

FHWA R&T Now

A news update of research, technology, and development from the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA)

July/August 2017

POLICY & PARTNERSHIPS

TRB and FHWA Review Highway Research

FHWA leadership involved with research and technology demonstration and deployment recently participated in a meeting of the Research and Technology Coordinating Committee (RTCC), FHWA's official research and technology (R&T) advisory committee. Leadership offered coordination and guidance through presentations focused on technology readiness levels that gauge how close an innovation is ready for widespread adoption; proprietary products; State Department of Transportation workforce readiness for innovation; the R&T Performance Evaluation Program; international R&T collaboration; the U.S. Department of Transportation Modal Research Plan; freight R&T; and moving innovations into practice.

The Transportation Research Board (TRB) convenes the RTCC twice yearly to provide continuing guidance and advice on FHWA's R&T program and makes broad-based research priority recommendations with an emphasis on FHWA's annual research program plans and budgets. Committee membership is drawn from top officials in State departments of transportation, as well as university and private-sector research organizations, local government officials, highway suppliers, contractors and consultants, environmental and highway safety specialists, and highway users.

For more information, contact John Moulden, 202-493-3470, john.moulden@dot.gov.

FHWA Meets with TRB Executives

In June, Butch Waidelich, FHWA's Acting Deputy Administrator, and Michael Trentacoste, FHWA's Associate Administrator for Research, Development, and Technology, attended the TRB Executive Committee meeting in Washington, D.C. The meeting featured a policy session discussion on smart cities and transportation.

The TRB Executive Committee serves as an advisory group to the chairman and the governing board of the National Research Council. The FHWA Administrator, other U.S. Department of Transportation modal administrators, and other sponsors serve as ex officio members. Members represent a balance of transportation modes, academic disciplines, private and public sectors, echelons of government, geographical regions, and other relevant factors.

For more information, contact Jack Jernigan, 202-493-3363, jack.jernigan@dot.gov.



EXPLORATORY ADVANCED RESEARCH

EAR Program Funds Truck Platooning Research

FHWA's Exploratory Advanced Research (EAR) program is funding early-stage truck platooning research and pilot deployment to determine the system-wide, public benefits and costs of platooning. In partnership with Volvo Trucks, Peterbilt, Peloton, and WABCO, the EAR program is funding research using simulation and testing to examine platoon aerodynamics, platoon formation, and potential fuel economy benefits.

Truck platoons are sets of heavy-duty trucks that are electronically coupled (using automation and connected vehicle technology) to allow them to drive in the same lane with short following distances, reducing fuel consumption and improving efficiency while using less highway lane capacity.

In May, the EAR program funded a demonstration in Los Angeles, California that provided visitors an opportunity to ride in a heavy truck that was part of a platoon of three trucks on a freeway. The speeds of the second and third truck were synchronized with cooperative adaptive cruise control.

FHWA is coordinating with others involved in truck platooning research and demonstrations, including the U.S. Department of Energy and the U.S. Department of Defense. It also working with those involved in the Smart City Challenge in Columbus, Ohio. Funded by the U.S. Department of Transportation, the project aims to extend two-vehicle platoons to arterial operations in combination with freight signal priority.

The EAR program attains broad scientific participation and extensive coverage of advanced ideas and new technologies by engaging stakeholders throughout its processes—not only in identifying and scoping topics, but also in ensuring the technical quality

of sponsored research through expert panels and in communicating research results.

For more information, contact David Kuehn, 202-493-3414, david.kuehn@dot.gov.

INFRASTRUCTURE

Technical Paper Wins Award at World Conference

Three researchers from the Turner-Fairbank Highway Research Center received a Best Paper Award at the World Conference on Pavement and Asset Management, which was held recently in Baveno, Italy. The paper, "Comparison of the Methodologies to Compute Pavement Surface Deflections from Traffic Speed Deflectometer Data," written by Mahdi Nasimifar, Senthil Thyagarajan, and Nadarajah Sivaneswaran, was one of only two recognized with this distinction. Over 240 papers were presented at the conference, ranging in topics from design and materials to economic, political, and environmental management strategies for pavements and asset management.

For more information, contact Katherine Petros, 703-493-3154, katherine.petros@dot.gov.

New TechBrief: "Analytical Method to Measure Water in Asphalt and its Application to Emulsion Residue Recovery"

In FHWA's TechBrief, "Analytical Method to Measure Water in Asphalt and its Application to Emulsion Residue Recovery" (FHWA-HRT-15-056), researchers observe that excess water in asphalt binders and pavement mixes can have a deleterious effect on pavement performance. The addition of water to binders through using warm and cold mix technologies highlights the need for accurately measuring water in asphalt. Also, increased water content of biologically derived binders and oils may be responsible for compatibility issues with petroleum-based products.

The TechBrief discusses how researchers developed a Karl Fischer titration method for



quantifying water in asphalt and asphalt emulsions that is accurate, quick, and highly sensitive. The method's detection limit is approximately 100 parts per million (ppm). Researchers tested Strategic Highway Research Program binders to assess the effectiveness of the method. Neat binder water content varied from 100 to 275 ppm water. They applied the method in the evaluation of three emulsion recovery procedures and noted that each procedure removed sufficient water for rheological measurement of the residues. More testing with the Universal Simple Aging Test plate vacuum oven method or more time in the oven may be necessary to ensure ruggedness for all asphalt emulsions.

This TechBrief is available to download at www.fhwa.dot.gov/publications/research/infrastucture/pavements/15056/index.cfm.

For more information, contact Jack Youtcheff, 202-493-3090, jack.youtcheff@dot.gov.

OPERATIONS

FHWA Discusses Automated Vehicle Research at IEEE Intelligent Vehicle Symposium

FHWA recently discussed its automated vehicle research activities during a presentation at the IEEE Intelligent Vehicle Symposium in Los Angeles, California that brought together professionals involved in standards development, algorithm development, robotics, and artificial intelligence.

The presentation focused on FHWA's recent efforts to conduct additional research and testing on connected automation systems that operate at intersections and on highways. It underscored the benefits of considering how automated vehicles are connected through communications to enable vehicles to operate more effectively in the system. The presentation also highlighted the new \$2 million effort to enhance and test the signalized intersection approach and departure application and the cooperative adaptive cruise control application.

FHWA is developing test plans and will begin testing in spring 2018 at the Aberdeen Proving Grounds.

For more information, contact Brian Cronin, 202-493-3269, brian.cronin@dot.gov.

Researchers Complete D2X Hub Proof of Concept Field Test

FHWA's Office of Operations Research and Development has completed the Device to Everything (D2X) Hub Proof of Concept Field Test, a project focused on evaluating the hub's ability to support the exchange of messages between connected mobile devices, vehicles, and intelligent transportation system (ITS) infrastructure. Testing was conducted from June 12 to 23 in Columbus, Ohio.

Funded by the ITS Joint Program Office, the D2X Hub will provide public agencies with a platform to facilitate the exchange of data to improve how they manage traffic and the safety and mobility of travelers using connected mobile devices. FHWA recently demonstrated D2X Hub capabilities to technical staff from its Ohio Division Office, the Ohio Department of Transportation, and the facilities of the City of Columbus at the Battelle and Ohio State University. The D2X Hub prototype and supporting documents are available to download at:

<https://www.itsforge.net/index.php/community/explore-applications#/45/135>.

For more information, contact, Jon Obenberger, 202-493-3265, jon.obenberger@dot.gov.

FHWA Participates in M Enabling Summit

FHWA's Office of Operations Research and Development participated in the M Enabling Summit, a conference in Washington D.C. that brought together professionals involved with accessible International Coding Technologies products, services, and consumer technologies. Titled, "Making Connected Things and Services Accessible for All," the event provided a platform for empowering technologies and



focused on next-generation innovations and breakthroughs for users of all abilities.

For more information, contact Mohammed Yousuf, 202-493-3199, mohammed.yousuf@dot.gov.

SAFETY

New Report: “Cooperative Adaptive Cruise Control Human Factors Study: Experiment 4- Preferred Following Distance and Performance in an Emergency Event”

FHWA’s report, “Cooperative Adaptive Cruise Control Human Factors Study: Experiment 4- Preferred Following Distance and Performance in an Emergency Event” (FHWA-HRT-17-024), presents human factors research to examine the effects of cooperative adaptive cruise control (CACC) on driver performance in a variety of situations. The report summarizes driving simulator experiments in which the driver was required to drive in a stream of vehicles. Participants experienced a vehicle merge in front of them and an emergency event that required driver intervention. The participants’ preferred following time gap did not significantly affect collision avoidance. However, those participants following at shorter distances were more likely to intervene more rapidly than those following at a far distance.

These findings support the idea that performance depends more on overall CACC following distance settings than with drivers’ personal preferences. This will allow CACC systems to implement a single following distance gap (or set of gaps based on vehicle physics). The results show that it is critical that drivers receive clear alerts when it is necessary to take over control of the vehicle. Without such measures, it is possible that CACC implementation may not result in improved roadway safety.

This report is available to download at www.fhwa.dot.gov/publications/research/safety/17024/index.cfm.

For more information, contact Brian Philips, 202-493-3468, brian.philips@dot.gov.

RECENT PERIODICALS

Public Roads—May/June 2017

This issue includes: Connected Vehicles: Coming Soon to a Road Near You; Slamming on the Brakes on a Mounting Problem; Where Can the Big Rigs Park?; and Riding Out the Storm.

It is available online via www.fhwa.dot.gov/publications/publicroads/17mayjun/index.cfm.

For more information, contact Lisa Shuler, lisa.a.shuler@dot.gov.

Innovator: Accelerating Innovation for the American Driving Experience—July/August 2017

This issue includes: Arizona’s First Prefabricated Bridge Improves Historic Route 66; Integrating Permitting Processes to Speed Up Project Delivery; The Power of People in Advancing Innovation; Road Safety Audit Helps Missouri Target Safety Investments; Using Ultra-High Performance Concrete to Build Bridges Better; States Innovate!; and Events.

The issue is available online via www.fhwa.dot.gov/innovation/innovator/issue61/3dIssue/.

For more information, contact Nichole Causey, nichole.causey@dot.gov.

LINKS

Turner-Fairbank Highway Research Center: www.fhwa.dot.gov/research/

Resource Center: www.fhwa.dot.gov/resourcecenter/

National Highway Institute: www.nhi.fhwa.dot.gov/home.aspx



Please forward this newsletter to others you think might find it interesting and/or useful.

Suggestions may be submitted to:

FHWA_Now@fhwa.dot.gov.

