

AMERICAN ASSOCIATION
OF STATE HIGHWAY AND
TRANSPORTATION OFFICIALS

AASHTO

TESTIMONY OF

The Honorable Brian W. Ness, P.E.

Chair, Committee on Research and Innovation, American Association of State
Highway and Transportation Officials;
Director, Idaho Transportation Department

REGARDING

**Bumper to Bumper: The Need for a National
Surface Transportation Research Agenda**

BEFORE THE

**Subcommittee on Research and Technology
of the Committee on Science, Space, and
Technology of the United States House of
Representatives**

ON

July 11, 2019

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INTRODUCTION

Chairwoman Stevens, Ranking Member Baird, and Members of the Subcommittee, thank you for the opportunity to appear today and address the critical need for a robust national surface transportation research agenda. My name is Brian W. Ness, and I serve as Director of the Idaho Transportation Department (ITD) and as Chair of the Special Committee on Research and Innovation for the American Association of State Highway and Transportation Officials (AASHTO). Today, it is my honor to testify on behalf of the great state of Idaho and AASHTO, which represents the transportation departments (state DOTs) of all 50 states, Washington, D.C., and Puerto Rico.

After spending 30 years with the Michigan Department of Transportation, I became Director of ITD ten years ago. I lead an agency with an annual budget of \$800 million and 1,600 hardworking and dedicated employees. I am particularly proud of our department's employee-driven innovation program started in 2014. Since that time, we have implemented more than 1,000 innovations, saved nearly \$9 million, created nearly 600 customer-service improvements, and saved 207,000 contractor and employee hours. ITD was recognized in 2016 by the Idaho Technology Council as a finalist for Innovative Company of the Year, competing against many of Idaho's largest corporations.

In an era of tight funding for state governments across the country, state DOTs rely heavily on research to help solve their most challenging problems. It has been proven time and again that one dollar of research investment today will pay many times that in ongoing future benefits. To assist Congress as it develops research provisions for the next surface transportation legislation (following the Fixing America's Surface Transportation (FAST) Act), I would like to make the following recommendations for transportation research:

- Congress should retain the current, multi-tiered research structure that has delivered a long track record of success.
- For reauthorization of the FAST Act, Congress should consider AASHTO's priority research areas developed through its extensive policy-development process.
- Congress needs to ensure a strategic approach to investment that accelerates the deployment of research findings, creating real results in the field.

CONGRESS SHOULD RETAIN THE CURRENT, MULTI-TIERED RESEARCH STRUCTURE THAT HAS DELIVERED A LONG TRACK RECORD OF SUCCESS

To build, maintain, and expand its vast multimodal transportation system, our nation has long committed to and relied on the fruits of research—including innovations in planning, materials,

construction methods, system operation, organizational effectiveness, and many other areas. Innovation and research allow state agencies to efficiently and effectively deliver a safe, reliable, and sustainable transportation system while continuously improving facilities and services. The federal government's support and funding for transportation research has been steady over many decades, dating back to the 1893 formation of the Office of Road Inquiry in the U.S. Department of Agriculture. However, by any measure—across industries or across countries—our nation invests very modest resources in transportation research and innovation.

A substantial return on investment from smarter, better, and longer-lasting transportation can easily be documented with factors such as more durable infrastructure and improved operations. Additional benefits extend far beyond those that are easily quantified, including lives saved, an environmentally responsible transportation system, and improved quality of life for our citizens whose daily lives depend on the efficient movement of people and goods. I will provide several examples of actual research projects later in this testimony.

Like the federal system of government, transportation research in the United States is a decentralized collection of interrelated programs. The national transportation system has a large geographical footprint, owned and operated by states and localities. Additional key stakeholders include Congress and the U.S. Department of Transportation (USDOT), universities, private firms, associations, and the users of the transportation system. The multi-tiered components of our national transportation research effort supported with federal surface transportation funds include the following:

- Federal research and technology transfer carried out directly by the USDOT, including research directed by the Secretary's policy and research offices, as well as by the modal agencies, including the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), National Highway Traffic Safety Administration (NHTSA), Federal Motor Carrier Safety Administration (FMCSA), and Federal Railroad Administration (FRA). Through the federal program, the USDOT addresses high-priority national research needs and shares new technologies and practices with the states. The USDOT research program is described in more detail later in this testimony.
- Research conducted by each state department of transportation, which is managed by the individual state DOT members of AASHTO's Research and Innovation Committee and its subordinate Research Advisory Committee, coordinate with national research programs and is funded using either federal funds or directly by the states themselves. The majority of the funding for this research comes from the federally-funded State Planning and Research (SPR) Program, which is the nation's cornerstone state research program.

- Various cooperative research programs administered by the Transportation Research Board (TRB) of the National Academies, including the National Cooperative Highway Research Program (NCHRP), Transit Cooperative Research Program (TCRP), Airport Cooperative Research Program (ACRP), and Behavioral Traffic Safety Cooperative Research Program (BTSCRP). Most of these programs determine their research agenda on an annual basis. The sum of these Cooperative Research Programs equal more than \$60 million annually in research projects for airports, transit, freight, rail, safety, hazardous materials, and highways. The largest of these programs—NCHRP—is funded through annual voluntary contributions of state DOTs from their SPR funds. NCHRP pools research dollars provided by the states to find solutions to transportation challenges directed by the AASHTO Research and Innovation Committee as critical.
- Policy research undertaken and managed directly by TRB. TRB conducts policy studies examining complex and controversial transportation issues at the request of Congress, executive branch agencies, states, and other sponsors. Studies cover all modes of transportation and a variety of safety, economic, environmental, and research policy issues. A major example is the recently released *Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future* study directed by Congress under the FAST Act.
- Special research authorized by Congress, such as the second Strategic Highway Research Program (SHRP2), which focused on four critical issues in transportation—safety, infrastructure renewal, travel-time reliability, and capacity needs. The results of this targeted research program were implemented successfully over the past six years by FHWA and AASHTO through the use of competitive funding and technical assistance opportunities to transportation agencies across the country.
- The University Transportation Centers (UTC) Program carried out by national, regional, and Tier 1 University Transportation Research Centers (UTCs) that consist of universities across the country focused on specific research areas or topics.

Each of these components plays a vital role in the overall national research effort and, while the efforts are generally independent, there is considerable coordination, collaboration, and communication between these research programs to ensure the development of cohesive, complementary, and significant research. AASHTO firmly believes this multi-tiered federal transportation research and implementation program is best positioned to meet the unique needs of each state.

AASHTO'S RESEARCH POLICY PRIORITIES FOR SURFACE TRANSPORTATION REAUTHORIZATION

To further build on the federal surface transportation program's solid foundation, AASHTO strongly urges Congress to reauthorize the FAST Act in a timely manner by September 30, 2020, without resorting to disruptive short-term extensions of the program. The following surface transportation research issues have been identified as part of AASHTO's FAST Act reauthorization effort:

- Increase funding for the Federal Research, Technology and Education (RT&E) Program. The FAST Act reduced the flexibility of MAP-21 research funding by requiring three congressionally designated efforts to be funded by existing federal research funding sources. AASHTO recommends a minimum budget of \$678 million per year to return the federal RT&E programs to former levels.
- Maintain the State Planning and Research (SPR) program in its current, formula-based configuration and continue the 25 percent set-aside for research, development, and technology-transfer activities. This will allow state DOTs to continue their commitments to research and implementation of innovative transportation technologies and processes across the country.
- Reauthorize the Transit Cooperative Research Program (TCRP). Research conducted through the TCRP and directly by the Federal Transit Administration remains a high priority for states. These activities promote best practices and facilitate the deployment of new technologies, thereby increasing operational efficiency. Funding for this program should be preserved.
- Reinstate the National Cooperative Freight Research Program (NCFRP). Throughout its history, a core element of the FHWA's RT&E mission has been to promote innovation and improvement in the highway system. This critical mission element has developed into a broad array of research and technology activities covering the spectrum of advanced research, applied research, technology transfer, and implementation. The National Cooperative Freight Research Program, however, was last authorized under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The Moving Ahead for Progress in the 21st Century (MAP-21) and the FAST Act provided increased emphasis on freight issues while simultaneously reducing funding for freight research at the national level. The NCFRP should be reestablished to assist states in their delivery of freight transportation projects with funding beyond the amount prescribed for the federally managed RT&E and SPR programs.

- Expand Eligible Activities through the National Highway Freight Program to include Research. Reform the National Highway Freight Program and the Nationally Significant Highway and Freight Projects (also known as INFRA) to more clearly include eligibility for investment in integrated freight technology, management and operations strategies and solutions, freight safety programs (including for emergency responders), and research supporting future investments.
- Expand Transit Research Grants and Funding to Explore Mobility Opportunities through Connected and Automated Vehicle Technology. The deployment of Connected and Automated Vehicle (CAV) technology is an unprecedented opportunity to improve transit service delivery. State DOTs are looking to FTA to conduct research, test, and safely deploy these emerging technologies. Funding is needed for research and deployment of CAV technology to enhance mobility alternatives for individuals who may be unable to use or are not served by traditional public transportation services. FTA research should also include an assessment of the impact of CAVs on labor, opportunities to retrain existing employees and train the employees needed in the future to maintain and support these technologies, and assess the infrastructure needed to support deployment.
- Scope a third Strategic Transportation Research Program. Building off the successful implementation of technologies and processes developed through the first and second Strategic Highway Research Programs, AASHTO is recommending \$1 million to scope the next Strategic Transportation Research Program. Technology is rapidly changing and increasingly impacting transportation, so potential focus areas for this next strategic research program include: advances in connected and autonomous technologies, incorporating safety-related technologies into our system, addressing infrastructure resiliency, and meeting the needs of multi-modal connectivity.

CONGRESS NEEDS TO ENSURE A STRATEGIC APPROACH THAT ACCELERATES THE DEPLOYMENT OF RESEARCH FINDINGS INTO REAL RESULTS IN THE FIELD

As Chair of the AASHTO Research and Innovation Committee, I established the following vision when selecting and implementing state DOT research projects:

- We must have a strategic approach to selecting research projects.
- When possible, these projects should provide a positive return on investment.
- Research should translate into real results in the field.
- The timeframes must be accelerated.

Estimating the value of research products is challenging. A research product can have multiple outcomes, which in turn can lead to multiple impacts. Significant time can pass between when the research product is developed, when it is put into practice, and when the impacts of that practice are realized. This affects the timing of evaluation activities. The nature of research products is wide-ranging. Some research projects are designed to improve existing practices, others help create policy decisions. Research products provide many types of benefits. Some have measurable returns on investment. Others help agencies improve practices, make policy decisions, or generate benefits to society, such as saving lives or creating cost and time savings. Research projects help AASHTO and the state DOTs address the nation's growing transportation needs.

A notable policy blueprint when it comes to identifying key issues in transportation research is the *Critical Issues in Transportation* developed this year by TRB. It identified the following 12 areas to supplement the wide range of perspectives and practical experience represented by the AASHTO Research and Innovation Committee membership.

1. Transformational Technologies and Services: Steering the Technology Revolution

All around the globe, companies are testing automated cars, trucks, ships, and aircraft. Test vehicles are already in operation. Some products are almost certain to enter the marketplace in the next few years. Driverless vehicles equipped with artificial intelligence may revolutionize transportation. Perhaps even sooner, vehicles connected to one another with advanced high-speed communication technologies may greatly reduce crashes. How will vehicle automation—along with connected vehicles and shared ride, car, bike, and scooter services—transform society? These revolutionary technologies and services can potentially speed deliveries, prevent crashes, and ease traffic congestion and pollution. How do we determine and guide, as necessary, the direction of these changes? How the future unfolds depends on which technologies and services consumers and businesses embrace and how policy makers respond. While we do not know what the future will bring, the changes could be momentous. For example, if we encourage people to pool rides in driverless electric cars, we could see the service, cost, and environment improve. What policies would best reduce traffic congestion and emissions and improve accessibility for the disabled, elderly, and economically disadvantaged? How do we benefit most from the advent of connected and automated vehicles and potentially transformative transportation services?.

2. Serving a Growing and Shifting Population

The U.S. population is expected to grow about one percent annually, with highway use increasing similarly. But this growth will not be spread evenly across the country. Urban areas are growing faster than rural areas, particularly clusters of metro areas known as “megaregions,” while many rural areas decline. At the same time, low-density residential development on the edges of urban areas continues to grow the fastest, which increases traffic and escalates emissions. Although many Millennials are settling in urban centers, more are locating on the edges of cities where Baby Boomers also prefer to live. How do we

adjust to and guide travel demand so we are not overwhelmed with more roads, traffic, and emissions as a result of these geographic preferences? Megaregions in the Northeast, Midwest, South, and West have emerged as economic engines for the economy, but they also have the worst traffic congestion. And their traffic volumes continue to grow faster than new transportation facilities can be built. What are the best policies and modes for improving travel within each megaregion? How do we ensure that megaregions are well connected to the rest of the nation and the world? How can rural populations be ensured adequate access to jobs and services? How is that access changing? Which policies are needed to provide adequate rural access?

3. Energy and Sustainability: Protecting the Planet

Vehicles, planes, ships, and other forms of transport emit more greenhouse gases than any other sector of the economy in the United States. And that share is growing because other sectors of the economy are reducing their emissions faster than transportation. Personal vehicles could rely on electrification using batteries or hydrogen as one way to significantly reduce greenhouse gas emissions. Planes, ships, and trucks pose major obstacles to this objective because of their dependence on fossil fuels that pack more power than alternatives. What are the most effective and cost-effective ways of achieving the drastic reductions needed in fossil fuel consumption? What are the appropriate roles for the public and private sectors in hastening this transition? How can the shift to electric vehicles be accomplished without overwhelming the power grid? Sustainability requires that there be long-term consideration of the implications of decisions and policies on social, economic, and environmental systems. Examples include making decisions based on life-cycle cost considerations and the long-term vitality of communities and key natural environmental systems. How can consideration of long-term sustainability goals be better incorporated into public policy debates and decisions about transportation?

4. Resilience and Security: Preparing for Threats

Recent floods, storms, fires, and hurricanes have disrupted the lives of millions and caused hundreds of billions of dollars in damage. Extreme weather and other natural disasters pose huge and costly threats to the transportation infrastructure. Public officials face the challenge of making vulnerable highways, bridges, railroads, transit stations, waterways, airports, and ports more resilient to climate change and other threats. What policies and strategies would help them meet this challenge? How do we set priorities, cope with disruptions, and pay for these adaptations? Terrorists often choose transportation facilities as their targets. Airports and airlines have increased security to guard against terrorism, but other modes of transport—buses, trains, and ships—are more vulnerable. How do we protect these forms of transport without unduly slowing the movement of people and goods? We also need to address the risks of new technologies. Drones, for example, can be used by terrorists or drug smugglers. Automated vehicles and aircraft are vulnerable to hackers. And all types of transport depend on Global Positioning Systems (GPSs), for which there is no back-up system. How do we make technological advances more secure and resilient?

5. Safety and Public Health: Safeguarding the Public

We depend on motorized transportation, but we pay a price with deaths, injuries, and diseases. Routine highway travel is the source of the vast majority of transport-related deaths in the United States. Even though there have been improvements in vehicles and facilities, most crashes are preventable. How do we muster the political will to adopt the most effective measures to reduce casualties and diseases caused by transportation? How do we encourage the use of the safest vehicle and road designs, reduce alcohol- and drug-impaired driving, and manage operator fatigue? Also, how do we curb driver distractions, especially in semi-automated vehicles that do not require full attention except in emergencies when multitasking drivers may be unprepared to respond? Marijuana legalization and opioid addiction may lead to more people driving while impaired. In addition, pedestrian and cyclist deaths are increasing. What can we do to address these problems? What successes from other countries can be applied? Air pollution comes from many sources, but some transport emissions, such as the particulates from burning diesel fuel, are especially harmful to people. People living near roads, ports, distribution centers, railyards, and airports—often the marginalized and the poor—are exposed to more of these types of vehicle emissions. How do we best address these problems?

6. Equity: Serving the Disadvantaged

The United States is prosperous, but not uniformly. More than 40 million Americans live in poverty. Outside central cities, an automobile is essential for access to jobs and a piece of the American dream, but about 20 percent of households with incomes below \$25,000 lack a car. In addition, nearly 40 million Americans have some form of disability, of whom more than 16 million are working age. And the population is aging: the number of people older than 65 will increase by 50 percent from 49 million now to 73 million by 2030. Access to jobs, health care, and other services can be expanded through transportation policies and programs and technology, but these approaches need to be affordable and effective. This is a particular challenge in sparsely populated areas. How do we help disadvantaged Americans get affordable access to work, health care, and other services and to family and friends? What policies would ensure that new technologies and services do not create new barriers to the disadvantaged or to rural residents? Also, as we expand transportation networks, how do we ensure that we are not harming low-income and minority neighborhoods?

7. Governance: Managing Our Systems

A complex web of institutions manages America's transportation services. Many levels of government, from local to national, play important roles. Some functions, such as public transit, airports, and ports, are managed by thousands of special authorities across the country. This spider web of governance frequently limits efficiency. For example, urban transport networks often span jurisdictional boundaries, creating disagreement about which agency is responsible for which aspects of planning, funding, and management. Separate funding streams for specific transportation modes impede efforts to provide travelers with multi-modal options. How do we address these challenges, particularly as

urban areas grow into megaregions? The federal government is responsible for interstate waterways and airspaces and for interstate commerce. However, federal leadership and funding for transportation supporting interstate commerce are waning, forcing state and local governments to take on a larger role. How do we ensure that there are efficient networks for interstate travel and international trade as the federal role declines? New private transportation services efficiently generate enormous data sets about trips. Such data can be helpful to agencies trying to manage system performance. Connected and automated vehicles will add even more information. How can public agencies gain access to these data streams to improve traffic flow while protecting privacy and proprietary information?

8. System Performance and Management: Improving the Performance of Transportation Networks

Highway congestion costs the nation as much as \$300 billion annually in wasted time. Flight delays add at least another \$30 billion. Clearly, demand for travel is outpacing growth in supply and the increasing congestion is costing us dearly. As the population grows, demand will only increase. However, expanding or building new roads, airports, and other facilities in urban areas is costly, time consuming, and often controversial. How can we serve growing demand in a financially, socially, and environmentally responsible manner? Transportation officials also need to squeeze more performance out of the existing networks. One way to do this is by managing demand: Charging drivers for peak-period travel in congested areas, for example, has the potential to increase ride sharing and generate revenues for transit, bike paths, and sidewalks. While pricing is more effective than other approaches, it is also unpopular. How do we build public and political acceptance for demand-management strategies that work? In the face of tight budgets, transportation officials must also figure out how to maintain the condition of roads, bridges, airports, and other assets for as long as possible. What research would help increase the durability of construction materials and designs? How do we speed adoption of new information to improve the life-cycle performance of transportation assets?

9. Funding and Finance: Paying the Tab

Fuel taxes and other user fees have traditionally paid for highways, bridges, airports, ports, and public transit. These user fees are generally fair and efficient ways to pay for the transportation infrastructure, which is valued in trillions of dollars. However, improving fuel efficiency undermines the revenue potential from the motor fuel taxes that have been the chief funding source for highways and transit. Since 1993, federal officials have not raised the fees that fund the federal share of surface transportation and have instead turned to general revenues. In addition, Congress has declined to raise aviation-related user fees, limiting funds for air traffic control and airports. Although most states have raised motor fuel taxes, state and local government officials are also turning to other sources as the revenues from these taxes decline. One is sales taxes, which can unfairly burden the poor. Also, officials are partnering with businesses to build and maintain roads and other assets. This approach has promising features, but relies on tolls or other charges that are

controversial. With advances in technology, officials can charge highway users by the number of miles traveled. They could also charge more during peak periods to manage demand and more to gas-guzzling vehicles to reduce emissions. But the public is not widely aware of these options and is not enthusiastic about them when it is. Clearly, we need to find new ways to maintain and expand the transportation infrastructure. How do we build understanding of the need to invest in transportation assets, identify the best funding options, and reach consensus for action?

10. Goods Movement: Moving Freight

The economy and our lifestyles depend on an efficient system for moving freight. Although railroads and pipelines are privately owned, funded, and managed, the freight system also requires adequate public infrastructure—roads, airports, ports, and waterways—for private companies to carry the goods needed. Freight movement is expected to grow dramatically in the coming decades to serve the growing population and economy. Without more spending on public infrastructure, this trend could lead to more traffic bottlenecks and capacity problems, especially as overnight and same-day delivery become more popular. How do we provide additional capacity when and where it is needed and ensure that beneficiaries bear the cost? Government officials face the challenges of providing adequate infrastructure for the freight industry while setting a level playing field for competition among private carriers and across transportation modes. In doing so, they need to account and charge for the costs that trucks, aircraft, ships, and other vehicles impose on public infrastructure. This is a process that is both difficult and controversial. How can officials best foster competition and set fair user fees for the freight industry? Another challenge for the freight industry is how to reduce its large and growing share of greenhouse gas emissions. One way to do this is through technology: improving batteries and fuel cells to speed the shift to electric-powered vehicles and moving to automated vehicles. Another is by improving efficiency, such as ensuring more vehicles are carrying freight on return trips. How do we make these improvements effectively and affordably?

11. Institutional and Workforce Capacity: Providing a Capable and Diverse Workforce

Government transportation agencies face huge challenges and tight budgets. Their ability to rise to these challenges depends on having capable workers with the tools they need to do their jobs. These agencies have difficulty competing for and keeping talented workers. They simply cannot pay as much as private industry. How can officials attract and retain the best employees despite the pay disparities between the public and private sectors? Also, the changing nature of transportation is creating different requirements for the workforce. As a result, transportation organizations struggle to keep workers up to date in the skills they need. Automated trucks, trains, vessels, and aircraft will disrupt the transportation workforce in both the public and private sectors. What are the likely impacts of these technological changes on transportation jobs? What are the best ways to help displaced workers? With a growing, changing, and aging population, transportation organizations will need to hire new and diverse employees. How can managers attract more members of underrepresented racial and ethnic groups into the transportation field? How can they

minimize the loss of expertise and experience when Baby Boomers retire?

12. Research and Innovation: Preparing for the Future

America is known for innovation. The revolutionary breakthroughs in transportation-related technology happened because of decades of public spending on basic research. In addition, steady improvements in the design, construction, operation, and management of transportation infrastructure has been spurred by research funded by government agencies. Public funding for research and education has never been more important, nor more uncertain. Many experiments are taking place in transportation across the country to meet the challenges of technological innovation and climate change. How do we record, evaluate, and share the results of these experiences and adopt innovations more quickly into standards and practices? Demands on transportation are growing as public spending on transportation research is declining. At the same time, public officials are often discouraged from taking risks. How do we encourage innovation in transportation agencies? How do we speed the pace of research to keep up with the major challenges transportation faces?

All proposed projects are carefully reviewed and prioritized considering the +collective interests of state DOTs. We also look for projects that are projected to result in high return on investment either directly or indirectly—by testing out new concepts or seeding future research—ultimately providing significant value for state DOTs and taxpayers. States like Michigan, Indiana, Ohio, and many others are using tools provided by the Strategic Highway Research Program (SHRP2), to find ways to build roads and bridges faster and more efficiently. The money they save allows them to fund more projects.

For example, Michigan has a 32-acre testing facility for connected and automated vehicle (CAV) technology operated under a partnership with the University of Michigan, the Michigan Department of Transportation, and the international automotive industry. Michigan has several other research projects currently underway, studying topics such as using unmanned aerial vehicles to collect transportation data, and using carbon-fiber reinforcement in bridges to address corrosion caused by salt used to melt snow and ice.

The state of Indiana spent \$3.9 million on research projects in 2017, and they report that five of those research projects saved the state just under \$190 million. What a great return on investment, saving 46 dollars for every one dollar spent on research!

In Idaho, my department developed a new concrete mix called High Early Strength Concrete, for use in accelerated bridge construction to link bridge girders. Then we partnered on a research project with a university to see how well the product performs. The study proved the new mix can replace Ultra-High Performance Concrete, which costs \$10,000 to \$15,000 per cubic yard, and reduce the cost to \$800 per cubic yard—a cost reduction of more than 90 percent.

Another example is Road Usage Charge (RUC) West, which brings together leaders from 14 state transportation organizations (Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Texas, Utah, and Washington) to share resources and explore innovative revenue solutions to sustainably fund the future of our transportation network.

The traditional revenues currently available for highways and local roads may not be able to preserve and maintain existing road infrastructure, reduce congestion, or improve service. Fuel taxes cannot meet current and long-term transportation funding needs because they continue to lose purchasing power—amounting to about 50 percent for the federal gas tax since its last adjustment 26 years ago. With gradual growth in the alternative-fuel vehicle fleet, states need to explore more sustainable transportation funding models like RUC in order to ensure adequate revenue for road maintenance and improvement. At their annual RUC West Board of Director’s meeting in June 2019, the board approved expanding the membership of RUC West to include all state DOT members. This expanded partnership will be operated through the Transportation Pooled Fund Program, which will allow federal, state, and local agencies and other organizations to combine resources to support transportation research studies.

We all want research projects to translate into results in the field. San Jose State University conducted a research project which created an incident-command field guide that includes flash cards highway crews can carry on a key ring in their trucks. When they come upon an incident, these cards allow workers to quickly develop an incident command post, assign the right course of action for transportation workers responding to the incident, and help them coordinate better with emergency responders—saving valuable time, and lives. Here is a link to a short video that shows how the guide and flash cards are used in the field:

<https://www.youtube.com/watch?v=z93KC7NUqV8>

As chair of the Research and Innovation Committee, I am sometimes asked why we spend money on research. The answer is simple—research projects allow state DOTs to stretch their transportation dollars farther. The money we save through research allows us to buy more steel, more asphalt, and more concrete. Research investments create long-term improvements taxpayers can actually see and benefit from.

CONCLUSION

AASHTO cannot stress enough the importance of national surface transportation research and implementation. Multiple and varied efforts are currently underway to move research into practice, and the variety of methods to do this are dependent on the actual results and specific solutions. It takes a wide variety of people in the research community to accomplish all of the objectives in transportation, including developing the data, establishing the needs, conducting the research, sharing the results, and implementing the best ideas.

By coordinating, collaborating, pooling and leveraging time and money, and utilizing the combined knowledge and expertise of our diverse research community, we are making significant contributions and improvements to the advancement of our nation's transportation system. This decentralized organization of research programs has served the nation well, and should be maintained in the next surface transportation authorization.

I thank you again for the opportunity to testify today, and am happy to answer any question.