

FHWA R&T Now

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

May/June 2016

POLICY & PARTNERSHIPS

FHWA-Funded Projects for NSTSCE Featured in Report

FHWA recently published a report that summarizes the projects it funded for the National Surface Transportation Safety Center for Excellence (NSTSCE), which was established in 2006 at the Virginia Tech Transportation Institute (VTTI) by authorization in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. FHWA was an important founding member of NSTSCE, chaired the original stakeholders committee for several years, and maintained membership in NSTSCE until June 2014.

NSTSCE's efforts were structured around a diverse stakeholders group: the Federal Government (FHWA and the Federal Motor Carrier Safety Administration), State Government (the Virginia Department of Transportation), academia (VTTI), and the private sector (General Motors® and Travelers® Insurance). With FHWA's guidance and financial contribution, 58 projects were conducted that support NSTSCE's mission of developing and disseminating advanced transportation safety techniques and innovations in both rural and urban communities. This report, "Summary of Projects Funded by the Federal Highway Administration for the National Surface Transportation Safety Center for Excellence from July 2006 to June 2014," is organized according to NSTSCE's five research focus areas: enhancing driver performance, examining roadway lighting and delineation, addressing age-related issues, addressing issues of fatigue, and providing outreach. Each project contains a brief, general description about its methods and findings and identifies deliverables.

To access the report, visit www.fhwa.dot.gov/publications/research/safety/16014/index.cfm.

ADVANCED RESEARCH

ARPA-E Announces \$30 million in Funding for NEXTCAR Program

The U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) announced \$30 million in funding for a NEXT-Generation Energy Technologies for Connected and Automated on-Road-vehicles (NEXTCAR) Program. The program will explore the development of new and emerging vehicle dynamic and powertrain control technologies that can reduce the energy consumption of future vehicles through the use of connectivity and vehicle automation. The ARPA-E NEXTCAR Program will look at transformative technological solutions that will enable at least an additional 20 percent reduction in the energy consumption of future connected and automated vehicles. The program builds on connected and automated vehicle concepts supported by FHWA's



Exploratory Advanced Research (EAR) Program with technical leadership from FHWA's Office of Operations Research and Development.

For more information about the program, contact Taylor Lochrane, 202-493-3293, taylor.lochrane@dot.gov. For information about the EAR Program, contact David Kuehn, 202-493-3414, david.kuehn@dot.gov.

Wearable Sensors in Transportation

The EAR Program recently published a report on the potential of mobile and wearable sensors for transportation research. Wearable sensors are small enough to be carried in smart phones or on fitness bracelets and can collect data on environmental, physiological, activity, and location variables. This report, "Wearable Sensors in Transportation—Exploratory Advanced Research Program Initial Stage Investigation," summarizes an initial stage investigation into wearable sensors for transportation research applications. As recent advances in hardware, connectivity, and data analysis have converged, the public are beginning to purchase more technology mobile sensors that can improve existing methods of transportation research and open up avenues for new research. This document is available to download at www.fhwa.dot.gov/advancedresearch/pubs/16034/index.cfm.

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

Video Analytics Workshop Introduces New Safety Analysis Tools to Stakeholders

With support from the Volpe National Transportation Systems Center, FHWA's EAR Program and its Office of Safety Research and Development recently hosted a workshop on presenting video analytics tools for analyzing safety data from the Second Strategic Highway Research Program. The event brought together over 75 stakeholders (including highway safety researchers and researchers from other industries) and highlighted recent research

results. Participants discussed progress in the development of automated tools to assist researchers in the use of large video data files.

Further information about video analytics research is available at www.fhwa.dot.gov/advancedresearch/pubs/15025/index.cfm.

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

INFRASTRUCTURE

Chemistry Lab to Advance X-ray Fluorescence Analysis

FHWA's Chemistry Laboratory at the Turner-Fairbank Highway Research Center (TFHRC) recently completed a study of 102 samples of asphalt binders that the Ohio Department of Transportation sent to be analyzed. To date, the Chemistry Lab has analyzed 1,549 samples of asphalt binders from 43 State and Federal agencies. Researchers in the lab have discovered that 11 percent of these samples contained recycled engine oil bottoms (REOB), 11 percent contained phosphoric acid, and 3 percent contained ground tire rubber. REOB is the liquid residue left over from refining used engine oils. Although further research is needed to determine the effect REOB might have on pavement life, some States have banned or restricted its use in asphalt.

To examine the asphalt binder samples, researchers employed a technique called X-ray Fluorescence Analysis (XRF), a method widely used by State departments of transportation (DOTs) to analyze cement. The Chemistry Lab is currently working with 12 State DOTs and four testing labs on a round robin study to refine its XRF technique, which will be offered to the American Association of State Highway and Transportation Officials (AASHTO) as a standard test method that industry can use.

For more information, contact Terry Arnold, 202-493-3305, terry.arnold@dot.gov.



FHWA Reviews Progress of LTPP Program at Committee Meeting

FHWA recently met with the Long-Term Pavement Performance (LTPP) Committee to review the progress of the LTPP program. The meeting consisted of briefings by LTPP staff followed by questions and answers and an open discussion. Key discussion topics included an update on highway legislation and its impact on the program, changes in FHWA leadership, a review of the LTPP Data Analysis Plan, and LTPP book distribution.

Other topics discussed included:

- FHWA's response to committee letter report #36.
- Pooled fund projects.
- LTPP outreach activities.
- LTPP State Coordinators Task Group.
- LTPP Information Management System.
- The status and schedule for LTPP InfoPave™.
- The release of LTPP Climate and LTPPBind Tools.
- The International Data Analysis Contest.
- New LTPP experiments.

For more information, contact Deborah Walker, 202-493-3068, deborah.walker@dot.gov.

Journal to Publish FHWA Report on Pavement Safety Performance

The International Journal of Pavement Engineering recently accepted a paper that discusses an FHWA study that uses crash data to show how pavements contribute to safety. Detailed in the report, "Evaluation of Pavement Safety Performance," the study aimed to isolate the effects of various low-cost pavement treatments on roadway safety. Researchers retrospectively examined pavement safety performance, looking back at crash data before and after treatments were installed. They analyzed both flexible and rigid pavement treatments, with the majority typically used for pavement preservation or minor rehabilitation

purposes, with one exception, high-friction surfacing, which is typically applied as a spot safety treatment. Conducted as part of Phase VI of FHWA's Evaluation of Low-Cost Safety Improvements Pooled Fund Study, this research has the potential to help State DOTs and other transportation agencies improve roadway safety by providing crash modification factors and benefit-cost ratios for different pavement treatments.

The *International Journal of Pavement Engineering* publishes cutting edge research and development related to pavement engineering, as well as project reviews, case studies, and special topics of importance and interest to the pavement community. "Evaluation of Pavement Safety Performance" (FHWA-HRT-14-065) is available at <https://www.fhwa.dot.gov/publications/research/safety/14065/index.cfm>.

For more information, contact Roya Amjadi, 202-493-3383, roya.amjadi@dot.gov.

OPERATIONS

Senator Cornyn Briefed on FHWA's CACC Testing, Colonel Bodrick Takes Part in Platooning Experiment at Aberdeen Test Center

On April 15, 2016, U.S. Senator John Cornyn (R-TX) visited the U.S. Army's Test and Evaluation Command at the Aberdeen Proving Ground in Maryland, where the Aberdeen Test Center is located. Unmanned Vehicle Division Chief Scott Savoie briefed the Senator on FHWA's Cooperative Adaptive Cruise Control (CACC) testing, which the U.S. Army is supporting through a recent interagency agreement with TFHRC. Savoie presented Senator Cornyn with the design of the connected vehicle system and showed him the components in the vehicle. The visit was organized to inform the Senator about U.S. Army robotics and autonomous research being tested at the Aberdeen Test Center.



Six days later, Colonel Morris Bodrick, Commander of the U.S. Army Aberdeen Test Center, participated in one of the experiments that FHWA researchers and engineers from the Volpe National Transportation Systems Center are conducting to evaluate CACC at the Aberdeen Test Center. The experiment featured four vehicles, traveling between 30 and 45 miles per hour, platooning at different gaps and acceleration/declaration rates. The tests highlight FHWA's positive partnership with the U.S. Army and underscore the capabilities and success of FHWA researchers and engineers through working at the Saxton Transportation Operations Laboratory at TFHRC.

For more information, contact Taylor Lochrane, 202-493-3293, taylor.lochrane@dot.gov.

ATTRI and NIDILRR Collaborate on FOA

The U.S. Department of Transportation's Accessible Transportation Technologies Research Initiative (ATTRI) and the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR) are collaborating on a Funding Opportunity Announcement (FOA) for robotics and automation technology application development to support independent mobility.

NIDILRR's grant, "Disability and Rehabilitation Research Projects (DRRP) Program: Accessible Transportation," aims to advance the application of automation and robotics to enhance accessible transportation for travelers with mobility, vision, hearing, and cognitive disabilities and improve opportunities for a seamless travel chain that meets their diverse needs. Further details about the grant are available at https://forecast.grantsolutions.gov/index.cfm?switch=grant.view&gff_grants_forecastInfoID=73886.

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

Subcommittee Proposes 21 Recommendations

As part of the Department of Labor's State Exchange on Employment and Disability (SEED), the Council of State Governments (CSG) and the National Conference of State Legislatures (NCSL) established the National Task Force on Workforce Development for People with Disabilities. The initiative provides an opportunity for State leaders to identify barriers to employment at the State level for people with disabilities and provide legislative and administrative policy recommendations to address these barriers.

FHWA's Mohammed Yousuf is serving as an advisor on the Task Force's Transportation, Technology and Other Employment Supports Subcommittee, which is developing recommendations that address transportation and technology related issues. The subcommittee, which recently met in Washington, DC, has proposed 21 new recommendations. These recommendations, and those of three other subcommittees, will be included in a final report to be completed in December. The report will also include a State engagement plan to assist in the implementation of these recommendations.

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

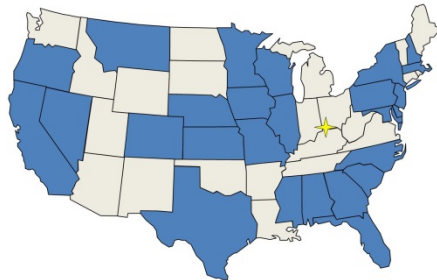
SAFETY

TCD Pooled Fund Consortium Hold Annual Meeting

Members of FHWA's Traffic Control Device (TCD) Pooled Fund Consortium recently held their annual meeting in Cincinnati. The Ohio, Indiana, Tennessee, and Kentucky DOTs attended the meeting as guests and experienced the benefits of being a contributing member. The Alabama, Delaware, and Montana DOTs have recently joined, increasing State DOT membership to 26. Other current members include FHWA's Office of Safety and Office of Operations, the City of Los Angeles DOT,



Broward County, Florida DOT, the American Traffic Safety Services Association, and the International Bridge, Tunnel, and Turnpike Association. In the map below, member States are shown in blue.



The annual meeting allows members to gather and view presentations of ongoing and completed research projects funded by the pooled fund and managed by FHWA. Members also discuss TCD-related issues in their State and region and they vote on the next round of project funding. The pooled fund and the annual meeting provide an excellent platform for FHWA to be aware of State and local level issues.

The purpose of the TCD Pooled Fund Consortium is to fund the systematic evaluation of novel TCDs, employing a consistent process that addresses safety, human factors, and operations issues for each proposed TCD concept. TCD Pooled Fund research will address TCD issues identified by local and State jurisdictions, industry, and other transportation safety organizations. These efforts will comply with the Manual on Uniform Traffic Control Devices (MUTCD) rule-making process, helping to incorporate novel TCDs into the MUTCD.

For more information, contact Jim Shurbutt, 202-493-3420, jim.shurbutt@dot.gov.

Technical Brief Discusses ICWSs Study

FHWA recently published the technical brief, "Safety Evaluation of Intersection Conflict Warning Systems (ICWS)." This document discusses an evaluation of ICWSs conducted under the Evaluation of Low Cost Safety Improvements Pooled Fund Study, which currently has 40 State members. The strategy

that was used intended to reduce the frequency of crashes by alerting drivers to conflicting vehicles on adjacent approaches at unsignalized intersections.

Researchers obtained geometric, traffic, and crash data for four-legged, rural, two-way, stop-controlled intersections with ICWS installations in Minnesota, Missouri, and North Carolina. To account for potential selection bias and regression-to-the-mean, researchers conducted an empirical Bayes before-after analysis using reference groups of similar four-legged, rural, two-way stop-controlled intersections without ICWS installation.

The analysis also controlled for changes in traffic volumes over time and time trends in crash counts unrelated to the strategy. The combined results for all States indicated statistically significant crash reductions for most crash types for two-lane at two-lane intersections and for four-lane at two-lane intersections. This document is available to download at www.fhwa.dot.gov/publications/research/safety/15076/index.cfm.

For more information, contact Roya Amjadi, 202-493-3383, roya.amjadi@dot.gov.

ELCSI-PFS Meeting Brings Together States

FHWA's Technical Advisory Committee for the Evaluation of Low-Cost Safety Improvements Pooled Fund Study (ELCSI-PFS) recently held its annual meeting at TFHRC. The purpose of the meeting, which brought together 34 of 40 State participants, was to set a research agenda, share State members' experiences and perspectives, and examine issues facing the Nation's roadways (among other technical safety exchanges). State members discussed safety challenges and the advancement of statistical methodologies and tools to advance safety research. The meeting featured presentations and discussions about intersections, lane departures, wrong way driving, speed concerns, future directions in research, and the impact of



the pooled fund study on advancing safety and the state of the practice.

Established by FHWA in 2004 to measure low-cost safety improvement strategies, the ELCSI-PFS conducts research within FHWA's Development of Crash Modification Factors (DCMF) program, a comprehensive, long-term safety research effort. The goal of the DCMF, created in November 2012 to support and complement the ELCSI-PFS, is to save lives by identifying new safety countermeasures that effectively reduce crashes. The DCMF aims to promote these countermeasures for nationwide installation by providing measures of their safety effectiveness, including benefit-to-cost ratios obtained through research.

For more information, contact Roya Amjadi, 202-493-3383, roya.amjadi@dot.gov.

RECENT PERIODICALS

Public Roads—March/April 2016

This issue includes: Toward More Flexible Design; Environmental Justice: The New Normal for Transportation; The World of Tomorrow Is Today; Spotlighting Speed Feedback Signs; and The Evolution of Geometric Design. It is available online via www.fhwa.dot.gov/publications/publicroads/16marapr/index.cfm.

For more information, contact TaMara McCrae, tamara.mccrae@dot.gov.

Innovator: Accelerating Innovation for the American Driving Experience—May/June 2016

This issue includes: Alabama's First Bridge Slide Exceeds Expectations; States Explore New Uses for 3D Models and Data; Diverging Diamond Interchanges Boost Safety Nationwide; Stakeholder Partnering; FHWA Incentives Help States Pursue Innovation; States Innovate!; and Events! The issue is available online via www.fhwa.dot.gov/innovation/innovator/issue54/3dIssue/.

For more information, contact Kathleen Bergeron, kathleen.bergeron@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

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