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TRANSPORTATION RESEARCH BOARD

ANNUAL REPORT *2020*



100 YEARS **TRB**
MOVING IDEAS: ADVANCING SOCIETY

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

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About TRB and the National Academies

The Transportation Research Board (TRB) is one of seven program divisions of the National Academies of Sciences, Engineering, and Medicine. The National Academies 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. Because TRB is housed within the National Academies, TRB's staff and volunteers have unequalled access to members of the National Academies and their expertise.

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. TRB's mission is accomplished through the hard work and dedication of nearly 11,000 volunteers and a staff of 133 professionals.

WELCOME

A Message from TRB Leadership

On behalf of the TRB Executive Committee, the thousands of volunteers involved in TRB committees and research panels, and the TRB staff, we are pleased to present this Annual Report for 2020, the 100th year of the Transportation Research Board. The past year has been one of unprecedented challenges, but also one of major accomplishments, which are summarized in this annual report.

TRB’s Centennial year began with the largest Annual Meeting in TRB’s history. More than 14,000 participants came to Washington, D.C., from across the United States and around the globe. All U.S. state departments of transportation (DOTs) were represented, as well as many federal, state, local, and foreign governmental agencies; private-sector companies; and academic and research institutions from around the world. The TRB Annual Meeting is the preeminent global event for transportation researchers, educators, practitioners, and students to connect and learn about the latest developments in transportation policy, research, and innovation.

As TRB turns to its next 100 years, this professional community of friends and volunteers—whether in-person or virtually—will continue leading impartial research, facilitating objective dialogues, and fostering innovative strategies. We have seen firsthand the need for continued leadership from TRB in an ever-evolving environment.

In 2020, the coronavirus pandemic brought unimagined challenges to the transportation industry. COVID-19 has had a profound impact on both the transportation system and the transportation community. TRB’s first priority is, and always will be, the safety and health of our thousands of volunteers and dedicated staff. Once it became clear that large gatherings should not be held, TRB decided not to proceed with any in-person conferences, workshops, or other scheduled events. Meetings and other convening activities were quickly converted to a virtual format or, in the case of some larger conferences, delayed until 2021. TRB adapted to its new environment and its work continued unabated.

Two topics became top priorities for TRB to address during 2020: 1) the impact of COVID-19 on transportation and 2) social and racial equity issues in transportation. TRB identified priority policy and research issues for each of these topics for the transportation community to address. Within TRB, a number of activities related to both COVID-19 and social and racial equity took place or are planned. Some of these activities are described in this annual report.

TRB’s current five-year strategic plan was adopted in June 2019 and contains six goals:¹

- | | | |
|-------------------------|------------------|--------------------------|
| 1. Information Exchange | 3. Advice | 5. Workforce Development |
| 2. Research | 4. Collaboration | 6. Communications |

This report highlights ongoing impacts and progress TRB made in meeting each of these goals during 2020.

As we enter TRB’s second century, we hope that you will contribute to advances in transportation through active participation in TRB’s convening, research, and advising activities, taking advantage of the many resources that TRB makes available to the transportation professional community and learning from the brightest and best who make TRB the premier transportation research organization that it is.

Thank you for all that you do for TRB!



Carlos Braceras
TRB Executive Committee Chair
*Executive Director,
Utah Department of
Transportation*



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TRB Executive Committee
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Environmental Engineering and Co-Director
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Neil Pedersen
TRB Executive Director



TRB's Mission and Work



Celebrating 100 Years of Transportation Research

TRB officially celebrated its 100th anniversary 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. TRB's volunteers and friends helped “Tell Us ‘Our’ Story” throughout the year.² Every month, you shared your stories, which are our stories. We were honored to receive more than 200 in all and you will see quotes from these stories throughout this report.

An official recounting of TRB's history was published in the Centennial book, *The Transportation Research Board, 1920–2020: Everyone Interested Is Invited*.³ More than 5,300 books were distributed during the 2020 TRB Annual Meeting.

Convening, Researching, and Advising

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. TRB's mission is accomplished through the hard work and dedication of nearly 11,000 volunteers and a staff of 133 professionals.

In addition to the record 14,035 attendees at the 2020 TRB Annual Meeting, TRB brings together volunteers through standing committees, panels, forums, conferences, workshops, meetings, and webinars. The TRB Annual Meeting is the leading annual event for transportation

researchers and professionals to access and share the latest in transportation research. In response to travel restrictions around the ongoing pandemic, convening opportunities continued virtually—allowing even wider participation from the transportation community.

In 2020, 4,646 individuals served on TRB’s standing technical committees. In addition, more than 14,000 volunteers contributed to committee activities as Friends. TRB’s Technical Activities Division convenes these committees, overseeing and managing the committees’ activities in support of TRB’s mission and strategic goals. Ann Brach is Director of the division.

TRB manages hundreds of research projects and publications annually. TRB’s journal, *The Transportation Research Record (TRR)*, publishes nearly 1,000 peer-reviewed papers each year. TRB’s bimonthly magazine, *TR News*, features timely articles on new and state-of-the-art research and practice, transportation news, “research pays off” articles, profiles of transportation professionals, workshop and conference announcements, new book notices, and news of TRB activities.

TRB manages four research programs in highways, public transit, airports, and behavioral traffic safety through its Cooperative Research Programs (CRP) division, with total budgets of more than \$60 million. Contractors conduct the actual research and more than 5,800 volunteers serve on CRP oversight committees and project panels. In 2020, CRP produced more than 140 publications. Christopher Hedges is Director of this division.

TRB Consensus Reports are the result of research performed by committees of volunteer experts who are supported by staff from the Consensus and Advisory Studies Division. More than 40 TRB Consensus Reports have contributed to changes in legislation in the United States, and, in 2020, approximately 175 volunteers served on committees for this program. Tom Menzies is Director of this division.

Either in response to requests from sponsoring agencies or on its own initiative, TRB’s internationally recognized Marine Board identifies research needs and provides a forum for the exchange of information on new technologies, laws and regulations, economics, the environment, and other issues affecting the marine transportation system; port operations; coastal engineering; and marine governance. Dr. Martha Grabowski, McDevitt Distinguished Chair in Information Systems, Le Moyne College, Syracuse, New York, and Senior Research Scientist, Rensselaer Polytechnic Institute, Troy, New York, began her two-year term as Marine Board Chair in November 2020. Scott Brotemarkle of TRB’s Technical Activities Division serves as the Marine Board’s Program Director.



Ann Brach, Director, Technical Activities



Chris Hedges, Director, Cooperative Research Programs



Tom Menzies, Director, Consensus and Advisory Studies



GOAL 1

Information Exchange

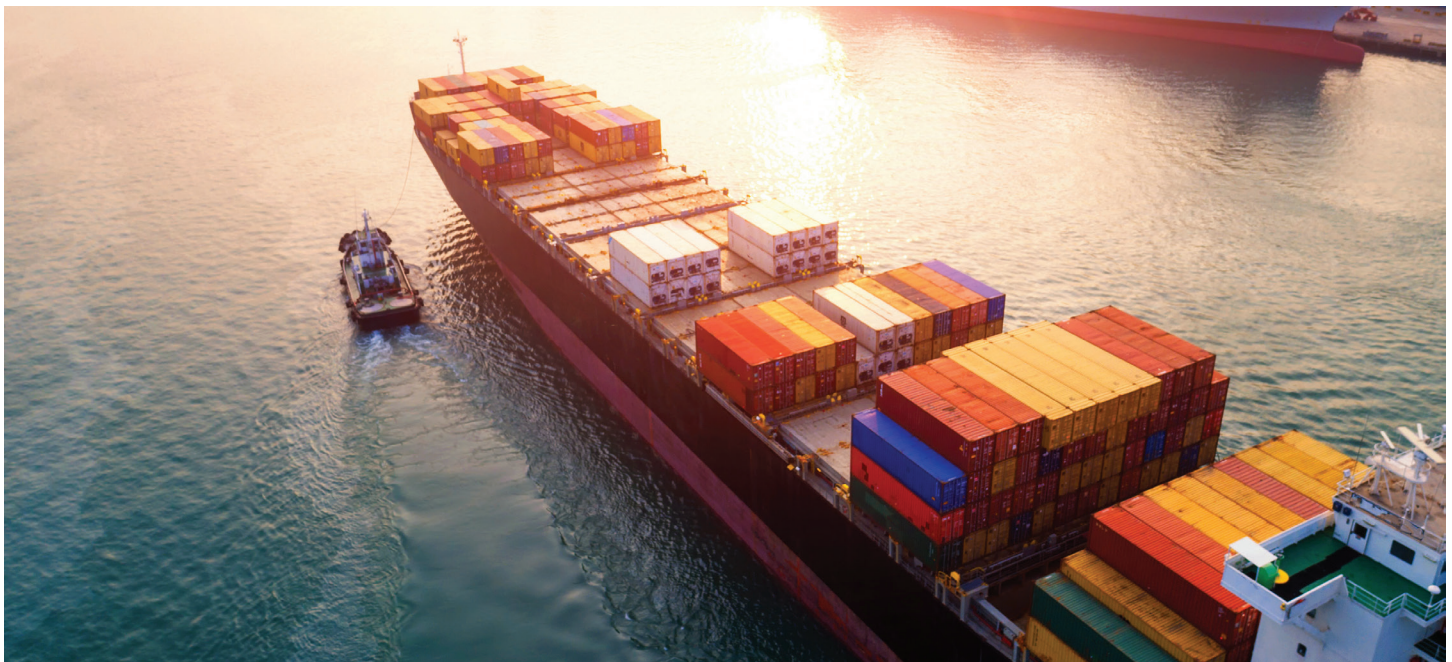
Convening Face to Face and Webcam to Webcam

In the middle of a mild winter, the 2020 TRB Annual Meeting—already known as “the biggest transportation research conference in the world”—attracted a record number of attendees. Participants shared research and expertise, taking part in more than 5,300 presentations across more than 800 sessions and workshops. The Annual Meeting also hosted meetings of more than 200 committees, as well as of many of the more than 350 subcommittees. TRB’s Annual Meeting is an opportunity for policymakers, administrators, practitioners, researchers, and representatives of government, industry, and academic institutions to meet and address all things transportation. The program covers all transportation modes and nearly every relevant aspect imaginable.

As the ability for people to meet in person became increasingly hindered by the state of the pandemic, TRB’s events were postponed or rescheduled to be delivered as virtual events. Whether in person or online, TRB convened or cosponsored 43 conferences, workshops, or meetings in 2020.



Photo: Event Photography of North America

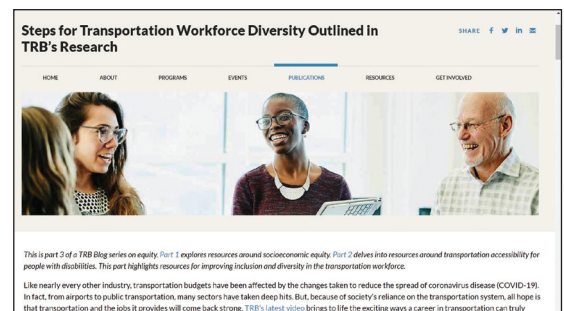
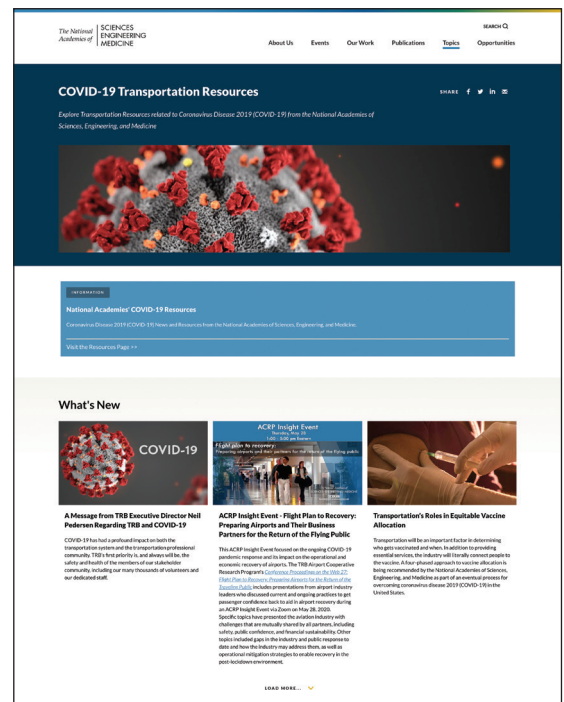


Resources That Change with the Data

Much of TRB’s work examines data over significant periods of time with careful review and analysis. Events in 2020 led the industry to seek out best practices that changed by the day as situations evolved. To meet these shifting needs, the National Academies of Sciences, Engineering, and Medicine closed gaps across its various units to offer constantly updated, thematic collections of resources.

As the COVID-19 pandemic grips the nation and the world, the National Academies are rapidly mobilizing critical expertise in science, engineering, and medicine to inform government response and recovery efforts with evidence-based guidance and are facilitating collaboration across research disciplines and between the public and private sectors. COVID-19 Responses & Resources (<https://www.nationalacademies.org/topics/covid-19-resources>) brings together the latest National Academies feature stories, reports, webinars, and more. COVID-19 Transportation Resources (<https://www.nationalacademies.org/topics/transportation-covid-19-resources>) offers resources specifically geared toward the transportation industry.

Across the nation, Americans are calling for action to address long-standing social and racial equity issues in the midst of a global pandemic that is disproportionately affecting minorities and other vulnerable communities. Research can shed light on the factors that drive systemic racial inequities—not only in society at large, but also within the sciences, engineering, and medicine—with the goal of finding solutions based on evidence. A range of studies, webinars, and other activities at the National Academies have explored this research, some of which are highlighted in Resources on Diversity, Equity, and Inclusion (<https://www.nationalacademies.org/topics/resources-on-diversity-equity-and-inclusion>).





GOAL 2 Research

I hope to make an impact on intelligent transportation and smart infrastructure through the internet of things and data analytics. The emerging 5G technology will transform transportation worldwide. The transformation will take a collective endeavor, and TRB has a variety of standing committees that help me make that impact.

Hongtao Dang, Assistant Professor,
Central Washington University,
Ellensburg, Washington



Covering Timely and Persistent Issues

By conducting, sharing, and promoting research, TRB creates and expands access to knowledge related to current and future issues in transportation. This research is particularly focused on innovative and implementable practices and technologies. TRB has issued an urgent and directed call for research needs statements specific to transportation and pandemics.⁴ At the same time, TRB continues to administer research into the day-to-day issues facing transportation, including concrete, facility design, and signals.

TRB’s most downloaded publications in 2020 show the country’s focus on future improvements to transportation service levels and on the environment.

Transit Cooperative Research Program (TCRP) Research Report 209: Analysis of Recent Public Transit Ridership Trends shows that, even before COVID-19, transit ridership was down across all modes except for commuter rail and demand-responsive services.⁵ Bus ridership is at its lowest point overall since the 1970s. The report details 10 case studies to better understand individual strategies used by transit agencies to mitigate ridership losses and increase ridership overall.





Vehicle electrification is among the technologies under consideration to reduce emissions of criteria pollutants, mobile source air toxics, and greenhouse gases (GHGs) from motor vehicles. Readers were interested in the results of TRB's research on this topic:

- *National Cooperative Highway Research Program (NCHRP) Web-Only Document 274: Zero-Emission Vehicles—Forecasting Fleet Scenarios and Their Emissions Implications* analyzes scenarios of infrastructure development, policy changes, and cost parameters to assess their impact on nationwide zero emission vehicle adoption and the corresponding levels of exhaust emissions.⁶
- *TCRP Research Report 219: Guidebook for Deploying Zero-Emission Transit Buses* provides transit agencies with information on current best practices for zero-emission bus deployments, as well as lessons learned from previous deployments, industry experts, and industry resources.⁷

Extreme weather events and a changing climate increase costs paid by taxpayers. State DOTs are accounting for climate resilience when making infrastructure decisions. *NCHRP Research Report 938: Incorporating the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change—Guidebook* can help fill the gaps in time-consuming and expensive analyses.⁸

MOST DOWNLOADED CRP Reports Published in 2020

In 2020, CRP produced more than 140 publications.

1. **Guidance to Improve Pedestrian and Bicyclists Safety at Intersections**
2. **Guidebook for Managing Data from Emerging Technologies for Transportation**
3. **Analysis of Recent Public Transit Ridership Trends**
4. **Incorporating the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change: Guidebook**
5. **Minutes Matter: A Bus Transit Service Reliability Guidebook**
6. **Bicyclist Facility Preferences and Effects on Increasing Bicycle Trips**
7. **Equity Analysis in Regional Transportation Planning Processes, Volume 1: Guide**
8. **Traffic Forecasting Accuracy Assessment Research**
9. **Guidebook for Deploying Zero-Emission Transit Buses**
10. **Alternative Intersection Design and Selection**

Data as of November 2020



GOAL 3

Advice



As part of the National Academies of Sciences, Engineering, and Medicine, TRB study committees provide formal advice to the federal government through consensus studies and review U.S. DOT research programs. Additionally, TRB provides useful information that informs policy discussions at all levels of government, through workshops and research reports.

Convening to Advise

Upon request, National Academies–appointed consensus study committees provide advice to Congress, executive branch federal agencies, the states, and other organizations on an array of complex and often controversial transportation topics of national significance. Committee members are selected to provide appropriate expertise and a balance of perspectives on the issues involved. Through these special expert committees, TRB also conducts periodic or continuing reviews of specific transportation research and technology programs. Policy study committee activities are subject to the requirements of Section 15 of the Federal Advisory Committee Act Amendments of 1997.

Consensus Study Committees

TRB conducts advisory studies in accordance with procedures of the National Academies. Some studies are requested by Congress or executive branch agencies, while others are self-initiated studies funded by TRB. Committees of volunteer experts, supported by staff from TRB’s Consensus and Advisory Studies Division, conduct these studies.

Formal policy advice comes through TRB’s consensus studies. Each study committee produces a report with evidence-based conclusions and recommendations that are subject to the National Academies’ rigorous report review process. Reports completed in 2020 and expected to be completed in early 2021 include the following:

Transit and New Mobility Services

New and expanding shared-mobility options—such as ride-hailing, shared cars, bikes or scooters, and microtransit—have proliferated. The study committee considered the role of these services as part of

regional transportation systems; specifically, the relationship to and impact of these services on existing public transit. As part of the study, the committee considered 1) how these services can improve the transportation system's ability to further goals such as accessibility, efficiency, equity, sustainability, and safety; 2) the role transit agencies and other entities could play in managing and otherwise furthering the new mobility landscape; and 3) ways that transit agencies have coordinated with the new mobility providers, both in the United States and abroad.

The study committee's report recommends steps to help bring about this transformation, including in urban areas with historically robust transit service.⁹ These steps then could increase the value and viability of transit and shared mobility services more broadly across regions.

U.S. Coast Guard's Use of Unmanned Technologies

The study committee identified, examined, and made recommendations on key considerations to guide the U.S. Coast Guard's priorities for developing, testing, and deploying unmanned systems for maritime awareness applications. The report, *Leveraging Unmanned Systems for Coast Guard Missions*, examines opportunities for the Coast Guard to make greater use of unmanned aerial, surface, and underwater vehicles.¹⁰

The committee that authored the report concluded that, to remain responsive and fully relevant to its many missions, the Coast Guard should take a more strategic approach to investigating and investing in these systems by 1) establishing a central office to plan and coordinate the investments; 2) partnering with and leveraging technologies from other military services, the federal government, and the private sector; and 3) encouraging experimentation across operational units and mission areas. In December, the Chair and Ranking Member of the U.S. House Committee on Transportation and Infrastructure wrote a letter to U.S. Coast Guard Commandant Karl L. Schultz urging adoption of the recommendations in the report.

Mitigation Measures for Lead Emissions from Aviation Gas

The study committee identified and assessed measures to reduce lead emitted from the combustion of aviation gas by piston-engine general aviation aircraft. Aviation gas continues to contain lead to provide the high octane needed for the safe operation of high-performance piston-engine aircraft, which account for about one-third of the fleet but more than two-thirds of the fuel consumed. The mitigation measures considered include expanding the availability and use of unleaded and lower-lead gasoline grades for the portion of the fleet that can use these fuels; the development and introduction of an unleaded grade that can satisfy the entire fleet; changes to operations and practices that contribute to lead emissions and exposures at small airports; and





the development of new, lead-free aviation propulsion technologies.¹¹ Because of uncertainty about the time it will take to develop and introduce an unleaded fuel that can serve the entire fleet, the report points to the importance of taking steps now to make early and sustained progress in reducing lead emissions and exposures.

Committees That Advise on U.S. DOT Research

TRB has several standing and ad hoc committees that review the research and development programs of various modal administrations in U.S. DOT, including the Federal Highway Administration (FHWA), Federal Transit Administration, and Federal Railroad Administration (FRA). The committee charged with reviewing FRA's rolling stock, track, train control, and human factors research to ensure it supports the agency's safety mission issued *Review of the Federal Railroad Administration's Research and Development Program in 2020*.¹²

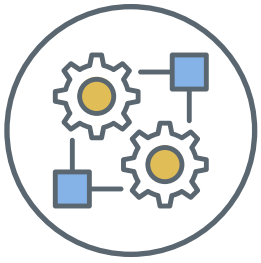
TRB's Committee for the Review of FHWA Infrastructure Research and Development is charged with advising the program regarding priorities in terms of the technical tools and products that state DOTs need to maintain and improve the performance of their pavements, bridges, and other structures. Their annual letter report highlights FHWA's Long-Term Infrastructure Performance Program accomplishments in pavement and bridge deck data collections, development of bridge deck deterioration models, and outreach to program stakeholders during 2019.¹³



Input to Policy Development at All Levels of Government

Although reports from TRB's research programs and conferences and workshops do not contain formal recommendations to government, they can be an important source of information for federal, state, and local governments when these entities are making policy, legislative, and regulatory decisions.

A notable example is a series of Insight Events workshops sponsored by TRB's Airport Cooperative Research Program (ACRP). The airline industry, airports, and their business partners have all been hit hard by the COVID-19 pandemic. In May 2020, TRB's Insight Event, "Flight Plan to Recovery: Preparing Airports and Their Business Partners for the Return of the Flying Public" convened experts to offer insights on a range of issues affecting the airline industry.¹⁴ The event covered public safety, passenger emotions and sense of safety and security, and financial stability. Speakers and participants considered mitigation strategies to enable recovery in the post-lockdown environment. Providing a platform to share this information helped inform airport operators across the country as they made operational and policy decisions in response to the pandemic.



GOAL 4

Collaboration



Communities of Interest

TRB's standing committees bring together individuals who share an interest and expertise in various aspects of transportation. TRB also brings experts and practitioners together through panels to work on various reports and products. All modes of transportation are represented, as well as nearly every discipline that contributes to transportation. A dedicated body of volunteers with a wide array of experience brings perspectives from across the country and around the world.

To better address critical and emerging transportation issues—along with perennial research needs in transportation—TRB restructured its standing technical committees, tightening up the structure and adding new committees where needed. Throughout the year, TRB implemented a strategic alignment of its standing committees' volunteer structure to ensure that the talent of TRB's thousands of volunteers can focus on 21st-century critical and emerging transportation issues within an organization that is flexible enough to respond to rapidly changing circumstances. After a year of consultation with volunteers, sponsors, and staff, a newly aligned volunteer structure was implemented, complete with new committees, refocused existing committees, and mechanisms to promote and support multimodal and multidisciplinary collaboration. Developing this new structure was an innovative and unprecedented effort of TRB volunteers and staff, who braved the challenges of systemic change to unleash new energy, spark innovation, and open new possibilities.

As TRB begins its second century, transportation is undergoing a period of rapid and transformational change. TRB serves as a big tent in which everyone can come together as equals—government, industry, and university; young people starting their professional journey and the profession's leading lights; and CEOs and technical experts. The committees are an environment in which any and all ideas can be proposed, debated, and tested on the basis of their merit.



My vision for TRB and the transport industry 100 years from now is that we will have transitioned to better, more efficient, and accessible modes of transportation that also take into consideration the complex utility needs of its users. The more technologically advanced society becomes, the greater the desire for community and human connection. I hope we, as transport-industry professionals, reimagine and build a transportation system that better accommodates all of us for a truly cohesive sense of community and oneness as a human race—if aliens aren't a thing by then.

Winnie Okello, Senior Civil Engineer, Pennsylvania DOT, Harrisburg



Strengthening Domestic and International Partnerships

The transportation industry is complex and made up of a wide range of actors. TRB partners with other organizations to ensure its advice, research, and collaboration includes all voices. TRB has entered into memoranda of understanding or letters of intent with several U.S. and international transportation organizations, and the Board participates in information sharing and sponsored sessions at major conferences and identifies opportunities to coordinate international research on common topics.

Considering the Future

To share perspectives on the biggest issues surrounding automated vehicles and shared mobility, TRB offers the Forum on Preparing for Automated Vehicles and Shared Mobility Systems. Long-term goals of the program are increasing safety, reducing congestion, enhancing accessibility, increasing environmental and energy sustainability, and encouraging economic development and equity. Forum members met privately in 2020 and offered two public events: one focused on scenario planning and one focused on expected impact in technology deployment from COVID-19.

Many supply-chain shifts were under way before the pandemic hit. Responses to COVID-19 are “accelerating those tremendously,” said Paul Bingham of IHS Markit during TRB’s Marine Board spring meeting, COVID-19 Impacts on Global Shipping.¹⁵ He stressed that, in terms of funding and infrastructure, “we’ll need to look at . . . what is going to be important to serve the economy looking toward the future, not the one from 2019 or before.”



GOAL 5

Workforce Development



KeAnna Dakwa, Tennessee State University, shares research on traffic circles and crash severity at the 2020 TRB Annual Meeting. Photo: Risdon Photography

Supporting Transportation Careers at All Levels

Through its collaborative structure, TRB is an ideal home for informal mentoring. From a first job through seasoned expertise, TRB connects professionals to colleagues both within their industry and in the bigger picture of transportation. The Minority Student Fellows Program welcomed another outstanding class to the 2020 TRB Annual Meeting.¹⁶ The ACRP and TCRP Ambassadors programs allowed professionals a chance to represent the organization. Graduate-level aviation students present and publish work in TRR through close work with advisors as part of the ACRP Graduate Research Awards.



Patrice Davenport, Director, Strategic Program Development

Research to Support the Workforce

Cooperative Research Program publications offer practical insights and frameworks for transportation practitioners. Although the research is often divided by mode of transportation, the issues cross industry lines. Three popular reports in 2020 focused on workforce optimization, expanding the workforce, and promoting employee health.

Increasingly, state transportation agencies are tasked with doing more with less when it comes to managing state transportation networks. *NCHRP Research Report 923: Workforce Optimization Workbook for Transportation Construction Projects* provides guidance to identify construction staffing needs and effectively allocate engineering and inspection staff and consultant resources to highway construction projects, with 35 specific staffing strategies that may help alleviate construction staff challenges.¹⁷

Although women currently are underrepresented in the transit industry, the percentage of women within transit agencies is increasing, and many transit agencies report that the percentage of women advancing into management and leadership positions has also been increasing over the past five years. *TCRP Synthesis 147: Attracting, Retaining, and Advancing Women in Transit* explores strategies that have been deployed effectively in transit and related industries.¹⁸

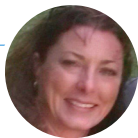


These reports are amazing for teaching.

But it's not like a textbook. It's actually

something you want to read.

Jennifer Schildgen, Airport Planner,
Division of Aeronautics, Idaho
Transportation Department



ACRP Synthesis 113: Airport Workforce Programs Supporting Employee Well-Being details the most commonly used programs of this type.¹⁹ Benefits to employers include reduced health care costs, improved productivity, decreased absenteeism, improved employee recruitment and retention, and more teamwork among employees. By participating in well-being programs, employees can also experience personal benefits, such as improved physical health, increased job satisfaction, and other emotional benefits.

Seeing TRB's Impact

Instead of a traditional aviation textbook, which can be hard to come by in this constantly changing industry, Dr. Kim Kenville, University of North Dakota, uses *ACRP Research Report 16: Guidebook for Managing Small Airports, Second Edition*, in her classes.²⁰ "This publication is just so consumable, useable, and the information is in chunks that fit perfectly into hourly lectures. The students . . . can learn more and find things easily," notes Kenville.

Emmett Municipal Airport, outside of Boise, Idaho, "took every bit of advice" from *ACRP Synthesis 74: Combining Mixed-Use Flight Operations Safely at Airports*.²¹ Since incorporating the procedures detailed in the report into its operations, the airport has not reported any further complaints from airplane pilots about the safety of paramotors—ultralight, engine-powered paragliders that are launched by foot or dolly. This success has led airport management to consult other ACRP reports, particularly pavement guidelines for small airports.

For agencies ranging from the U.S. Forest Service to the Massachusetts Institute of Technology and many local transportation agencies in between, the volumes of the *NCHRP Strategic Issues Facing Transportation* series are valuable resources.²² Staff at various

agencies report specific projects. The Kentucky Transportation Cabinet has used volumes as guidance to help integrate risk from climate change and extreme weather. California's Contra Costa Transportation Authority will see future cost avoidance after using the guidance to raise the elevation of SR-4 to avoid flooding. At New York State DOT, a volume spurred discussion and reflection for the sustainability team and high-level managers. These and many other voices from the field were reported in the *NCHRP Impact Report 2019*.²³

Interactive Learning Opportunities

Every year, TRB offers approximately 100 webinars for professional development to thousands of participants. Starting in March, TRB began presenting free rapid-response webinars, mostly around the ever-evolving COVID-19 pandemic. In March, an introductory webinar that clarified lessons learned from similar disruptions attracted 1,000 people to the live event; since then, another 1,400 have watched the recording.²⁴ Subsequent rapid-response webinars took a look at more nuanced issues, including the supply chain and overall traffic trends, both of which hosted more than 1,500 attendees.^{25,26} A webinar on COVID-19's effects on asset management drew more than 1,000 attendees.²⁷

Blogs on Diversity, Equity, and Inclusion

In 2020, TRB began a blog on trb.org to tie together the wide range of resources available on topics that are shaping the future of transportation. The first posts in the series explored TRB's offerings on building socioeconomic equity, transportation accessibility for people with disabilities, and improving workplace diversity and inclusion.²⁸ Executive Director Neil Pedersen shared personal reflections on transportation's role in addressing the racial disparity that exists in our society.

Appealing to Younger Generations with What Has Always Made Transportation Exciting

We work in a groundbreaking industry that has become even more exciting over the past 10 years because of the increasing application of computer-based technology. A new video from TRB introduces a new generation to *Your Future in Transportation*.²⁹ More than 10,000 views and three Telly Awards speak to the video's success.

Many of the values that younger generations seek in a career can easily be met by a job in transportation. There are unending opportunities to continue learning and growing as the industry progresses. Not only engineers and designers but also planners and data analysts can make a difference to the world through their work in transportation. The practical, sensible results in transportation are easy to see and are constantly improving.

TOP 10 WEBINARS

1. The Supply Chain and COVID-19
2. How Much Will COVID-19 Affect Travel Behavior?
3. Traffic Trends and Safety in a COVID-19 World
4. Asset Management in a COVID-19 World
5. Transportation and COVID-19: Practices from Other Disease Outbreaks
6. Turbo-Charged: Turbo Roundabout Advancements
7. Roundabouts in the *Manual on Uniform Traffic Control Devices*
8. Why Surface Transportation Agencies Use Drones
9. Evaluation Load Testing for Bridges
10. A Conversation on Speed Management

Data as of November 2020

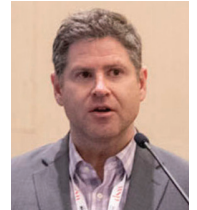


GOAL 6

Communications

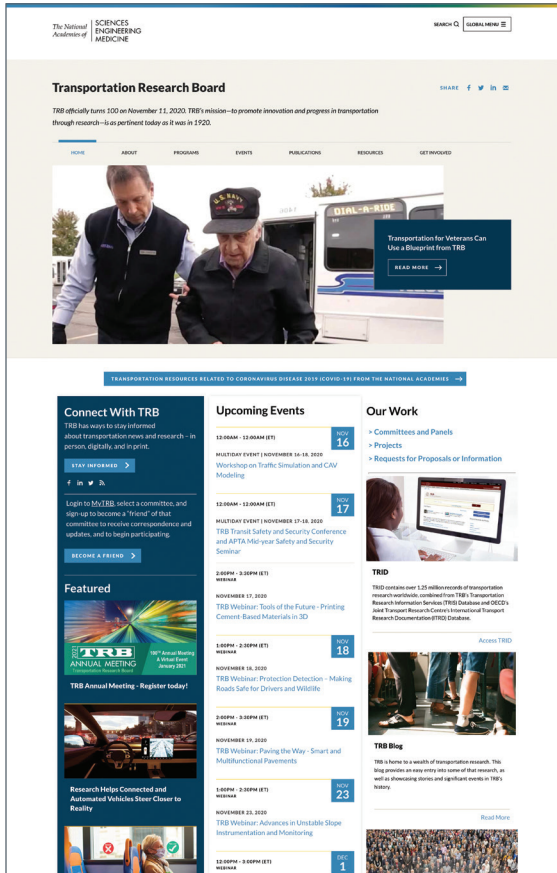
New Ways to Tell TRB's Story

One of the most visible changes to TRB in 2020—especially as we moved to an increasingly online world—is the update to TRB’s website. The new website shows off a modern design but also highlights the clear connections to the National Academies of Sciences, Engineering, and Medicine. Other new features include a blog and an events calendar that integrates other offerings from the National Academies. Internal codes allow social media to pull in images from the website when users post about TRB offerings. Our Global Affiliates’ logos are featured on the home page. It is a more appropriate storefront for the workings occurring behind the scenes, as TRB’s communications staff now are housed within the National Academies’ larger communications department and have a formalized strategy under new leadership.



Paul Mackie, Director of Communications

In addition to TRB’s weekly newsletter, three mode-specific listservs send out announcements of new projects, calls for nominations, calls for problem statements, and requests for proposals as they arise. Each of these lists are made up of a couple thousand subscribers who often are responsible for further spreading the message at the university transportation centers, professional groups, consultancies, or the state DOTs they represent.





Audience Growth

In March, TRB surveyed subscribers of its long-standing weekly E-Newsletter, finding insights into TRB’s community. The survey showed significant engagement from TRB’s core volunteers and friends in standing committees, panel members, and transportation agency professionals in the United States as well as in Australia, Canada, India, and Spain. It also showed huge potential for audience growth with younger, female, and other underrepresented audiences.

TRB is working on several communications initiatives that will bear fruit over the next year, including a significant revision of its communications strategic plan, a major design update to the E-Newsletter, and more ways for volunteers to engage in a valuable way. Changes will be aimed at impressing the existing TRB community and reaching new audiences.

TRB continues to reach more key audiences through multiple platforms, including growing social media presences. While Twitter and Facebook remain social stalwarts, TRB has focused especially on improving communications through LinkedIn, where researchers and professionals are looking to interact, promote their work, and find solutions.

The world should welcome more ideas from nontechnical transportation professionals who can communicate innovations in transportation more visually and less technically. I hope to refresh in everyone’s mind that transportation safety is not only an engineering business—it is everybody’s business. TRB has provided me with research-based tools and peer-to-peer learning, not to mention the knowledge I’ve gained during the four times I’ve attended the TRB Annual Meeting in Washington, D.C., in the past decade.

Rudynah Capone, Innovation and Technology Transfer Manager, Louisiana Transportation Research Center





Guiding the Conversation

TRB started the year off in the news with the 2020 Annual Meeting. Sessions were featured on C-SPAN, and Streetsblog USA's *The Overhead Wire* did a three-part podcast series on material presented at the meeting. Articles appeared in *Forbes*, *Politico*, and *Inverse*, as well as in trade and academic publications including *Transport Topics*, *AASHTO Journal*, *Freight Waves*, *Mass Transit Magazine*, and more. As the year continued, TRB's resources continued to be cited in legislation, as well as in trade and popular press.

Transportation and Communicable Disease

The COVID-19 pandemic had an immense impact on transportation in 2020. Early on, TRB research was highlighted in an article by *The Washington Post*, citing the importance of planning, as detailed in ACRP's *Airport Roles in Reducing Transmission of Communicable Diseases*.³⁰ As the pandemic progressed, articles in *The Washington Post*, *Politico*, *Transport Topics*, *WAMU*, and *Government Technology* noted TRB research in topics ranging from public transit subsidies to airplane safety to changing travel behavior.

Public transit ridership had begun declining even before COVID-19. *The New York Times* examined the topic and noted an active TRB project analyzing the causes and responses.³¹ The publication will address the applicability of the results to the post-pandemic world while remaining relevant in the long term.

Advising the Nation

A flurry of newspapers and other media throughout South Carolina showed the continued use of TRB's 2019 future interstates report, localizing the issue of the condition of Interstates and using the report to explore next steps.³² An outlet in Rhode Island also referenced the same TRB report to point to issues specific to the state.³³

TRB's Committee for a Study on the Feasibility of Wheelchair Restraint Systems in Passenger Aircraft continued to hold public panel sessions while conducting its research.³⁴ An in-depth review of travel accessibility for people with disabilities by *USA Today* reported on the panel's work.³⁵ The final research is expected in 2021.

Extended Research

TRR publishes outstanding peer-reviewed papers presenting research findings. An article published in TRR on roads and GHG emissions was covered in more than a dozen media outlets, including *Scientific American*, *TechCrunch*, and *MIT News*.³⁶

Since COVID-19, the inequities around transportation access are more glaring than ever. I plan to continue to work with the Communications and Engagement Committee to highlight issues of concern and how we as practitioners can work to create a more just transportation system.

Stephanie Brooks, Project Manager, Community Engagement, Fitzgerald & Holliday, Inc.



2021 and the Future

As we look to the future—100 years into the future—I believe our industry will pivot away from talking in terms of “transportation” and will be fully focused on “mobility.”

Diane Gutierrez-Scaccetti, Commissioner,
New Jersey DOT



TRB's 2021 Annual Meeting Embraces a Virtual Setting

Because the need for knowledge hasn't changed, TRB's 100th Annual Meeting (TRBAM) will be conducted as a virtual event over a series of dates throughout January 2021. The decision to go virtual was made in the interest of the health and safety of all meeting attendees in light of COVID-19. Many sessions and workshops will focus on the spotlight theme “Launching a New Century of Mobility and Quality of Life.” Through an interactive virtual event platform, attendees will be able to join from anywhere in the world; experience presentation and poster sessions, workshops, exhibits, and committee meetings; and, most importantly, connect with other attendees—just as they have all come to expect from TRBAM each January.

Upcoming Work on COVID-19 and Equity

Some of the biggest challenges of 2020 were already on TRB's radar with research in the works (see box, page 20). Research that was started before the pandemic may now point to new directions in understanding current micromobility practice and policies in the United States and methodologies for calculating overall impacts, as well as return on investment. Transit employees who operate vehicles are essential and are vulnerable to COVID-19. Consequently, the new guide for bus operator workforce management will address recruiting, training, retaining, and rewarding of these important employees.

Questions of system equity are not new to public transit services and, as the pandemic has disproportionately affected people of color and those in blue-collar essential services positions, equity is becoming a central focus in transportation. A playbook for addressing inclusion in mobility for traditionally underserved populations is under way. Forthcoming TRB syntheses will assess the equity impacts of bus network redesigns and will examine the coordination of public transit with investments in affordable housing policies.

Some communities are weighing the economic, social, and environmental benefits of fare-free public transportation against the costs and benefits of current fare payment systems and available capacity for increased ridership. A study will examine the benefits, costs, and trade-offs to consider in eliminating partial or full public transportation fares. Another synthesis will document the impacts on revenue and equity of implementation of fare capping in U.S. transit agencies.

Guides are also expected to explore issues around general policing and people experiencing homelessness in public transportation.

TRB will continue to focus on transportation accessibility for people with disabilities. A highly anticipated consensus study expected in 2021 will assess and evaluate the conditions under which it may be technically feasible to equip passenger aircraft with in-cabin restraint systems for motorized and nonmotorized wheelchairs. The study is expected to advise on further actions for needed

research, data, and technical analyses to inform public policy decisions about whether and how such systems may be used on commercial aircraft. In terms of public transportation, studies will test a smartphone app meant to aid users with visual impairments in navigating public bus systems, as well as research that will help set the stage for consistency in the design, installation, and usability of tactile walking surfaces for people with reduced mobility in multimodal transportation.

Two new standing committees also are addressing ongoing research related to COVID-19 and equity: the Transportation and Public Health Committee and the Equity in Transportation Committee.

2021 Critical Issues Update

TRB's *Critical Issues in Transportation 2019* reflects the issues the Executive Committee charged TRB's programs and committees to focus on.³⁷ Transportation issues change quickly and have already developed since publication.

TRB PROJECTS RELATED TO COVID-19 AND EQUITY

NCHRP Synthesis Project 20-05/Topic 52-13

Shared Micromobility Policies, Permits, and Practices
<https://bit.ly/36AwARu>

NCHRP Project 08-36/Task 62

Best Practice Methodology for Calculating Return on Investment for Transportation Programs and Projects
<https://bit.ly/35vg0CY>

TCRP Project F-28

Practitioner's Guide to Bus Operator Workforce Management
<https://bit.ly/3eXICrF>

TCRP Project B-47

Impact of Transformational Technologies on Underserved Populations
<https://bit.ly/3lwkU8m>

TCRP Synthesis Project J-07/Topic SA-52

Assessing Equity and Identifying Impacts Associated with Bus Network Redesigns
<https://bit.ly/3pqjkaH>

TCRP Synthesis Project J-07/Topic SB-34

Coordination of Public Transit Services and Investments with Affordable Housing Policies
<https://bit.ly/3eZGIXu>

TCRP Project J-11/Task 39

Evaluation Framework for Fare-Free Public Transportation
<https://bit.ly/2lzcVcC>

TCRP Synthesis Project J-07/Topic SH-21

Transit Fare Capping: Balancing Revenue and Equity Impacts
<https://bit.ly/36wXtWh>

TCRP Project J-05/Topic 20-03

Policing and Public Transportation
<https://bit.ly/38FUy05>

TCRP Project J-11/Task 40

Homelessness: A Guide for Public Transportation
<https://bit.ly/3lvZWXh>

Study on the Feasibility of Wheelchair Restraint Systems in Passenger Aircraft
<https://bit.ly/35vgAAE>

Transit IDEA Project J-04/IDEA 91

Comprehensive Wayfinding for All (CWall)
<https://bit.ly/3ks9HnZ>

TCRP Project B-46

Tactile Wayfinding in Transportation Settings for Travelers Who Are Blind or Visually Impaired
<https://bit.ly/2lz1z8t>

Mobility technology and services update regularly, the population is shifting locations and behaviors in response to the pandemic, and the changing economy requires new ways of thinking about financing. In response to the focus

on COVID-19's impact on transportation and on social and racial equity issues in transportation, TRB will be issuing addenda to the 2019 document addressing these two topic areas.

Endnotes

- 1 http://onlinepubs.trb.org/onlinepubs/general/trb_strategic_plan.pdf
- 2 "Tell Us 'Our' Story" responses can be found at <https://trbcentennial.nationalacademies.org/our-story/tell-us-our-story-challenge-responses>.
- 3 www.nap.edu/catalog/25472/the-transportation-research-board-1920-2020-everyone-interested-is-invited
- 4 www.trb.org/main/CallforRNSTransportationAndPandemics.aspx
- 5 www.nap.edu/catalog/25635/analysis-of-recent-public-transit-ridership-trends
- 6 www.nap.edu/catalog/25709/zero-emission-vehicles-forecasting-fleet-scenarios-and-their-emissions-implications
- 7 www.nap.edu/catalog/25842/guidebook-for-deploying-zero-emission-transit-buses
- 8 www.nap.edu/catalog/25744/incorporating-the-costs-and-benefits-of-adaptation-measures-in-preparation-for-extreme-weather-events-and-climate-change-guidebook
- 9 www.nationalacademies.org/our-work/the-role-of-public-transportation-and-mobility-management-in-an-era-of-new-and-expanding-shared-mobility-options
- 10 www.trb.org/Publications/Blurbs/181449.aspx
- 11 www.nationalacademies.org/our-work/lead-emissions-from-piston-powered-general-aviation-aircraft
- 12 www.trb.org/Publications/Blurbs/181388.aspx
- 13 www.nap.edu/catalog/25691/long-term-infrastructure-program-letter-report-january-2-2020
- 14 www.nationalacademies.org/event/05-28-2020/acrp-insight-event-flight-plan-to-recovery-preparing-airports-and-their-business-partners-for-the-return-of-the-flying-public
- 15 <https://vimeo.com/showcase/7164384>
- 16 www.trb.org/AboutTRB/MinorityStudent.aspx
- 17 www.nap.edu/catalog/25720/workforce-optimization-workbook-for-transportation-construction-projects
- 18 www.nap.edu/catalog/25741/attracting-retaining-and-advancing-women-in-transit
- 19 www.nap.edu/catalog/25919/airport-workforce-programs-supporting-employee-well-being
- 20 <http://www.trb.org/Publications/Blurbs/162145.aspx>
- 21 www.nap.edu/catalog/23568/combining-mixed-use-flight-operations-safely-at-airports
- 22 www.nap.edu/catalog/25757/strategic-issues-facing-transportation-volume-7-preservation-maintenance-and-renewal-of-highway-infrastructure
- 23 www.trb.org/Publications/Blurbs/180526.aspx
- 24 www.nationalacademies.org/event/03-23-2020/trb-webinar-transportation-covid-19-practices-from-other-disease-outbreaks
- 25 www.nationalacademies.org/event/04-08-2020/trb-webinar-the-supply-chain-and-covid-19
- 26 www.nationalacademies.org/event/06-01-2020/trb-webinar-how-much-will-covid-19-affect-travel-behavior
- 27 www.nationalacademies.org/event/07-15-2020/trb-webinar-transportation-asset-management-in-a-covid-19-world
- 28 To see these and other blog posts, visit www.nationalacademies.org/trb/blog.
- 29 <https://youtu.be/YkT4UZLtpo>
- 30 The article can be found at www.washingtonpost.com/local/trafficandcommuting/the-gao-told-the-government-in-2015-to-develop-a-plan-to-protect-the-aviation-system-against-an-outbreak-it-never-happened/2020/03/24/81cf1926-6555-11ea-b3fc-7841686c5c57_story.html. The ACRP report can be found at www.nap.edu/catalog/25367/airport-roles-in-reducing-transmission-of-communicable-diseases.
- 31 The article can be found at www.nytimes.com/interactive/2020/03/13/upshot/mystery-of-missing-bus-riders.html. The project can be found at <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4524>.
- 32 The articles can be found at www.kpvi.com/news/national_news/s-c-interstates-have-backlog-of-problems/article_0f1b17ad-31e2-5666-aa3c-d97c567f1e4b.html, www.charlestonchronicle.net/2020/07/19/south-carolina-interstate-systems-rate-of-fatalities-bridge-deterioration-travel-increase-and-congestion-among-highest-in-u-s-and https://thetandd.com/news/local/s-c-interstates-have-backlog-of-problems/article_0604ebb6-6c68-5e12-9257-623cd451411b.html. To see *The Future Interstate Report*, visit www.nap.edu/resource/25334/interstate.
- 33 www.wpri.com/news/transportation/report-majority-of-ris-interstate-bridges-in-need-of-replacement
- 34 www8.nationalacademies.org/pa/projectview.aspx?key=51840
- 35 <https://stories.usatodaynetwork.com/flying-while-disabled/bathroom-accessibility>
- 36 <http://news.mit.edu/2020/stiffer-roadways-improve-truck-efficiency-emissions-0611>
- 37 www.nap.edu/catalog/25314/critical-issues-in-transportation-2019

Volunteer Leadership

TRB’s Executive Committee provides strategic direction and oversight of TRB’s programs and activities. The 26 appointed members of the volunteer Executive Committee include public- and private-sector executives, prominent academicians, and members of the National Academies. In addition, 16 ex officio members—top executives from TRB’s sponsoring agencies—serve on the Executive Committee. As TRB Executive Director, Neil Pedersen is the only staff member on the committee.

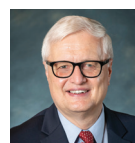
Transportation Research Board 2020 Executive Committee*



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



Susan A. Shaheen, Professor, Civil and Environmental Engineering and Co-Director, Transportation Sustainability Research Center, University of California, Berkeley



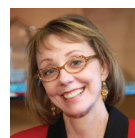
Neil J. Pedersen, Executive Director, Transportation Research Board



Michael F. Ableson, CEO, Arrival Automotive—North America, Birmingham, Michigan



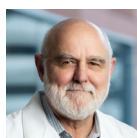
Susan Hanson, Distinguished University Professor Emerita, Graduate School of Geography, Clark University, Worcester, Massachusetts



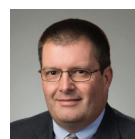
Geraldine Knatz, Professor, Sol Price School of Public Policy, Viterbi School of Engineering, University of Southern California, Los Angeles



Marie Therese Dominguez, Commissioner, New York State Department of Transportation, Albany



Stephen W. Hargarten, Professor, Emergency Medicine, Medical College of Wisconsin, Milwaukee



William Kruger, Vice President, UPS Freight for Fleet Maintenance and Engineering, Richmond, Virginia



Ginger Evans, Chief Strategy Officer, CAG Holdings LLC, Washington, D.C.



Chris T. Hendrickson, Hamerschlag University Professor of Engineering Emeritus, Carnegie Mellon University, Pittsburgh, Pennsylvania



Julie Lorenz, Secretary, Kansas Department of Transportation, Topeka



Nuria I. Fernandez, General Manager—CEO, Santa Clara Valley Transportation Authority, San Jose, California



S. Jack Hu, UGA Foundation Distinguished Professor of Engineering, Senior Vice President for Academic Affairs and Provost, University of Georgia, Athens



Michael R. McClellan, Vice President—Strategic Planning, Norfolk Southern Corporation, Norfolk, Virginia



Nathaniel P. Ford, Sr., Chief Executive Officer, Jacksonville Transportation Authority, Jacksonville, Florida



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



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



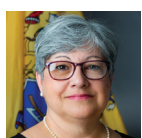
Michael F. Goodchild, Professor Emeritus, Department of Geography, University of California, Santa Barbara



Ashby Johnson, Executive Director, Capital Area Metropolitan Planning Organization, Austin, Texas



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



Diane Gutierrez-Scaccetti, Commissioner, New Jersey Department of Transportation, Trenton



Brian W. Ness, Director, Idaho Transportation Department, Boise



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



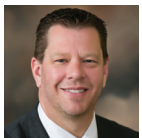
Shawn Wilson, Secretary, Louisiana Department of Transportation and Development, Baton Rouge



Victoria A. Arroyo, Executive Director, Georgetown Climate Center; Professor from Practice, Georgetown University Law Center, Washington, D.C. (*ex officio*; *past chair*, 2019)



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



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



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



Martha R. Grabowski, McDevitt Distinguished Chair in Information Systems, and Professor and Director, Information Systems Programs, Le Moyne College, Syracuse, New York (*ex officio*)



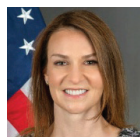
William H. Graham, Jr. (Major General, U.S. Army), Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers (*ex officio*)



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



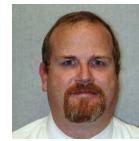
Nikola Ivanov, Director of Operations, Center for Advanced Transportation Technology Laboratory, University of Maryland, College Park, and Chair, TRB Young Members Coordinating Council (*ex officio*)



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



Leslie S. Richards, General Manager, Southeastern Pennsylvania Transportation Authority, Philadelphia, Pennsylvania (*ex officio*)



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



Karl L. 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 (*ex officio*)



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



Katherine F. Turnbull, Executive Associate Director and Regents Fellow Research Scientist, Texas A&M Transportation Institute, College Station (*ex officio*, *voting*; *past chair*, 2018)



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

* Membership as of October 15, 2020.

APPENDIX A Statement of Activities

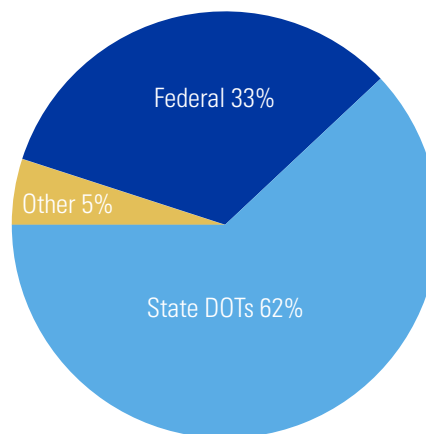
Funding Support by Program and Expenditures

	2019 (Actual)	2020 (Projected*)
CORE TECHNICAL ACTIVITIES		
State Highway and Transportation Departments (State DOTs)	\$7,730,000	\$7,910,000
Federal Government		
Federal Highway Administration (FHWA)	1,450,000	1,400,000
Office of the Assistant Secretary of Transportation for Research and Technology (OST-R)	300,000	225,000
Federal Transit Administration (FTA)	187,000	187,000
National Highway Traffic Safety Administration (NHTSA)	216,000	162,000
Department of the Interior	85,000	85,000
Department of Energy (DOE)	72,000	74,000
Environmental Protection Agency (EPA)	72,000	74,000
U.S. Air Force Civil Engineer Center	72,000	74,000
Federal Motor Carrier Safety Administration	75,000	56,000
Federal Aviation Administration (FAA)	72,000	54,000
Federal Railroad Administration	72,000	54,000
U.S. Army Corps of Engineers	0	25,000
Subtotal, Federal Government	\$2,673,000	\$2,470,000
Other		
Fees and Sales	6,062,000	2,761,000
California Air Resources Board	77,000	79,000
American Public Transportation Association	72,000	74,000
Association of American Railroads	72,000	74,000
Subtotal, Other	\$6,283,000	\$2,988,000
TOTAL, CORE TECHNICAL ACTIVITIES	\$16,686,000	\$13,368,000
MARINE BOARD CORE PROGRAM		
U.S. Coast Guard	75,000	75,000
U.S. Army Corps of Engineers	75,000	75,000
Office of Naval Research	65,000	65,000
National Oceanic and 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 Supervisor of Salvage and Diving	12,000	12,000
TOTAL, MARINE BOARD CORE PROGRAM	\$316,000	\$316,000
COOPERATIVE RESEARCH PROGRAMS		
National Cooperative Highway Research Program (State DOTs)	45,100,000	43,000,000
Airport Cooperative Research Program (FAA)	14,059,000	12,438,000
Transit Cooperative Research Program (FTA)	5,451,000	4,980,000
Behavioral Traffic Safety Cooperative Research Program (Governors Highway Safety Association, NHTSA)	775,000	1,262,000
National Cooperative Freight Research Program (OST-R)	224,000	32,000
TOTAL, COOPERATIVE RESEARCH PROGRAMS	\$65,609,000	\$61,712,000
RAIL SAFETY IDEA PROGRAM	\$446,000	\$383,000
EVALUATIONS OF FHWA RESEARCH AND TECHNOLOGY PROGRAM PROJECTS	\$0	\$810,000
SECOND STRATEGIC HIGHWAY RESEARCH PROGRAM SAFETY DATA, PHASE 1	\$4,494,000	\$1,392,000
POLICY STUDIES	\$3,416,000	\$2,717,000
CONFERENCES, WORKSHOPS, FORUMS, RESEARCH PROJECTS, AND TRB CENTENNIAL	\$3,548,000	\$1,287,000
TRB TOTAL	\$94,515,000	\$82,080,000

* Calendar Year 2020 comprises actual data through October and estimates for the remainder of the year.

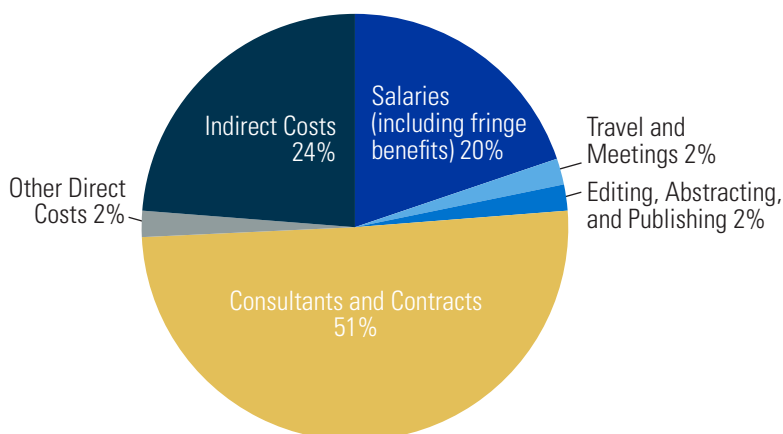
TRB Funding Support

	2019 (Actual)	2020 (Projected*)
SOURCES OF FUNDS		
Federal	32,423,000	26,945,000
State DOTs	52,830,000	50,910,000
Other	9,262,000	4,225,000
TOTAL	\$94,515,000	\$82,080,000



Distribution of TRB Expenditures

	2019 (Actual)	2020 (Projected*)
EXPENDITURES BY MAJOR COST CATEGORY		
Direct Costs		
Consultants and Contracts	48,356,000	42,594,000
Salaries (including fringe benefits)	15,672,000	16,958,000
Editing, Abstracting, and Publishing	1,929,000	1,467,000
Travel and Meetings	5,267,000	1,433,000
Other Direct Costs	2,333,000	1,922,000
Indirect Costs	19,712,000	19,797,000
TOTAL EXPENDITURES	\$93,269,000	\$84,171,000



TRB Reserve Fund

	2019 (Actual)	2020 (Projected*)
Fund balance, end of previous fiscal year	\$17,960,000	\$19,206,000
Plus (minus) current fiscal year income over (under) expenditures	1,246,000	(2,091,000)
BALANCE, CURRENT FISCAL YEAR	\$19,206,000	\$17,115,000

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

APPENDIX B

Sponsors and 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

Christopher Dailey

California Department of Transportation

Dara Wheeler

Colorado Department of Transportation

Stephen Cohn

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

Allison R. Hardt

Richard Y. Woo

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Diane Gurtner

Wyoming Department of Transportation

Timothy McDowell

Federal Government

U.S. Department of Transportation

Federal Aviation Administration

Federal Highway Administration

Federal Motor Carrier Safety Administration

Federal Railroad Administration

Federal Transit Administration

National Highway Traffic Safety Administration

Office of the Assistant Secretary of Transportation for Research and Technology

U.S. Air Force Civil Engineer Center

U.S. Army Corps of Engineers

U.S. Department of Energy

U.S. Department of the Interior

U.S. Environmental Protection Agency

Other Organizations

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American Public Transportation Association

Association of American Railroads

California Air Resource Board

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Bureau of Safety and Environmental Enforcement

Maritime Administration

National Oceanic and Atmospheric Administration

Office of Naval Research

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U.S. Army Corps of Engineers

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Calendar and Fiscal Year 2020 Core Financial Support Provided by

- 88 Sponsor and Sustaining Global Affiliates
- 70 Organizational Affiliates from 12 nations
- More than 700 individual affiliates

APPENDIX C TRB Webinars, Conferences, and Workshops

January 1 – December 31, 2020 • In-person conferences and workshops are noted with their location.

JANUARY

- 12–16 TRB 99th Annual Meeting • *Washington, D.C.*
 27 Turning Your Aviation Research Question into a Problem Statement
 29 Turbo-Charged: Turbo Roundabout Advancements

FEBRUARY

- 5–6 Committee Meeting for a Study on the Feasibility of Wheelchair Restraint Systems in Passenger Aircraft • *Washington, D.C.*
 11 Evaluating Load Testing for Bridges
 12 To Fuel or Not to Fuel: Guidance for Providing Aircraft Fueling Services
 18–19 Lead Emissions from Piston-Powered General Aviation Aircraft Meeting • *Washington, D.C.*
 19 Let's Work Together: Airport Emergency Working Groups
 19–20 Coast Guard Maritime Domain Awareness Committee Meeting • *Washington, D.C.*
 19–20 Cybersecurity Workforce of the Federal Aviation Administration Committee Meeting • *Washington, D.C.*
 24 How to Preserve Your Pavement Through Better Crack Seal
 24–25 Forum on Preparing for Automated Vehicles and Shared Mobility Services • *Washington, D.C.*
 25 American Society of Civil Engineers Geo-Congress 2020 • *Minneapolis, Minnesota**
 25 Why Surface Transportation Agencies Use Drones
 26 Future of U.S. Science Policy Symposium at the National Academy of Sciences • *Washington, D.C.*
 27 Emergency Events and Their Damage to Assets

MARCH

- 2 Greener in Two Ways: Innovative Sustainability Solutions for Airports
 4 Fast-Track: A Tactical Transit Study
 5 Quantifying the Performance of Your Pavement Preservation
 8 Geosynthetics 2020: Case Studies • *Charleston, South Carolina**
 9 A Conversation on Speed Management
 11 Right-Sizing Transportation Investments
 12–13 Review and Update of Bureau of Safety and Environmental Enforcement Offshore Oil and Gas Operations Inspection Program Committee Meeting • *Washington, D.C.*

- 16 Making Your Budget Work: Stormwater Management Projects at Airports
 17 How Rough Is Your Pavement?
 19 Exploring Equity Implications of Emerging Transportation Technologies
 23 Transportation and COVID-19: Practices from Other Disease Outbreaks
 26 How to Guide Alternative Contracting Projects
 30 Guide for Transportation Performance Management and Data
 31 Designing Solid-State Roadway Lighting

APRIL

- 8 The Supply Chain and COVID-19
 9 How Construction History May Enhance a Pavement Management System
 13 Roundabouts in the *Manual on Uniform Traffic Control Devices*
 14 Start Your Transportation Research with TRID
 16 Demanding Data: Transactional Data for Demand-Responsive Transportation
 20–21 Committee Meeting for a Study on the Feasibility of Wheelchair Restraint Systems in Passenger Aircraft
 21 Breaking Down Barriers: Aiding Airport Travelers with Disabilities
 22 Greener in Many Ways: Environmentally Sustainable Funding and Financing
 23 Protecting Your Airspace: Implementing Obstruction Management Plans
 27 The Intersection Between Health and Transportation
 28 Sustainable Highway Construction
 28–29 Coast Guard Maritime Domain Awareness Committee Meeting
 30 What Role Does Ecology Have in Sustainable Transportation?

MAY

- 7 Steel Your Bridges: Preservation Practices for Steel Bridge Coatings
 11 Staying Connected: Improving Your Airport's Communication Strategies
 12 Attracting the Future Construction Workforce: Case Studies
 12–13 Marine Board 2020 Spring Meeting
 13 Data-Sharing Tips for Public Transportation Agencies
 13 Forum on COVID-19, AVs, and Shared Mobility (AV/SM)

- 13 Transportation Resilience Metrics Committee Meeting
- 18 Designing Landscapes to Enhance Roadside Water Management
- 19–20 Federal Highway Administration Research and Technology Coordinating Committee
- 21 You Can Get There from Here: Developing an Emissions Roadmap for Airports
- 27 Evaluating Goals Under the Disadvantaged Business Enterprise (DBE) Program
- 28 Airport Cooperative Research Program (ACRP) Insight Event: Flight Plan to Recovery—Preparing Airports and Their Business Partners for the Return of the Flying Public
- 28 Performance-Based Management of Traffic Signals

JUNE

- 1 How Much Will COVID-19 Affect Travel Behavior?
- 2 Traffic Trends and Safety in a COVID-19 World
- 3 Enhancing Monarch Butterfly Habitats Along Roadway Corridors
- 4 Evolution of Project Delivery Information Systems
- 10 How to Certify and Verify Pavement Surface Condition Data
- 11 How to Use Self-Consolidating Concrete in Bridge Applications
- 15 Standing Committees on Intermodal Freight Transport and International Trade and Transportation Midyear Meeting
- 15 Standing Committee on Marine Safety and Human Factors Midyear Meeting
- 16 Transportation Experiences and Next Steps in the COVID-19 Pandemic
- 17 Let's Work Together: Collaborative Partnering for Airports
- 18 Bearing with Bridges: Bearings and Expansion Joints on Highway Bridges
- 23 Construction Project Staffing Strategies for Transportation Agencies
- 24 Pavement Deflections: Past, Present, and Future
- 25 COVID-19 Impacts on Managed Lanes
- 26 Transportation Resilience Metrics Meeting
- 29 A Research Roadmap for Transportation and Public Health
- 29–30 Cybersecurity Workforce of the Federal Aviation Administration Committee Meeting
- 30 Forecasting Zero-Emission Vehicles Fleet Scenarios and Emissions Implications

JULY

- 7 Smooth Road Ahead: Applying Pavement Condition Data for Airports
- 8 When to Use Fully Grouted Piezometer Installations
- 9 Enhance Work Zone Safety with New Technologies

- 13–15 Transportation Asset Management Summer Mega-Meeting*
- 14 Accelerating Automated Vehicle Acceptance
- 15 Asset Management in a COVID-19 World
- 16 Seismic Design Basics
- 20 Safe Transportation of Liquefied Natural Gas by Railroad Tank Car Committee Meeting
- 21 How Performance and Data Informs Transportation Decision Making
- 23 Strategic Issues Affecting Highway Preservation, Maintenance, and Renewal
- 27–30 Automated Vehicles Symposium 2020
- 28 Bridge Scour Risk Management
- 29 Human Trafficking and Mobility of Missing and Murdered Indigenous Women
- 29 Standing Committee on Transportation and Public Health Midyear Meeting
- 29–30 Cybersecurity Workforce of the Federal Aviation Administration Committee Meeting
- 29 Standing Committee on Environmental Analysis and Ecology Virtual Seminar
- 30 Measures of Performance for Operating a Reliable Transportation System

AUGUST

- 3–13 Roadside Safety Design and AASHTO Technical Committee on Roadside Safety
- 4 Using Otta Seal as a Surface Treatment on Low-Volume Roads
- 4–5 ACRP Insight Event: Introduction to Blockchain and Airport Operations in a COVID-19 Environment
- 4–6 Geospatial Data Acquisition Technologies in Design and Construction Summer Committee Meeting
- 5 Managing Construction Through Electronic Ticketing
- 6 Reach for the Sky: Attracting New Aviation Career Professionals
- 10 Selecting Better Pavement Markings through Field Trials
- 11–12 Committee Meeting for a Study on the Feasibility of Wheelchair Restraint Systems in Passenger Aircraft
- 12 Enter the Portal: The Transportation Performance Management Portal
- 12 TRB AV/SM Forum Members Meeting: Review Research White Papers
- 13 What's Cooler than Cool? Cooler Pavements for Urban Heat Island Mitigation
- 18 Public Transit Ridership Trends
- 19 Preserving Concrete Pavement
- 26 Delivering Bridge Projects with Building Information Modeling
- 26 Review of Federal Highway Administration Infrastructure R&D: Expert Task Group on Bridges

- 26 U.S.–China Mobility Management Meeting*
- 31 The Relationship Between Bicycle Facilities and Increasing Bicycle Trips

SEPTEMBER

- 2 How Women Fare in the Transit Industry
- 8 Envisioning the Next Generation of Traffic Management Systems
- 9 Fabricating Asphalt for Laboratory Testing
- 10 Framework for Managing Data from Emerging Technologies
- 15 Committee on Progress and Opportunities Toward Decreasing the Risk of Offshore Energy Operations Meeting
- 15 Incentivizing Sustainable Air Service
- 15–16 Cybersecurity Workforce of the Federal Aviation Administration Committee Meeting
- 15–16 Workshop on Transportation Law
- 16 On the Road Again: Engaging Students in Road Engineering Careers
- 17 Enhancing Pavement Foundation Resilience Through Moisture Measurement
- 21 Modeling Long-Distance Intercity Travel for Sustainable Global Travel
- 21 Security of America’s Medical Product Supply Chain Committee Meeting
- 22 Designing Beyond: Improving Airport Operations Through BIM
- 23 Stay Current on Research in Progress
- 24 Commodity Flow Survey Workshop
- 24 Federal Highway Administration Research and Technology Coordinating Committee
- 29 Capacity Impacts of Connected and Autonomous Vehicles

OCTOBER

- 1 Governing Data to Improve Transportation Asset Management
- 5 Introducing an Improved Design Procedure for Unbonded Concrete Overlays
- 6 A Resilient Path Forward for the Marine Transportation System
- 7 Weathering the Storm: Climate Resilience at Airports
- 8 Updating Designs for Mechanically Stabilized Earth Walls in AASHTO
- 13 Advancing Transportation Equity
- 14 How Accurate Are Traffic Forecasts?
- 15 Determining Social and Economic Qualifications in the DBE Program
- 19 Where Are We Now with Performance-Based Pavement Warranties?

- 20 Measuring Highway Assets Through Nondestructive Evaluation
- 21 Benefitting from Weigh-in-Motion Data
- 22 Balancing the Scales: Equity Analysis in Transportation Planning
- 28 Finding the Path: Messaging Before, During, and After Weather Events
- 29 2020 Virtual Forum on Sustainability and Emerging Transportation Technology, Part 1
- 29 Make it Count: Estimating Market Values for Small Airports

NOVEMBER

- 2 Reporting Employee Safety in Public Transportation
- 5 2020 Virtual Forum on Sustainability and Emerging Transportation Technology, Part 2
- 6 Keep on Truckin’: Using Simulators for CDL Testing During COVID-19
- 9 Advancing Innovative Automated Vehicles and Shared Mobility Research
- 9–10 Marine Board Fall Meeting
- 12 Celebrating TRB’s Centennial by Exploring the Future of Transportation Research
- 16–18 Workshop on Traffic Simulation and CAV Modeling
- 17 3-D Printing of Cement-Based Materials
- 17–18 Transit Safety and Security Conference and American Public Transit Association Midyear Safety and Security Seminar
- 18 Using Roadside Animal Detection Systems to Protect Drivers and Wildlife
- 19 Paving the Way: Smart and Multifunctional Pavements
- 23 Advances in Unstable Slope Instrumentation and Monitoring

DECEMBER

- 3 Rail in the Time of Coronavirus: Planning, Operating, and Constructing Rail
- 8 Planning an Effective Airport Deicing Runoff Management Program
- 9 Specifying Clay and Gravel for Road Surfacing
- 10 Cross-Cutting Issues in Urban Congestion Pricing

*TRB was cosponsor of the meeting.

APPENDIX D TRB Publications

January 1 – December 31, 2020

Transportation Research Records (online)

- 2674:1 Issue 1: January 2020
- 2674:2 Issue 2: February 2020
- 2674:3 Issue 3: March 2020
- 2674:4 Issue 4: April 2020
- 2674:5 Issue 5: May 2020
- 2674:6 Issue 6: June 2020
- 2674:7 Issue 7: July 2020
- 2674:8 Issue 8: August 2020
- 2674:9 Issue 9: September 2020
- 2674:10 Issue 10: October 2020
- 2674:11 Issue 11: November 2020
- 2674:12 Issue 12: December 2020

Special Reports¹

- 334 Review of the Federal Railroad Administration’s Research and Development Program
- 335 Leveraging Unmanned Systems for Coast Guard Missions

Conference Proceedings on the Web (online)

- 26 Public–Private Partnerships: What Are the Lessons Learned?
- 27 Flight Plan to Recovery: Preparing Airports for the Return of the Traveling Public

Transportation Research Circulars (E-Circulars) (online)

- E-C259 International Transportation and Economic Development Conference 2018: 15th International Conference on Mobility and Transport for Older Adults and People with Disabilities

- E-C260 Managing Highway Rock Slope Scaling
- E-C261 TRB Forum on Preparing for Automated Vehicles and Shared Mobility
- E-C262 TRANSED 2018: 15th International Conference on Mobility and Transport for Older Adults and People with Disabilities
- E-C263 Conference on Performance and Data in Transportation Decision Making
- E-C264 Conference on Health and Active Transportation
- E-C265 Second International Conference on Resilience to Natural Hazards and Extreme Weather Events
- E-C266 Transportation Asset Management in a COVID-19 World
- E-C267 Summary of Transportation Research Needs Related to COVID-19

TR News

Nos. 325–330

Online Newsletters

TRB Transportation Research E-Newsletter

Airport Cooperative Research Program (ACRP) Research Reports²

- 14 Deicing Planning Guidelines and Practices for Stormwater Management Systems, Second Edition
- 210 Innovative Solutions to Facilitate Accessibility for Airport Travelers with Disabilities
- 211 Guidance for Using the Interactive Tool for Understanding NEPA at General Aviation Airports

- 212 Airports and Unmanned Aircraft Systems
 - Volume 1: Managing and Engaging Stakeholders on UAS in the Vicinity of Airports
 - Volume 2: Incorporating UAS into Airport Infrastructure—Planning Guidebook
 - Volume 3: Potential Use of UAS by Airport Operators
- 213 Estimating Market Value and Establishing Market Rent at Small Airports
- 214 BIM Beyond Design Guidebook
- 215 Transportation Network Companies (TNCs): Impacts to Airport Revenues and Operations—Reference Guide
- 216 Guidebook for Assessing Collaborative Planning Efforts Among Airport and Public Planning Agencies
- 217 Guidance for Diversity in Airport Business Contracting and Workforce Programs
- 218 Building and Maintaining Air Service Through Incentive Programs
- 219 Advanced Ground Vehicle Technologies (AGVT) for Airside Operations
- 221 Measuring Quality of Life in Communities Surrounding Airports
- 222 Collecting and Sharing of Operations and Safety Data
- 223 Performance Measures for State Aviation Agencies
- 224 Understanding Impacts to Airports from Temporary Flight Restrictions

ACRP Syntheses of Airport Practice²

- 106 Airport Risk Identification and Prioritization Practices
- 107 Models for Law Enforcement at Airports

¹ Available in print and online.

² Entire series available in print and online.

108	Characteristics of the FBO Industry 2018–2019
109	Escalator Falls
110	Airport Renewable Energy Projects Inventory and Case Examples
111	Last Mile in General Aviation: Courtesy Vehicles and Other Forms of Ground Transportation
112	Airport Operations Training at Small Airports
113	Airport Workforce Programs Supporting Employee Well-Being
114	Visual Arts Programs at Airports

ACRP Legal Research Digests²

21	Update: Compilation of DOT and FAA Airport Legal Determinations and Opinion Letters as of December 31, 2018
38	Legal Issues Related to Large-Scale Airport Construction Projects
39	Updated Survey of Laws and Regulations Applicable to Airport Commercial Ground Transportation
40	Permissible Uses of Airport Property and Revenue

ACRP Web-Only Documents (online)

42	Toolkits and Resource Library for Airports and Unmanned Aircraft Systems
45	Airport Environmental Research Roadmap Narrative Report
46	Recovering International Recyclables from In-Flight Service
47	Commercial Space Operations Noise and Sonic Boom Measurements
48	Evaluating the Use of Spatially Precise Diurnal Population Data in Aviation Noise Studies
49	Research Roadmap on Airport Administration and Human Resource Issues
50	Research Roadmap on Safety Issues

ACRP WebResources (online)

3	Airport Stormwater Electronic Resource Library and Training Materials, Update
8	Integrating Social Media with Emergency Management at Airports
9	Airport Emergency Plan Development Tool

National Cooperative Highway Research Program (NCHRP) Research Reports³

750	Strategic Issues Facing Transportation, Volume 7: Preservation, Maintenance, and Renewal of Highway Infrastructure
899	Broadening Integrated Corridor Management Stakeholders
922	Stormwater Infiltration in the Highway Environment: Guidance Manual
923	Workforce Optimization Workbook for Transportation Construction Projects
924	Foreseeing the Impact of Transformational Technologies on Land Use and Transportation
926	Guidance to Improve Pedestrian and Bicyclist Safety at Intersections
927	Evaluating the Effects of Recycling Agents on Asphalt Mixtures with High RAS and RAP Binder Ratios
928	Identification of Factors Contributing to the Decline of Traffic Fatalities in the United States from 2008 to 2012
929	Unsignalized Full Median Openings in Close Proximity to Signalized Intersections
930	Update of Security 101: A Physical Security and Cybersecurity Primer for Transportation Agencies
931	A Guide to Emergency Management at State Transportation Agencies
932	A Research Roadmap for Transportation and Public Health

933	Evaluating Mechanical Properties of Earth Material During Intelligent Compaction
934	Traffic Forecasting Accuracy Assessment Research
935	Proposed AASHTO Seismic Specifications for ABC Column Connections
936	Guide to Ensuring Access to the Publications and Data of Federally Funded Transportation Research
937	Guidebook for Implementing Alternative Technical Concepts in All Types of Highway Project Delivery Methods
938	Incorporating the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change: Guidebook
939	Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods <ul style="list-style-type: none"> • Volume 1: Design–Build Delivery • Volume 2: Construction Manager–General Contractor Delivery • Volume 3: Research Overview
940	Solid-State Roadway Lighting Design <ul style="list-style-type: none"> • Volume 1: Guidance • Volume 2: Research Overview
941	Bicyclist Facility Preferences and Effects on Increasing Bicycle Trips
942	Evaluating the Suitability of Roadway Corridors for Use by Monarch Butterflies
943	Design and Access Management Guidelines for Truck Routes: Planning and Design Guide
944	Guide to Calculating Ownership and Operating Costs of Department of Transportation Vehicles and Equipment: An Accounting Perspective
945	Strategies for Work Zone Transportation Management Plans
946	Procedures and Guidelines for Validating Contractor Test Data

² Entire series available in print and online.

³ Publications released since 2001 available in print and online.

947	Implementing Information Findability Improvements in State Transportation Agencies
949	Proposed AASHTO Guidelines for Performance-Based Seismic Bridge Design
950	Proposed AASHTO Guide for Bridge Preservation Actions
951	Proposed AASHTO Load Rating Provisions for Implements of Husbandry
952	Guidebook for Managing Data from Emerging Technologies for Transportation
953	Improving Mid-Term, Intermediate, and Long-Range Cost Forecasting: Guidebook for State Transportation Agencies
954	Performance-Based Management of Traffic Signals
955	Guide for Quantitative Approaches to Systemic Safety Analysis

NCHRP Syntheses of Highway Practice³

544	Concrete Technology for Transportation Applications
545	Electronic Ticketing of Materials for Construction Management
546	Use of Weigh-in-Motion Data for Pavement, Bridge, Weight Enforcement, and Freight Logistics Applications
547	Advancements in Use of Geophysical Methods for Transportation Projects
548	Development and Use of As-Built Plans by State Departments of Transportation
549	Incorporating Roadway Access Management into Local Ordinances
550	Alternative Intersection Design and Selection
551	Highway Hydraulic Engineering State of Practice
552	Practices for Fabricating Asphalt Specimens for Performance Testing in Laboratories
553	Performance-Based Pavement Warranty Practices

554	Advances in Unstable Slope Instrumentation and Monitoring
555	Estimating and Contracting Rock Slope Scaling Adjacent to Highways
556	Asset Management Approaches to Identifying and Evaluating Assets Damaged Due to Emergency Events
557	Utility Pole Safety and Hazard Evaluation Approaches
558	Availability and Use of Pedestrian Infrastructure Data to Support Active Transportation Planning
559	Emerging Challenges to Priced Managed Lanes

NCHRP Legal Research Digests³

80	Buy America Requirements for Federal Highway Projects
81	Legal Issues Concerning the Use of Transportation Facilities to Generate Revenue for State DOTs
82	Potential Liability Associated with Unstable Slope Management Programs
83	Guidelines for Drafting Liability Neutral Transportation Engineering Documents and Communication Strategies

NCHRP Web-Only Documents (online)

263	White Papers for Right-Sizing Transportation Projects
266	Developing a Physical and Cyber Security Primer for Transportation Agencies
267	Developing a Guide to Emergency Management at State Transportation Agencies
268	Proposed Modifications to AASHTO Culvert Load Rating Specifications
269	Guide Specification for Service Life Design of Highway Bridges
270	Developing a Guide to Ensuring Access to the Publications and Data of Federally Funded Transportation Research

271	Guidelines to Incorporate the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change
272	Existing and Emerging Highway Infrastructure Preservation, Maintenance, and Renewal Definitions, Practices, and Scenarios
273	Road User Understanding of Bicycle Signal Faces on Traffic Signals
274	Zero Emission Vehicles: Forecasting Fleet Scenarios and Their Emissions Implications
275	Potential Section 106 Exempted Categories or Program Comments for Federal Highway Administration Projects: National Streamlining Opportunities
276	Evaluating Strategies for Work Zone Transportation Management Plans
277	Implementing Alternative Technical Concepts in All Types of Highway Project Delivery Methods
278	Context-Sensitive Design Options for Workhorse Bridges in Rural Historic Districts: Practitioner's Guide and Research Report
279	Information Findability Implementation Pilots at State Transportation Agencies
280	Valuing Wildlife Crossings and Enhancements for Mitigation Credits
281	Integrating Tribal Expertise into Processes to Identify, Evaluate, and Record Cultural Resources
282	Framework for Managing Data from Emerging Transportation Technologies to Support Decision-Making
283	Improving Mid-Term, Intermediate, and Long-Range Cost Forecasting for State Transportation Agencies
284	Decision-Making Guide for Traffic Signal Phasing
285	Developing a Guide for Quantitative Approaches to Systemic Safety Analysis
287	Planning and Implementing Multimodal, Integrated Corridor Management: Guidebook
288	Standard Definitions for Common Types of Pavement Cracking

³ Publications released since 2001 available in print and online.

- 289 Business Models to Facilitate Deployment of Connected Vehicle Infrastructure to Support Automated Vehicle Operations
- 290 Highway Capacity Manual Methodologies for Corridors Involving Freeways and Surface Streets

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

- 208 Strategic Communications to Improve Support for Transit-Priority Projects: Report and Toolkit
- 209 Analysis of Recent Public Transit Ridership Trends
- 210 Specifications for Demand-Responsive Transportation Development of Transactional Data
- 211 Guidebook for Detecting and Mitigating Low-Level DC Leakage and Fault Currents in Transit Systems
- 212 Stray Current Control of Direct Current-Powered Rail Transit Systems: A Guidebook
- 213 Data Sharing Guidance for Public Transit Agencies—Now and in the Future
- 214 Equity Analysis in Regional Transportation Planning Processes
 - Volume 1: Guide
 - Volume 2: Research Overview
- 215 Minutes Matter: A Bus Transit Service Reliability Guidebook
- 216 Improving the Safety, Health, and Productivity of Transit Operators Through Adequate Restroom Access

- 217 Improving the Health and Safety of Transit Workers with Corresponding Impacts on the Bottom Line
- 218 Characteristics and Elements of Nonpunitive Employee Safety Reporting Systems for Public Transportation

TCRP Syntheses of Transit Practice (online)

- 144 Multimodal Fare Payment Integration
- 145 Current Practices in the Use of Onboard Technologies to Avoid Transit Bus Incidents and Accidents
- 146 Transit Security Preparedness
- 147 Attracting, Retaining, and Advancing Women in Transit
- 148 Business Models for Mobile Fare Apps
- 149 Transit Signal Priority: Current State of the Practice
- 150 Third Rail Insulator Failures: Current State of the Practice
- 151 Maintenance Planning for Rail Asset Management: Current Practices

TCRP Legal Research Digest (online)

- 55 Tax Increment Financing for Transit Projects

TCRP Web-Only Document (online)

- 72 Developing a Guide to Bus Transit Service Reliability

APPENDIX E TRB Staff

As of September 2020

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