approaches for Determining and Complying with TMDL Requirements Related to Roadway Stormwater Runoff*,
- NCHRP Synthesis Report 531: *Automated Pavement Condition Surveys*,
- NCHRP Synthesis Report 543: *Transportation Workforce Planning and Development Strategies*, and
- NCHRP Legal Research Digest 76: *Update of Selected Studies in Transportation Law, Volume 8, Section 3—Indian Transportation Law*.

## Transit Cooperative Research Program

In June 2019, the second annual TCRP Day was held to enhance awareness of the program and the invaluable research it provides to the public transportation industry. More than 35 transit organizations hosted events.<sup>3</sup>

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 27 years, TCRP has undertaken more than 780 research studies that span a comprehensive array of public transportation topics.

The TCRP Oversight and Project Selection Commission 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 2019 TCRP Annual Report of Progress.<sup>4</sup>

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.

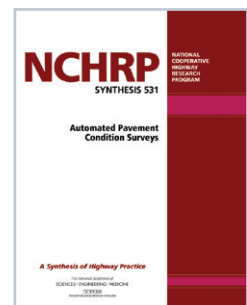
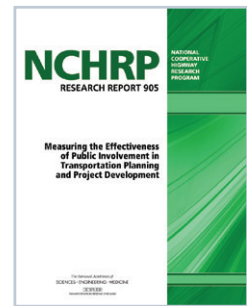
With \$5 million authorized and appropriated annually, TCRP supports the public transportation industry and community through conferences, webinars, and project panels, maintaining a high level of engagement with the public transportation industry and stakeholders. The program selects high-priority research projects through the TCRP Oversight Panel process and notes public transportation problems in needs of applied research by inviting the submission of research needs from the industry and stakeholders.

In FY 2019, TCRP produced 14 publications, including eight *TCRP Research Reports* and six *TCRP Synthesis Reports*, bringing the total to more than 698 since the program's inception.<sup>5</sup> The following TCRP publications of particular interest were completed during the year.

### Maintenance

*TCRP Research Report 206: Guidance for Calculating the Return on Investment in Transit State of Good Repair* provides guidance and a spreadsheet tool for calculating the return on investment for a specific investment or program of investments to achieve and maintain transit assets in a state of good repair (SGR).

A key product of the research is a spreadsheet tool for transit agencies, discussed in Chapter 4 and available for download from the TRB website by searching for “TCRP Research Report 206.” The tool is not a detailed life-cycle





BaltimoreLink, an overhaul of the core transit system in the Baltimore, Maryland, metropolitan area. *TCRP Synthesis 140* offers an overview of bus network redesigns in different geographical locations and in agencies of different sizes. (Photo: MarylandGovPics, Flickr)

cost calculator for developing project alternatives but rather a high-level tool for communicating the benefits of SGR investment and comparing investments in improving or maintaining SGR to other types of transit investments.

### Marketing and Communications

*TCRP Research Report 208: Strategic Communications Toolkit to Improve Support for Transit-Priority Projects* presents effective communications strategies to gain public support for transit-priority projects. Transit-priority projects are efforts to improve transit service, particularly in terms of speed and reliability, by prioritizing the movement of transit vehicles over automobiles. The report and associated toolkit provide practical guidance to decision-makers and communications staff of public transportation agencies and other providers of transit services.

### Operations

*TCRP Synthesis Report 140: Comprehensive Bus Network Redesigns* provides an overview of the current state of practice regarding comprehensive bus network

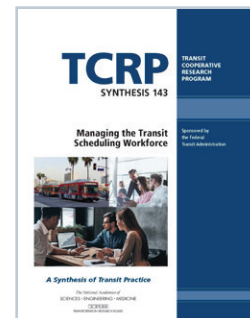
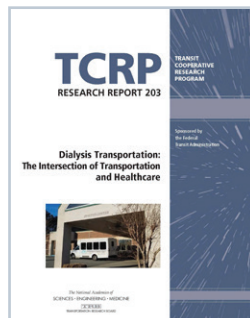
redesign. The study captures the state of the practice among agencies of different sizes, geographic locations, and modes.

Case examples of five transit systems are provided, presenting an in-depth analysis of the processes and considerations, challenges, lessons learned, and keys to success. The report presents the reality and complexity of conducting a bus network redesign, and agencies that use it will be able to make better decisions about the process.

### Policy and Planning

*TCRP Research Report 205: Social and Economic Sustainability Performance Measures for Public Transportation* is a practical tool to help transit agencies of all sizes develop and use social and economic sustainability performance measures to plan, evaluate, and report on social and economic sustainability. This guidance 1) presents key findings from the literature review and transit agency interviews; 2) identifies a list of 57 top social and economic sustainability performance measures and 56 transit service measures, selected using evaluation criteria established in collaboration with the research panel; and 3) provides transit agencies with guidance on how to set goals, determine objectives, establish measures, implement and evaluate the measures, and report progress on social and economic sustainability. The report is accompanied by an Excel workbook that can be used by transit agencies to develop their own initial lists of performance measures.

*TCRP Research Report 207: Fast-Tracked—A Tactical Transit Study* presents the current state of the practice for quick-build projects for surface transit or tactical transit projects. Based on tactical urbanism, these projects use lower cost, temporary materials, and short-term tactics as a way of pilot testing or expediting projects while longer-term planning is conducted in order to initiate physical and operational strategies that improve the delivery of surface transit. More and more communities are using this methodology not only to accelerate transit projects but also to support safer, more efficient use of streets.







TCRP Synthesis 143 examines transit agency workforce management. (Photo: Metropolitan Transportation Agency of the State of New York)

### Service Configuration

TCRP Research Report 203: *Dialysis Transportation—The Intersection of Transportation and Healthcare* documents the issues and concerns related to transportation for dialysis, a treatment that annually saves the lives of approximately 0.5 million Americans whose kidneys have failed. Those issues and concerns result from the intersection of transportation and health care.

TCRP Research Report 203 presents information on 1) end-stage renal disease and its prevalence and treatment options in the United States; 2) current and projected demand and costs associated with transportation for kidney dialysis in the United States; 3) health-care initiatives that aim to reduce end-stage renal disease, improve access to health care, and increase accountability of health-care providers; and 4) effective practices and new strategies implemented by public transportation agencies for funding and providing transportation for kidney dialysis. To access the forecasting tool and information briefs that accompany the report, search the TRB website for “TCRP Research Report 203.”



Deborah Flint (center) is Chair of the ACRP Oversight Committee.

### Workforce Development

TCRP Synthesis Report 143: *Managing the Transit Scheduling Workforce* provides an overview of the current state of the practice regarding transit agencies’ management of their transit scheduling workforce. The study examines five agencies of different sizes, geographic locations, and modes and explores how they recruit, train, develop, and retain schedulers. For cases in which transit agencies use third parties to create schedules, the study also shows how the agencies manage those third parties.

The report analyzes how transit systems are evolving their practices to adapt to industry and technological changes and offers transit systems new ideas and strategies to retain good schedulers.

### Webinars

In addition to publication downloads from the National Academies Press, webinar attendance is a key indicator of how many people are accessing TCRP products. Communicating results is a necessary first step to facilitate the research-to-practice pipeline. Webinars offer a relatively resource-efficient and interactive environment in which attendees can hear directly from the report authors, ask clarifying questions, and receive feedback that might make a proposed solution more relevant to their particular environment.

Approximately 300 people participated in the webinar Contracting Commuter Rail Systems, 656 people attended a webinar on dialysis transportation, 99 people attended the webinar Addressing Difficult Customer Situations, and 108 people participated in the College Student Transit Pass Programs webinar.

### Impacts on Practice

The recently developed and produced *Impacts on Practice* series offers examples of how public transportation industry practitioners are using TCRP research results to assist them in their work. With more examples to come, TCRP developed five Research in Action case studies to help demonstrate the effectiveness of TCRP research in practice:

- “The MBTA Builds a Safety-First Culture from the Ground Up”;
- “Coordinated Transportation Serves Veterans in Western Montana”;
- “Metra Invests in a Sustainable Workforce with Targeted Training, Capacity-Building”;
- “State of Good Repair Research Methods Support an MPO’s Quest to Improve Travel Demand Forecasting”; and
- “Awareness is the Cornerstone of Safety at the St. Cloud Metropolitan Transit Commission.”



Among the problem statements to be addressed by ACRP are challenges in calculating runway length requirements, innovation, and combating human trafficking. (Photo: Kyle Harmon, Flickr)

## Airport Cooperative Research Program

Airports are critical infrastructure serving the needs of an increasingly international citizenry, who expect instant access to global information and ideas, goods and services, and travel and leisure experiences. Whether they live in a rural community or a major city, each year more and more Americans rely on air travel that starts and ends at airports.

Since its establishment in 2005, ACRP has helped foster and sustain safe, efficient, clean, and reliable airport operations by conducting applied research to solve airport operator's day-to-day challenges. In 2019, ACRP continued to conduct high-quality, industry-driven research and disseminate it to airport practitioners using innovative tools and strategies.

Following are highlights of ACRP's accomplishments during 2019.

### Sponsoring Research to Address Airport Challenges

Since its inception, ACRP has steadfastly adhered to one of its most important guiding principles: to involve airport stakeholders in directing its research. Airport operators, industry associations, federal and state transportation agencies, universities, and aviation consultants generate research ideas and problem statements and serve on panels that craft RFPs, select research teams, and help guide the research through the project. This process delivers results that are responsive to industry needs identified by practitioners closest to the issues.

In 2019, ACRP received 77 problem statements addressing challenges facing different types of airports.

The problem statements encompass such diverse topics as encouraging and sustaining a culture of innovation at airports, calculating runway length requirements for general aviation airports, and combating human trafficking at airports.

In response to these problem statements, ACRP committed more than \$7 million to supporting new research projects. This investment raises the total amount of project funding since 2005 to more than \$140 million and the total number of ACRP projects authorized since 2006 to more than 600.

In addition, ACRP published 41 research products (reports, digests, syntheses, web-only documents, conference proceedings, and WebResources) in 2019, producing guidance for managing small airports, innovating strategies for aviation education, quantifying emissions from alternative jet fuels, and many more.

### Getting Research into the Right Hands

ACRP research, solutions, and tools cannot fulfill their purpose sitting on a shelf unread and unused. To make sure that the airport industry is aware of its research, ACRP deploys state-of-the-art digital communications and stakeholder engagement tactics. Since ACRP began its dissemination work, awareness of the program and its work has grown significantly, and ACRP has benefitted from having more practitioners submit problem statements, volunteer for panels, respond to requests for proposals, follow ACRP on social media, and engage in the program through other means.

In 2019, ACRP focused on multiple engagement efforts, including Ideahub, the Ambassador and Champions programs, the ACRP webinar program, and videos and website enhancements.

- **IdeaHub.** IdeaHub is ACRP's online platform that helps the airport community submit, organize, and refine ideas that develop into problem statements. Based on user feedback, ACRP refined its design and created new features to make it even easier to submit and follow ideas. As a result, ideas and problem statements flourished, and the ACRP Oversight Committee selected more than 20 projects to fund for FY2020.
- **Ambassadors and Champions.** ACRP Ambassadors are a select group of experienced airport professionals who help amplify ACRP's reach. Ambassadors attend conferences around the United States and Canada, staffing exhibits and presenting ACRP research. In 2019, 17 Ambassadors reached more than 4,000 practitioners in 18 different states and provinces. The Champions program provides learning and professional

development opportunities to early- to mid-career professionals. An ACRP Champion, sponsored by his or her respective organization, completes “missions” designed to build knowledge and drive engagement in ACRP’s research and dissemination activities. This year, Amber Leathers, a senior planner at Charlotte Douglas International (CLT) Airport, became the first Champion to complete all missions. To celebrate Leathers’s accomplishment, ACRP held a luncheon at CLT Airport and presented her with a certificate of completion.

- **Webinars.** Each year, ACRP hosts webinars in which researchers present findings to a nationwide audience. Webinars feature principal investigators (PIs) and research teams, who discuss their research results with hundreds of airport practitioners. ACRP and PIs work collaboratively to create relevant and engaging presentations. In 2019, ACRP hosted 16 webinars that attracted more than 1,700 attendees.
- **Videos.** ACRP uses videos to spread research and information in a different and engaging way. In 2019, ACRP produced “What Makes a Good ACRP Problem Statement?” a short whiteboard animation on the criteria that make a high-quality problem statement (applicability, achievability, implementation, and understandability).<sup>6</sup> ACRP also expanded its “ACRP Chats With” series in which industry professionals provide an in-depth look at a specific topic. In “ACRP Chats with Katherine Preston on ACRP Roadmaps,” Preston, a principal consultant with HMMH, discusses two ACRP research roadmap projects: Design and Construction of Airport Facilities and Airport Operations and Maintenance.<sup>7</sup>

In 2019, ACRP also convened its fourth Insight Event, Public–Private Partnerships: What Are the Lessons Learned?, to help airport managers and operators better understand key characteristics and considerations for public–private partnerships (P3s). The event brought together airport industry leaders, academic experts, consultants, and other stakeholders to discuss the current landscape of airport P3s. Speakers and attendees discussed challenges, opportunities, lessons learned, and best practices across the P3 process, from preprocurement through financial close. Presenters drew from firsthand experiences pursuing P3s for airports in the United States and shared lessons learned along the way.

In 2019, the ACRP Oversight Committee began an update to the 2015 ACRP Strategic Plan that will focus on digital delivery, broadening outreach, and aligning research needs with the appropriate research methods. The committee is scheduled to adopt the updated plan, “Blueprint for the Future,” in January 2020.

## 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.

Starting in FFY 2018, TRB assumed management of the program’s research activities. The name of the program was changed to the Behavioral Traffic Safety Cooperative Research Program (BTSCRP) 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, BTSCRP provides practical, implementation-ready solutions to save lives, prevent injuries, and reduce costs of road traffic crashes associated with unsafe behaviors.

The GHSA Executive Board serves as the governing board for BTSCRP. 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.



The first meetings of BTSCRP panels tackled such topics as e-scooter safety, child safety in new travel modes, and implications of legislation related to the use of electronic devices while driving.



Variable message signs provide information like traffic and weather updates, roadwork warnings, and crash notifications. A BTSCRP project is developing a guide for using these signs, including how and when to post, barriers to implementations, and impacts and effectiveness. (Photo: Oregon DOT)

### First Projects

Contracts awarded for the first nine BTSCRP projects include

- BTSCRP Project 01, Guidance for Employer-Based Behavioral Traffic Safety Programs for Drivers in the Workplace;
- BTSCRP Project 02, Guide for Behavioral Traffic Safety Messaging on Variable Message Signs;
- BTSCRP Project 03, Examining the Implications of Legislation and Enforcement on Electronic Device Use While Driving;
- BTSCRP Project 04, Tracking State Traffic Citation and Adjudication Outcomes;
- BTSCRP Project 06, Guide for MPO and HSO Coordination on Behavioral Traffic Safety Countermeasures;
- BTSCRP Project 07, Assessing the Impacts of Connected, Automated, and Autonomous Vehicles on the Future of Transportation Safety (jointly funded with NCHRP Project 17-91);
- BTSCRP Project 08, Use of SHRP 2 Naturalistic Driving Study Database to Improve Teen Driving Safety: Phase 1 Proof of Concept; and
- BTSCRP Project 09, Influence of Infrastructure Design on Distracted Driving.

The GHSA Executive Board selected six new research projects in 2019, including

- BTSCRP Project 10, E-Scooter Safety: Issues and Solutions;
- BTSCRP Project 11, Ensuring Child Safety in New Travel Modes;
- BTSCRP Project 12, State Practices Promoting Older Driver Safety;
- BTSCRP Project 13, Communicating Safe Behavior Practices to Vulnerable Road Users;

- BTSCRP Project 14, Understanding and Analyzing Crash Contributing Factors (jointly funded with NCHRP Project 22-45); and
- BTSCRP Project 15: Highway Safety Strategies for Rural Communities.

### CRP Staff News

- **Megan Chamberlain** left CRP to join the National Research Council Space Studies Board.
- **Bryan Contreras** of Cardozo Education Campus in Washington, D.C., joined CRP in summer 2019 as a TransSTEM Academy Intern.
- **Keyara Dorn** left CRP to join TRB's Technical Activities Division.
- **Cassandra Franklin-Barbajosa** joined the staff as Editor on August 12.
- **Marci Greenberger** was promoted to ACRP Manager.
- **Matthew Griffin** joined the staff on October 14 as ACRP Senior Program Officer.
- **David Jared** joined the staff on September 30 as NCHRP Senior Program Officer.
- **Ann Petty** retired after serving for more than 15 years as Managing Editor, specifically for the *Transportation Research Record*.
- **Jennifer J. Weeks** transferred from the Technical Activities Division to CRP as Publishing Projects Manager.

<sup>1</sup> www.TRB.org

<sup>2</sup> www.TRB.org/NCHRP

<sup>3</sup> Full details are available on the TCRP Day Toolkit website: www.apta.com/research-technical-resources/tcrp/tcrp-day.

<sup>4</sup> www.TRB.org/Publications/Blurbs/180060.aspx

<sup>5</sup> All publications are available at www.nap.edu/author/TCRP/transportation-research-board/transit-cooperative-research-program.

<sup>6</sup> https://vimeo.com/327744004

<sup>7</sup> www.youtube.com/watch?v=FzZ8o\_1\_d4c



## EXECUTIVE OFFICE

The Transportation Research Board (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, which was updated and approved by the TRB Executive Committee in 2019. The TRB Strategic Plan 2019–2021 contains vision and mission statements for TRB, a set of high-level goals, objectives that support these goals, and action items for each objective.<sup>1</sup> It is intended to provide high-level strategic direction from the Executive Committee to all of TRB's programs and committees and to TRB staff.

The high-level goals of the plan are the following:

1. Provide an impartial forum for the sharing of information across all disciplines and modes on current and emerging transportation issues and related research and innovation, including transportation's relationship with social, economic, environmental, and other issues important to society.

2. Create and expand access to knowledge by conducting, sharing, and promoting research on current and future issues in transportation, particularly focused on innovative, implementable practices and technologies.
3. Provide timely and trusted advice to inform the choices facing decision-makers across all modes of transportation.
4. Promote collaboration on transportation research, education, and technology transfer at international, national, regional, state, and local levels; across public and private sectors; and among transportation providers, users, and other stakeholders.
5. Develop transportation professionals by providing lifelong learning opportunities and by fostering and promoting an environment that continually enhances the diversity, inclusivity, skills, and capacity of the transportation professional community.
6. Enhance the transportation community's knowledge of TRB activities and their impacts, the nation's leaders' and public's awareness of the contributions of research to transportation's value, and their understanding of the importance of transportation to society.



TRB Executive Director Neil Pedersen welcomes Minority Student Fellows to the 2019 Annual Meeting.  
(Photo: Risdon Photography)



Chris Hendrickson  
Chair  
Division Committee



Neil J. Pedersen  
Executive Director



Russell W. Houston  
Associate Executive  
Director



The TRB Executive Committee was led by women from 2018 to 2019 (left to right): 2019 Vice Chair Leslie S. Richards, 2019 Chair Victoria A. Arroyo, and 2018 Chair Katie Turnbull. (Photo: Risdon Photography)

## Appointments and Report Review

The Executive Office processes TRB'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. 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. Chris Hendrickson, Hamerschlag University Professor Emeritus, Carnegie Mellon University, is serving a 3-year term as chair of the Division Committee.



Chris Hendrickson guides the work of the Division Committee. (Photo: Risdon Photography)

## Minority Student Fellows Program

With support from the Federal Highway Administration and other organizations and individuals, the TRB Minority Student Fellows Program seeks to increase



The Minority Student Fellows Program supports students from minority-serving institutions as they attend the Annual Meeting and present their research. (Photo: Risdon Photography)

the participation of students of different racial and ethnic groups that are underrepresented in the Annual Meeting, on TRB committees and activities, and in transportation research.<sup>2</sup> The program supports students from select minority-serving institutions to attend the Annual Meeting and present research. Since the program began in 2010, 150 graduate and undergraduate students have participated, with 30 selected for the 2020 Annual Meeting.

## Communications

TRB is expanding its capacity to focus on strategic communications activities. In 2019, the communications team increased the emphasis of social media, created promotional materials focusing on the value of TRB, initiated an effort to enhance the usability of TRB's homepage, created new or updated communications plans for the TRB Annual Meeting and for dissemination of the TRB history book, and kicked off an update to the TRB communications plan.

A new Director of Communications–Media was added to the communications team. In addition, as part of the National Academies' transformation process, TRB's communications staff members were brought into the larger organization's Office of the Chief Communications Officer. The move is designed to give TRB better access to a talented, large team of communications professionals from throughout the Academies.

Communications milestones for 2019 included the following:

- Exceeding 70,000 subscribers to the NASEM TRB E-Newsletter;<sup>3</sup>
- Increasing engagement and growth on Twitter, with nearly 22,000 followers;<sup>4</sup> on Facebook, with 8,600 likes; and on LinkedIn, with 6,800 followers—a 31% increase since 2018 in the number of LinkedIn followers;
- Attracting an average of 720,000 page views per month on TRB's website, [www.TRB.org](http://www.TRB.org);
- Production of 89 webinars that attracted approximately 350 people per webinar;<sup>5</sup> and
- Creation of 10 TRB straight-to-recordings—on-demand webinars—that collectively had more than 3,000 views.<sup>6</sup>

## Expanding the Stakeholder Community

In 2019 TRB continued its work to become more diverse in its partnerships, more inclusive of new stakeholders, and more global in its outlook. TRB's community of more than 8,000 engineers, scientists,

and other transportation researchers and practitioners from the public and private sectors and academia all contributed their expertise in the public interest by participating on TRB committees, panels, and task forces. Others continued their involvement by supporting TRB activities as TRB Global Affiliates; by participating in TRB-sponsored conferences, workshops, and webinars; and by authoring technical papers and contract research reports. TRB launched and supported new programs and initiatives to bring additional value to the TRB community, such as hosting a career fair and offering a solutions showcase during the Annual Meeting.

TRB sought to strengthen its mission deliberately through strategic planning and via the 2019 edition of *Critical Issues in Transportation*. Through various convening activities, TRB proactively worked with stakeholders to address such impending challenges as workforce preparedness, technology deployment, and resilience. TRB engaged nontraditional entrants to the transportation field while working to ensure that volunteers and staff were reflective of and attuned to the industry's evolution.

### **Global Affiliate Program**

TRB continued to grow its network of affiliated organizations by providing innovative ways for universities, public and international agencies, nonprofits, consultants, and technology firms to further engage with the TRB community. Benefits for participants included resources, networking, professional development, and exposure through publication subscriptions, special events, program discounts, webinars, Annual Meeting registrations, and special recognition.

In January 2019, Sustaining Circle Global Affiliates attended a special networking luncheon to share ideas to help TRB staff evolve and improve the benefits of affiliation. The Global Affiliate program continues to help TRB attract, network with, and serve new modes and sectors of the transportation community.

### **Forum on Preparing for Automated Vehicles and Shared Mobility**

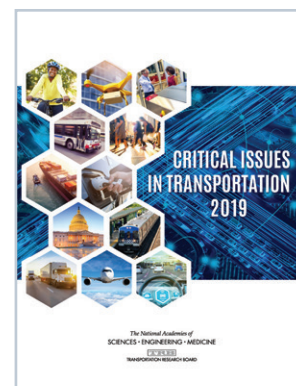
Launched in 2018, the National Academies–TRB Forum on Preparing for Automated Vehicles and Shared Mobility met in Washington, D.C., in February and in conjunction with the Automated Vehicle Symposium in July in Orlando, Florida.<sup>7</sup> Spring and fall webinars supplemented these two in-person meetings.

The Forum convenes partners to discuss the critical research issues surrounding the deployment of automated vehicles and shared mobility. It emphasizes

the identification and facilitation of the fact-based research required to set policies regarding deployment of these technologies to meet long-term goals. The Forum receives support from more than 40 organizations, many of which are 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 2019 activities included the following:

- Sponsoring a TRB Annual Meeting session;
- Holding five workshops on the “big questions” surrounding automated vehicles and shared mobility: Vision for a Fully Evolved Future (February 13), Importance and Role of Connectivity (February 14), Impacts on Traditional Research Processes (May 3), Economic Implications of AVs and Shared Mobility (July 14), and Impacts on the Roles of Government and the Private Sector (July 15);
- Publishing summaries of these five workshops as Transportation Research E-Circulars;
- Adding to a catalogue of critical research needs, with more than 150 research topics across five categories;
- Maintaining an ongoing directory of information resources that relate directly to the objectives of the Forum;
- Maintaining 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 conferences and meetings sponsored by TRB and other organizations.



The TRB Forum on Preparing for Automated Vehicles and Shared Mobility met in Washington, D.C., to research and discuss critical issues regarding these developing technologies.

### Careers in Motion Initiative

During the 2019 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 hosted the second Careers in Motion Networking Fair, which included employer tables, quick-fire talks, a resume critique area, and tips on networking. The event offered an opportunity for prospective employers from a wide range of sectors and modes to meet with transportation professionals interested in working for their organizations.

This was also the second year for TRB's Careers in Motion Job Center, an online platform created to support the broader transportation industry's impending challenges in attracting and retaining its professional workforce.<sup>8</sup> The website curates professional transportation jobs from employers all over the world and in many different disciplines and connects these jobs to the broader TRB community. TRB plans to continue to add more features and networking opportunities to this growing platform.

### 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; production and management of Transportation Research Information Services (TRIS) databases; and management of the TRB Library.

### Information Technology

TRB relies on several software systems to meet program requirements: maintaining committee records, building and maintaining TRB's extensive website, building and making available TRIS databases, supporting the TRB Bookstore and the webinar program, supporting the Annual Meeting, and helping to manage and monitor the progress of Cooperative Research Programs (CRP) projects and products.

In 2019, TRB and CRP started a project to integrate CRP into the MyTRB site and to consolidate the respective databases in order to optimize operational efficiency and reduce costs. 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 helps publications subscribers to manage their subscriptions. MyTRB also allows committee members and other volunteers to maintain their own user profiles and contact information. The most recent update enhances the process used by volunteers to become friends of TRB's standing technical committees.

### Transportation Research Information Services

TRIS continues to develop and maintain the TRIS databases and offers library services to TRB staff, committee members, and sponsors. In March, TRIS worked with the U.S. Department of Transportation (DOT) and the National Transportation Library (NTL) to offer a webinar that highlighted differences between and advantages of TRID, Research in Progress (RiP), U.S. DOT's Research Hub, and NTL's ROSA P repository.

To ensure the Transportation Research Thesaurus's (TRT's) ongoing value to the transportation community, TRIS has been working on a project to move TRT into a new semantic middleware system called PoolParty. PoolParty will improve data collection and search results and will help support a standards-based thesaurus, improve administrative functions, ease the addition of new concepts for the TRT, and facilitate the use of TRT by other organizations.

- **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.<sup>9</sup> The records comprise published or ongoing research in English, German, French, or Spanish; more than 284,000 records link to full-text publications. All the TRIS databases are available free of charge on TRB's website.



The Careers in Motion Networking Fair at the 2019 Annual Meeting offered networking tips, resume critique, and opportunities to meet prospective employers. (Photo: Risdon Photography)



- **TRT** is a controlled vocabulary of almost 9,500 terms, designed to improve the indexing and retrieval of transportation research information.<sup>10</sup> All records in TRIS databases are tagged or indexed with appropriate TRT terms.
- The **Publications Index** includes 78,000 citations and abstracts for all TRB, Highway Research Board (HRB), Strategic Highway Research Program (SHRP), and Marine Board publications since 1923.<sup>11</sup> 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.<sup>12</sup> 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.
- **Research in Progress** is a database of more than 12,500 records of active or recently completed research projects.<sup>13</sup> 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 offers local access to many serial titles and contains the complete collection of TRB, HRB, SHRP, and Marine Board publications. The library is in the process of digitizing all pre-1996 issues of the *Transportation Research Record* and *Highway Research Record*, as well as all pre-2000 TRB and HRB reports and serials. Links to full texts are provided via the appropriate records in TRID.

The library participates in the National Transportation Knowledge Network.

## Centennial Anniversary

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. At the 2019 Annual Meeting, TRB released a brochure to raise anticipation for the upcoming celebration. The brochure included a timeline of significant events in TRB's history, described how people can join in on the celebration, provided information on the various components and goals of the celebration, and included details on the various ways people could participate and contribute to the celebration.

The screenshot shows the TRB Centennial website. At the top, it features the logos for 'The National Academies of SCIENCES ENGINEERING MEDICINE' and 'TRANSPORTATION RESEARCH BOARD 100 YEARS MOVING IDEAS. ADVANCING SOCIETY'. Below the logos is a navigation bar with links for HOME, ABOUT, EVENTS, OUR STORY, PARTICIPATE, and CONTRIBUTE. The main content area is dominated by a large, colorful collage of transportation-related images, including an airplane, a train, a truck, and various infrastructure projects. Below the collage, the text reads: 'Celebrate TRB's Centennial with Us! TRB officially turns 100 on November 11, 2020. TRB's mission—to promote innovation and progress in transportation through research—is as pertinent today as it was in 1920.' This is followed by a section titled 'Tell Us "Our" Story' which explains a challenge where users are asked to share their stories. A specific question is highlighted: 'How has TRB supported your professional development and career growth?' with a button that says 'ANSWER THE QUESTION'. The challenge is dated 'October 2019'.

The newly launched TRB Centennial website offers information on key research, history highlights, and ways to become engaged in the celebration of TRB's 100th anniversary.

In October 2019, TRB launched its Centennial website, where visitors can find Centennial Papers, history highlights, TRB's timeline, and Tell Us Our Story submissions, as well as information on how to become engaged in the celebration.<sup>14</sup> A primary goal of the celebration will be to promote the value of transportation and TRB's critical role in the process.

## Staff News

**Lisa Marflak**, Director Communications/Media, left TRB to become Supervisory Public Affairs Specialist for the U.S. Copyright Office.

**Steven Andreadis**, Distance Learning and Electronic Dissemination Coordinator, departed TRB to also work at the U.S. Copyright Office.

**Paul Mackie** was hired as TRB's new Director of Communications/Media.

<sup>1</sup> The TRB Strategic Plan 2019–2020 is available online at [http://onlinepubs.trb.org/onlinepubs/general/trb\\_strategic\\_plan.pdf](http://onlinepubs.trb.org/onlinepubs/general/trb_strategic_plan.pdf).

<sup>2</sup> [www.trb.org/abouttrb/minoritystudent.aspx](http://www.trb.org/abouttrb/minoritystudent.aspx)

<sup>3</sup> [www.trb.org/Publications/PubsTRBENewsletter.aspx](http://www.trb.org/Publications/PubsTRBENewsletter.aspx)

<sup>4</sup> [www.trb.org/ElectronicSessions/Twitter.aspx](http://www.trb.org/ElectronicSessions/Twitter.aspx)

<sup>5</sup> [www.trb.org/ElectronicSessions/ConferenceRecordings.aspx](http://www.trb.org/ElectronicSessions/ConferenceRecordings.aspx)

<sup>6</sup> [www.trb.org/electronicSessions/str.aspx](http://www.trb.org/electronicSessions/str.aspx)

<sup>7</sup> For more information on the Forum, visit <https://trb.org/AVSMForum>.

<sup>8</sup> [www.careers.mytrb.org](http://www.careers.mytrb.org)

<sup>9</sup> <https://trid.trb.org>

<sup>10</sup> <http://trt.trb.org>

<sup>11</sup> <http://pubsindex.trb.org>

<sup>12</sup> <http://rns.trb.org>

<sup>13</sup> <http://rip.trb.org>

<sup>14</sup> The Centennial website is available at [www.TRB.org/Centennial](http://www.TRB.org/Centennial).



## ADMINISTRATION AND FINANCE

The TRB Administration and Finance Division provides financial management services and administrative support for the work of TRB staff; financial oversight of the contracts and grants related to TRB activities; expenditure controls; administration of publications sales and distribution; and maintenance of the benefits and services for sponsor and affiliate organizations. The division also is liaison to the administrative and financial offices of the National Academies of Sciences, Engineering, and Medicine.

In June 2019, the Administration and Finance Division was incorporated into the National Academy of Sciences Office of the Chief Financial Officer. It no longer is a separate unit within TRB.

### 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 to be \$91 million for the calendar year 2019. A statement of income and expenditures appears on pages 10–11.

### 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



The U.S. Department of Transportation is a sponsor of TRB. (Photo: Risdon Photography)

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 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 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 Affiliate Sustaining Circle are entitled to complimentary registration for all employees to TRB webinars. In 2019, TRB conducted approximately 90 webinars on a variety of topics, with more than 30,000 total registrants. The webinars offered more than 100 professional development hours for professional engineers, and certified planners had the opportunity to earn more than 19 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 Affiliate Sustaining Circle is \$25,000, with a 20% 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 \$73,500. (See pages 42–43 for a list of TRB sponsors and members of the Global Affiliate Sustaining Circle.)

## Publication Sales and Distribution

TRB disseminates the results of transportation research and technology worldwide through the timely distribution of its publications. In 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 list of TRB publications issued from January 1 through December 31, 2019, appears on pages 48–50.

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# INSTITUTIONAL AFFILIATES

## SPONSORS

### **State Transportation Departments**

(Listed with TRB Representatives)

#### **Alabama Department of Transportation**

Juanita Owens

#### **Alaska Department of Transportation and Public Facilities**

Anna Bosin

#### **Arizona Department of Transportation**

Dianne Kresich

#### **Arkansas State Highway and Transportation Department**

Elisha C. Wright-Kehner

#### **California Department of Transportation**

Dara Wheeler

#### **Colorado Department of Transportation**

Amanullah Mommandi

#### **Connecticut Department of Transportation**

Edgardo Block

#### **Delaware Department of Transportation**

Drew Boyce

#### **District Department of Transportation**

Stephanie Dock

#### **Florida Department of Transportation**

James D. Dockstader

#### **Georgia Department of Transportation**

Supriya Kamatkar

#### **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**

Daniel Wadley

#### **Kentucky Transportation Cabinet**

Jason Siwula

#### **Louisiana Department of Transportation and Development**

Samuel Cooper

#### **Maine Department of Transportation**

Dale Peabody

#### **Maryland State Highway Administration**

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Richard Y. Woo

#### **Massachusetts Department of Transportation**

Stephen Woelfel

#### **Michigan Department of Transportation**

Carol Aldrich

#### **Minnesota Department of Transportation**

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**

Ken Chambers

#### **New Hampshire Department of Transportation**

Ann Scholz

#### **New Jersey Department of Transportation**

Amanda Gendek

#### **New Mexico Department of Transportation**

Tamara Haas

#### **New York State Department of Transportation**

Robert Sack

#### **North Carolina Department of Transportation**

Neil Mastin

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## 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. Army Corps of Engineers

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

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# TRB WEBINARS AND WEBCASTS

(January 1, 2019–December 31, 2019)

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## JANUARY

- 23 Assessing the Value of Added Highway Capacity Projects

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## FEBRUARY

- 4 Systemic Pedestrian Safety Analysis and Risk-Based Prioritization
- 5 More than Recycling: Best Practices in Airport Waste Management
- 6 Adapting Shoreline Infrastructure to Sea-Level Rise and Extreme Events
- 12 Contracting Commuter Rail Services
- 13 Challenges in Using Big Data Analytics for Transportation Project Delivery
- 19 Traffic Bottleneck Identification and Solutions
- 26 Digitize Your Checklists: Computerized Airport Maintenance Management
- 27 Practical Design Principles for Affordable Roundabouts: Case Studies

---

## MARCH

- 5 Leading Future Improvements in Transportation Safety
- 6 Renewal of Stormwater Systems Using Trenchless Technologies
- 12 Getting Served: Legalities and Risks of Airport Contractual Agreements
- 20 Energetic Value: The Design and Economics of Microgrids at Airports
- 21 Four Databases with a Common Goal: Promoting Transportation Research
- 25 Improved Analysis of Two-Lane Highway Capacity and Operational Performance
- 26 Waterborne Traffic Paint Application, Materials Selection, and Testing
- 27 Funding Infrastructure with Land Value Capture: The Good, the Bad, and the Ugly
- 27 One Federal Decision: Requirements and Tips for Achieving This Goal

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## APRIL

- 10 Highway Performance Monitoring System: Travel Time Data Processing
- 11 Section 106 of the National Historic Preservation Act: Update on Case Law
- 15 Road Weather and Flood Monitoring with the National Water Model
- 18 Taking Preparedness Seriously: Emergency Exercises for Any Airport
- 23 Evaluation of Superheavy Load Movement on Flexible Pavements
- 24 Building Better Microsurfacing and Slurry Seals
- 29 Ensuring Equity with Priced Managed Lanes
- 30 Simplified Full-Depth Precast Concrete Deck Panel System

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## MAY

- 1 Understanding Disadvantaged Business Enterprise Interstate Certification
- 7 *TCRP Synthesis 127: Addressing Difficult Customer Situations\**
- 8 Priming the Pump: Cleaner Approaches to Airport Ground Transportation
- 9 How Do Site Selectors Determine a Community's Transportation Infrastructure Competitiveness?
- 13 Dialysis Transportation: The Intersection of Transportation and Healthcare
- 15 Guide to Snow and Ice Performance Measures: Key Findings and Recommendations
- 21 Evolution of Intellectual Property and Research in the Transportation World
- 22 Making of a Smart Airport: Preparing for the Internet of Things
- 30 Continuous Deflection for Comprehensive Pavement Assessments

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## JUNE

- 5 *TCRP Synthesis 131: College Student Transit Pass Programs\**
- 10 *Simple Highway Capacity Manual (HCM) Analysis Tools for Planning Applications*
- 11 Communications Strategies for Talking Tolls and Public–Private Partnerships
- 13 Evidence-Based Methods for Cities to Actively Manage the Final 50 Feet of the Urban Goods System to Gain Productivity
- 13 Limitations of Drug Fatality Data
- 24 Cone Penetration Test and Liquefaction Evaluation for Highway Bridges
- 26 Research and Lessons Learned Implementing Diverging Diamond Interchanges
- 27 How Agency Culture Is Transforming with the Use of Performance Measures
- 31 Enhancing Geotechnical Asset Performance by Improving Moisture Measurement

**JULY**

- 1 Understanding Polydrug Use and Its Role in Drug-Impaired Driving
- 8 Visualization for Transportation Decision-Making, Operations, and Safety
- 11 Avoid Costly Mistakes: Understanding FAA Grant Assurance Obligations
- 16 Innovations in Freight Data
- 17 Partnerships Between Transit Agencies and Transportation Network Companies
- 29 Rapid Scenario Planning: Freeway Facilities Analysis Using the HCM
- 30 Toolkit for Measuring Public Involvement Effectiveness in Transportation
- 31 Enhancing Geotechnical Asset Performance by Improving Moisture Measurement

**AUGUST**

- 6 Social and Economic Sustainability Metrics for Public Transportation
- 8 Plan for Disaster: Is Your Airport Prepared for an Airfield Accident?
- 13 How It Affects You: The International Maritime Organization's January 1, 2020, Vessel Fuel Deadline
- 14 Mobility Management: Public Participation Event
- 15 Limitations of the Infiltration Approach to Stormwater Management
- 20 Use of Life Cycle Assessment in Public Procurement: State of Practice
- 26 Recent Developments in Cold Asphalt Recycling
- 27 Practices and Marketing to Increase Rural Transit Ridership and Investment
- 28 The Research in Progress Database: Entering Projects and Searching Records
- 29 Roundabout Implementation Experience: Overcoming Challenges

**SEPTEMBER**

- 5 Concrete Overlay Performance and Research Innovation
- 10 New Resources for Managing Small Airports
- 11 Lessons Learned in Transportation Scenario Planning
- 12 Design Thinking Potential for State Departments of Transportation
- 18 Emerging Technologies for Construction Delivery
- 19 Open-Graded Pavements: A Primer with Emphasis on Water Quality Benefits
- 24 Managing Effective Transportation Safety Systems: Research Update
- 26 Capture the Data: Quantifying Airport Ground Access Vehicle Activity
- 30 The Near-Road Pooled Fund Study

**OCTOBER**

- 3 Latest Advances in Large-Span Buried Bridges
- 7 Practices for Stabilized and Recycled Base and Subgrade Materials
- 8 Unclutter Your Processes: Simplifying Climate Risk Management at Airports
- 9 Legal Issues Regarding National Environmental Policy Act Assignment for Federal Transportation Programs
- 10 Design and Construction of Mechanically Stabilized Earth Structures
- 16 Tunnel Operations Practices Featuring the Hampton Roads Bridge-Tunnel
- 17 Understanding and Using Census Data for Tribal Transportation Programs
- 21 Automated Pavement Condition Surveys
- 23 Moving Beyond "Accommodating": Integrated Multimodal Analysis in HCM6
- 28 Inertial Profiler Certification for the International Roughness Index
- 31 Complying with Total Maximum Daily Load Requirements Related to Roadway Stormwater Runoff

**NOVEMBER**

- 7 Comprehensive Renewable Resources Strategy for Airports
- 12 Carbon Fiber-Reinforced Polymer Systems for Concrete Structures
- 13 Driving Surface Aggregate: Improving Performance and Sustainability
- 13 Visualization for Improving Transportation Planning and Asset Management
- 14 Cold as "ICE": Intersection Control Evaluation Using HCM6
- 18 Emerging Issues in Transportation Project Finance
- 20 Using GIS for Land Use Compatibility Planning Near Airports
- 21 Metered Roundabouts: Peak Hour Flows and Part-Time Signalization
- 25 Road Safety in Low- and Middle-Income Countries

**DECEMBER**

- 3 Advanced Structural Materials for Concrete Bridges
- 5 Innovative Alternative Intersection and Corridor Studies Using the HCM6
- 10 Give the "All Clear:" Hazard Zoning at General Aviation Airports
- 11 Tunnel Operations Practices Featuring the MassDOT Tunnel

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# TRB CONFERENCES AND WORKSHOPS

(January 1, 2019–December 31, 2019)

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## JANUARY

- 13–17 TRB 98th Annual Meeting
  - 30–31 Planning for Shifting Trade Workshop\*
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## MARCH

- 8 5th Annual Contra Costa Redefining Mobility Summit\*
  - 10–15 Inaugural African Conference for Linear Infrastructure and Ecology\*
  - 24–27 8th International Conference on Case Histories in Geotechnical Engineering\*
  - 31– Tolling Technology and Managed Lanes Business Summit\*
  - 31– Lifesavers\*
  - Apr. 2
- 

## APRIL

- 7–9 14th National Light Rail and Streetcar Conferences\*
  - 9–10 Innovations in Freight Data Workshop
  - 9–12 2019 Joint Rail Conference\*
  - 15–17 International Conference on Demand-Responsive and Innovative Transportation Services
  - 18 Mobility Management: Public Participation Event, Part 2
  - 23–25 2nd International Intelligent Construction Technologies Group Conference\*
- 

## MAY

- 19–21 International Bridge, Tunnel, and Turnpike Association Summit on Finance and Policy\*
  - 20–23 Transportation Soil Engineering in Cold Regions\*
  - 20–22 TRB Managed Lanes Midyear Meeting\*
  - 21 Research Day of the International Transport Forum Annual Summit\*
- 

## JUNE

- 2–5 17th National Transportation Planning Applications Conference
  - 12–15 Workshop on Emerging Issues for *Highway Capacity Manual* Procedures
  - 12–14 7th International Conference on Bituminous Mixtures and Pavements\*
  - 12–15 TRB Highway Capacity and Quality of Service
  - 13–16 2019 World Transport Convention\*
  - 18–20 TRB Operational Effects of Geometrics and Geometric Design Joint Midyear Meeting
  - 18–20 TRB Highway Safety Performance Midyear Meeting
  - 25–27 17th Biennial National Harbor Safety Committee Conference
- 

## JULY

- 8–11 Southern African Transportation Conference\*
- 9–12 17th Biennial Conference on Transportation Energy and Policy\*
- 11 TRB Occupant Protection Midyear Meeting
- 14–18 AASHTO Highway Maintenance Conference\*
- 14–16 Workshop on Sustainable Resource Conservation and Recovery
- 15–18 Automated Vehicle Symposium 2019\*
- 18–19 TRB Access Management Midyear Meeting
- 21–26 Joint Meeting of the AASHTO Committee on Design and Council on Active Transportation and TRB Roadside Safety Design Committee\*
- 21–24 American Society of Civil Engineers 2019 Airfield and Highway Pavements Conference\*
- 21–24 58th Annual Workshop on Transportation Law
- 22–24 Bridge Engineering Institute Conference 2019\*
- 22–24 Geospatial Data Acquisition Technologies in Design and Construction Midyear Meeting
- 24–26 2019 Summerail Conference



**AUGUST**

- 4–7 9th International Conference on Structural Health Monitoring of Intelligent Infrastructure\*
- 4–7 Transportation Demand Management Committee Summer Meeting and Association for Commuter Transportation International Conference\*
- 6–8 TRB Traffic Signal Systems Midyear Meeting
- 25–28 NOISE-CON 2019\*
- 26–27 10th New York City Bridge Conference\*

**SEPTEMBER**

- 10–12 2019 Texas Department of Transportation Annual Environmental Conference\*
- 10–13 6th International Conference on Women’s Issues in Transportation
- 15–18 12th International Conference on Low-Volume Roads
- 15–18 Conference on Performance and Data in Transportation Decision Making
- 22–26 International Conference on Ecology and Transportation\*
- 29– 3rd International Conference on Information Technology in Geo-Engineering\*

**OCTOBER**

- 6–10 PIARC 26th World Road Conference
- 21 TRB Workshop at the 69th Highway Geology Symposium\*
- 23–24 Air & Waste Management Association Conference on Freight and Environment: Ports of Entry\*
- 29 Mobility Management: Public Participation Event

**NOVEMBER**

- 4–7 Geo-Structural Aspects of Pavements, Airfields, and Railways 2019\*
- 5–6 9th International Visualization in Transportation Symposium: Visualization in Action
- 10–14 GeoMEast International Conference 2019: Sustainable Civil Infrastructures—Beyond the Horizon\*
- 13–15 2nd International Conference on Transportation System Resilience to Natural Hazards and Extreme Weather
- 20–21 1st International Conference on 3-D Printing and Transportation
- 20–22 7th Florida Automated Vehicles Summit\*

**DECEMBER**

- 11–12 Conference on Health and Active Transportation
- 11–13 International Accelerated Bridge Construction Conference\*
- 18–21 5th Conference of Transportation Research Group of India\*

\*TRB was cosponsor of the meeting.

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# PUBLICATIONS

(January 1, 2019–December 31, 2019)

## Transportation Research Records (online)

- 2673:1 Issue 1: January 2019
- 2673:2 Issue 2: February 2019
- 2673:3 Issue 3: March 2019
- 2673:4 Issue 4: April 2019
- 2673:5 Issue 5: May 2019
- 2673:6 Issue 6: June 2019
- 2673:7 Issue 7: July 2019
- 2673:8 Issue 8: August 2019
- 2673:9 Issue 9: September 2019
- 2673:10 Issue 10: October 2019
- 2673:11 Issue 11: November 2019
- 2673:12 Issue 12: December 2019

## Special Reports<sup>1</sup>

- 330 Performance of Bridges That Received Funding Under the Bridge Research and Construction Program
- 331 The Vital Federal Role in Meeting the Highway Innovation Imperative
- 332 Review and Update of U.S. Coast Guard Vessel Stability Regulations and Guidance
- 333 Toward New Naval Platforms: A Strategic View of the Future of Naval Engineering

## Conference Proceedings<sup>1</sup>

- 55 Airport Roles in Reducing Transmission of Communicable Diseases
- 56 Socioeconomic Impacts of Automated and Connected Vehicles

## Conference Proceedings on the Web (online)

- 23 Economic and Social Sustainability at Airports
- 24 Challenges to Implementing Successful Land Use Strategies at Airports
- 25 Proceedings of the 12th National Conference on Transportation Asset Management

## Letter Report (online)

Long-Term Infrastructure Program Letter Report:  
January 30

## TR News

Nos. 319–324

## Online Newsletters

TRB Transportation Research E-Newsletter

## Transportation Research E-Circulars (online)

- 241 Past, Present, and Future of Asphalt Binder Rheological Parameters
- 242 A Literature Review of Rail Trespassing and Suicide Prevention Research
- 243 SHRP 2 Safety Data Student Paper Competition 2017–2019
- 244 Mobility on Demand: A Smart, Sustainable, and Equitable Future
- 245 Transportation Oral History: State of the Practice and a Path Forward
- 246 Structural Monitoring
- 247 TRB Forum on Preparing for Automated Vehicles and Shared Mobility: Mini-Workshop on the Importance and Role of Connectivity
- 248 12th International Conference on Low-Volume Roads
- 249 Key Elements of Construction Quality Assurance for Implementation
- 250 Drug-Impaired Driving: Research Needs
- 251 Relationship Between Laboratory Cracking Tests and Field Performance of Asphalt Mixtures
- 252 TRB Forum on Preparing for Automated Vehicles and Shared Mobility: Mini-Workshop on the Transition Toward Shared Automated Vehicles
- 253 Transformational Technologies in Transportation: Impacts on Traditional Research Processes and Programs
- 254 Workshop on the Use of Traffic Speed Deflection Device Data in Network- and Project-Level Pavement Decisions
- 255 Innovations in Freight Data Workshop
- 256 Managing Transportation Systems in a Fast-Changing World
- 257 Primer on Bridge Load Testing
- 258 Forum on Preparing for Automated Vehicles and Shared Mobility

## Airport Cooperative Research Program (ACRP) Research Reports<sup>2</sup>

- 16 Guidebook for Managing Small Airports, 2nd Edition
- 192 Airport Management Guide for Providing Aircraft Fueling Services
- 194 Using Disaggregated Socioeconomic Data in Air Passenger Demand Studies
- 195 Best Practices for Airport Obstruction Management Guidebook
- 196 Guidebook for Integrating Collaborative Partnering into Traditional Airport Practices
- 197 Guidebook for Developing a Comprehensive Renewable Resources Strategy

- 198 Wetland Mitigation
  - Volume 1: Executive Summary
  - Volume 2: A Guidebook for Airports
- 199 Climate Resilience and Benefit–Cost Analysis: A Handbook for Airports
- 200 Using GIS for Collaborative Land Use Compatibility Planning Near Airports
- 201 Airport Emergency Communications for People with Disabilities and Others with Access and Functional Needs
- 202 Developing Innovative Strategies for Aviation Education and Participation
- 203 Guidelines for Collecting, Applying, and Maintaining Pavement Condition at Airports
- 204 Air Demand in a Dynamic Competitive Context with the Automobile
- 205 Revolving Funds for Sustainability Projects at Airports
- 206 Guidebook on Effective Land Use Compatibility Planning Strategies for General Aviation Airports
- 207 Optimizing the Use of Electric Preconditioned Air (PCA) and Ground Power Systems at Airports
- 208 Benefit–Cost Analyses Guidebook for Airport Stormwater
- 209 Integrating Sustainability and the Environmental Review Process

### ACRP Syntheses of Airport Practice<sup>2</sup>

- 94 Attracting Investment at General Aviation Airports Through Public–Private Partnerships
- 95 Airport Incident Reporting Practices
- 96 Practices to Mitigate Alkali–Silica Reaction (ASR) Affected Pavement at Airports
- 97 How Airports Plan for Changing Airport Capacity: The Effects of Upgauging
- 98 Simulation Options for Airport Planning
- 99 Emergency Working Groups at Airports
- 100 Airport Greenhouse Gas Reduction Efforts
- 101 Communication Strategies for Airport Passenger Access and Mobility
- 102 Value, Benefits, and Limitations of Qualifications-Based Selection for Airport Project Delivery
- 103 Promoting Aviation Career Education in High Schools and Community Colleges
- 104 Current Landscape of Unmanned Aircraft Systems at Airports
- 105 Airport Surface Weather Observations Options for General Aviation Airports

### ACRP Research Results Digest<sup>2</sup>

- 28 Thought Leader Forum Summary: Emerging Issues for ACRP

### ACRP Legal Research Digest<sup>2</sup>

- 37 Legal Issues Relating to Airports Promoting Competition

### ACRP Web-Only Documents (online)

- 37 Research Roadmap in the Area of Airport Operations and Maintenance
- 39 Policy and Planning Issues Roadmap
- 40 Airport Design and Construction Narrative Research Roadmap
- 41 Alternative Jet Fuels Emissions: Quantification Methods Creation and Validation Report
- 43 Improving AEDT Modeling for Aircraft Noise Reflection and Diffraction from Terrain and Manmade Structures

### ACRP WebResources (online)

- 7 Best Practices for Airport Obstruction Management Library

### National Cooperative Freight Research Program (NCFRP) Research Reports<sup>3</sup>

- 39 Freight Transportation Resilience in Response to Supply Chain Disruptions
- 40 Impacts of Policy-Induced Freight Modal Shifts: Understanding and Using New Data Sources to Address Urban and Metropolitan Freight Challenges (online)

### National Cooperative Highway Research Program (NCHRP) Research Reports<sup>3</sup>

- 888 Development of Roundabout Crash Prediction Models and Methods
- 889 Performance Measures in Snow and Ice Control Operations
- 894 Performance of Longitudinal Barriers on Curved, Superelevated Roadway Sections
- 898 A Guide to Developing Financial Plans and Performance Measures for Transportation Asset Management
- 901 Prioritization Procedure for Proposed Road–Rail Grade Separation Along Specific Rail Corridors
- 902 Benchmarking and Comparative Measurement for Effective Performance Management by Transportation Agencies
- 903 Geotechnical Asset Management for Transportation Agencies
  - Volume 1: Research Overview
  - Volume 2: Implementation Manual

- 904 Leveraging Big Data to Improve Traffic Incident Management
- 905 Measuring the Effectiveness of Public Involvement in Transportation Planning and Project Development
- 906 LRFD Minimum Flexural Reinforcement Requirements
- 907 Design of Concrete Bridge Beams Prestressed with CFRP Systems
- 908 Acceptance Criteria of Complete Penetration Steel Bridge Welds Evaluated Using Enhanced Ultrasonic Methods
- 909 Guide to Truck Activity Data for Emissions Modeling
- 910 Design Guidelines for Horizontal Sightline Offsets
- 911 Guidelines for Traversability of Roadside Slopes
- 912 Guidelines for Detection and Remediation of Soluble Salt Contamination Prior to Coating Steel Highway Structures
- 913 Compendium of Successful Practices, Strategies, and Resources in the U.S. DOT Disadvantaged Business Enterprise Program
- 914 Measuring, Characterizing, and Reporting Pavement Roughness of Low-Speed and Urban Roads
- 915 Relationship Between Erodability and Properties of Soils
- 916 Sustainable Highway Construction Guidebook
- 917 Right-Sizing Transportation Investments: A Guidebook for Planning and Programming
- 918 Approaches for Determining and Complying with TMDL Requirements Related to Roadway Stormwater Runoff
- 919 Field Verification of Proposed Changes to the AASHTO R 30 Procedures for Laboratory Conditioning of Asphalt Mixtures
- 920 Management and Use of Data for Transportation Performance Management: Guide for Practitioners
- 921 Case Studies in Implementing Cross-Asset, Multiobjective Resource Allocation
- 925 Estimating the Value of Truck Travel Time Reliability

### NCHRP Syntheses of Highway Practice<sup>3</sup>

- 522 Managing State Transportation Research Programs
- 531 Automated Pavement Condition Surveys
- 532 Seismic Design of Nonconventional Bridges
- 533 Very Short Duration Work Zone Safety for Maintenance and Other Activities
- 534 Emerging Technologies for Construction Delivery
- 535 Pedestrian Safety Relative to Traffic-Speed Management
- 536 Bridge Demolition Practices
- 537 Impact of Asphalt Thickness on Pavement Quality
- 538 Practices for Online Public Involvement
- 539 Landscape Development and Management Practices for Urban Freeway Roadsides
- 540 Leveraging Private Capital for Infrastructure Renewal
- 541 Practices on Acquiring Proprietary Data for Transportation Applications
- 542 Prioritization of Freight Investment Projects
- 543 Transportation Workforce Planning and Development Strategies

### NCHRP Legal Research Digests<sup>3</sup>

- 76 Update of Selected Studies in Transportation Law, Volume 8, Section 3: Indian Transportation Law
- 77 Update of Selected Studies in Transportation Law, Volume 8, Section 1: Civil Rights and Transportation Agencies
- 78 Condemnation Hierarchy: Competing Public Uses
- 79 The Effectiveness of State False Claims in Protecting State Transportation Funding

### NCHRP Web-Only Documents (online)

- 258 Manual on Subsurface Investigations
- 259 Guidelines to Improve the Quality of Element-Level Bridge Inspection Data
- 260 Proposed Refinements to Design Procedures for Geosynthetic Reinforced Soil (GRS) Structures in AASHTO LRFD Bridge Design Specifications
- 261 Case Studies of Truck Activity Data for Emissions Modeling
- 262 Sustainable Highway Construction
- 263 White Papers for Right-Sizing Transportation Projects
- 264 Proposed Enhancements to Pavement ME Design: Improved Consideration of the Influence of Subgrade and Unbound Layers on Pavement Performance

### Transit Cooperative Research Program (TCRP) Research Reports (online)

- 203 Dialysis Transportation: The Intersection of Transportation and Healthcare
- 204 Partnerships Between Transit Agencies and Transportation Network Companies
- 205 Social and Economic Sustainability Performance Measures for Public Transportation
- 206 Guidance for Calculating the Return on Investment in Transit State of Good Repair
- 207 Fast-Tracked: A Tactical Transit Study
- 208 Strategic Communications Toolkit to Improve Support for Transit-Priority Projects

### TCRP Syntheses of Transit Practice (online)

- 138 Public Transit Rider Origin–Destination Survey Methods and Technologies
- 139 Transit Service Evaluation Standards
- 140 Comprehensive Bus Network Redesigns
- 141 Microtransit or General Public Demand–Response Transit Services: State of the Practice
- 142 Implementing the U.S. DOT Reasonable Modification Rule
- 143 Managing the Transit Scheduling Workforce

<sup>1</sup> Available in print and online.

<sup>2</sup> Entire series available in print and online.

<sup>3</sup> Publications released since 2001 available in print and online.

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