

# FHWA R&T Now

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

**September 2014**

## **GENERAL/ADMINISTRATIVE**

### **SHRP2 Announces Recipients of Fourth Round of Implementation Assistance Funding**

The Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) recently announced the recipients of funding under the fourth round of the Second Strategic Highway Research Program's (SHRP2) Implementation Assistance Program (IAP). Organizations in 37 States will receive funds for project implementation and technical assistance. Round 4 featured the first SHRP2 opportunities in the safety area. The joint FHWA/AASHTO IAP began in 2013 and has thus far put 24 SHRP2 Solutions into the hands of transportation agencies on approximately 200 projects.

The application period for Round 5 will begin on January 16, 2015, with selections announced in early April. Round 6 is planned for June 2015.

For more information, contact Carin Michel, 410-962-2530, [carin.michel@dot.gov](mailto:carin.michel@dot.gov), or visit [www.fhwa.dot.gov/goshrp2](http://www.fhwa.dot.gov/goshrp2).

## **ADVANCED RESEARCH**

### **Workshop on Visibility Held at Turner-Fairbank**

On August 13 and 14, 2014, FHWA's Exploratory Advanced Research (EAR) Program, Office of Safety Research and Development, and Office of Safety hosted a workshop on visibility at Turner-Fairbank Highway Research Center (TFHRC). The workshop aimed to identify opportunities from advances in science and engineering that could apply to highway safety; identify gaps in the current transportation research field of visibility; provide direction to the broader visibility program; and identify novel technologies or methods that could be used in highway transportation visibility research.

The event brought together individuals who conduct visibility research and allowed them to discuss innovative research ideas, tools, and technologies in the field. The information gathered from this meeting is expected to help FHWA better gauge the future direction of its visibility program. Some of the topics included lighting the infrastructure for roadways, intersections, and pedestrians; interaction of vehicle lighting with traffic control devices (retroreflectivity); as well as visibility for vehicles of the future and connected vehicles.

A summary report of the workshop will be published soon. For more information about the project, contact Michelle Arnold, 202-493-3990, [michelle.arnold@dot.gov](mailto:michelle.arnold@dot.gov). For more information about the



EAR Program, contact David Kuehn, 202-493-3414, [david.kuehn@dot.gov](mailto:david.kuehn@dot.gov).

#### **Mechanisms of Hydration Meeting Held at NIST**

On September 2, 2014, the EAR Program held a project meeting on the topic, "Mechanisms of Hydration and Setting of Ordinary Portland Cement in Simple and Complex Systems." The meeting, which took place at the National Institute of Standards and Technology (NIST), allowed researchers and stakeholders to review the progress of the initial research phase.

The focus of this FHWA project is to provide data from physical measurements and observations of very early age chemical reactions in the transition from the plastic, fresh form of concrete (that can be manipulated and consolidated), through the initial and final set, to hardened concrete that is developing measurable strength. This real-time, molecular-level data is being used to improve and calibrate NIST's "HydratiCA" model of early age hydration and subsequent microlevel structural development in concrete for paving and other transportation structures.

An improved hydration model will be a software tool that is powerful, but simple enough to be incorporated in other concrete design, proportioning, and troubleshooting software. The EAR project is being conducted by Princeton University with Oklahoma State University, University of California Santa Barbara, Rice University, and W.R. Grace.

For more information about the project, contact Richard Meininger, 202-493-3191, [richard.meininger@dot.gov](mailto:richard.meininger@dot.gov). For more information about the EAR Program, contact David Kuehn, 202-493-3414, [david.kuehn@dot.gov](mailto:david.kuehn@dot.gov).

#### **EAR Program Hosts Workshop to Review VASTO Project Results**

On August 21, 2014, the EAR Program hosted a workshop at TFHRC to review results from the project, "VASTO--Evolutionary Agent System for

Transportation Outlook." The goal of this EAR supported research is to develop an efficient simulation-based traffic analysis modeling system that seamlessly integrates the agent based modeling and simulation methodologies with existing and emerging simulation tools for exploring untapped possibilities of traffic modeling and analysis functionalities. The project was conducted by the University of Arizona with George Mason University and the Maricopa Council of Governments.

For more information about this project, contact David Yang, 202-493-3284, [david.yang@dot.gov](mailto:david.yang@dot.gov). For more information about the EAR Program, contact David Kuehn, 202-493-3414, [david.kuehn@dot.gov](mailto:david.kuehn@dot.gov).

#### **Summary Report: Utilizing Various Data Sources for Surface Transportation Human Factors Research**

This report summarizes a 2-day EAR Program workshop to discuss data sources for surface transportation human factors research. Held on November 6 and 7, 2013, the workshop was designed to assess the increasing number of different datasets and multiple ways of collecting data that can be used to increase understanding of human errors. Participants discussed how to resolve controversies among different datasets and how to choose the best datasets for particular applications. Expert speakers shared their research experience of using various datasets from sources such as driving simulators, field studies and field operational tests, and naturalistic driving studies. The expert panel identified several potential research topics to address challenges that must be overcome to integrate data from multiple sources.

The document is available at [www.fhwa.dot.gov/advancedresearch/pubs/14077/index.cfm](http://www.fhwa.dot.gov/advancedresearch/pubs/14077/index.cfm). For more information about the project, contact David Yang, 202-493-3284, [david.yang@dot.gov](mailto:david.yang@dot.gov). For more information about the EAR Program, contact David Kuehn, 202-493-3414, [david.kuehn@dot.gov](mailto:david.kuehn@dot.gov).



### **Summary Report: Use of Vehicle Noise for Roadways, Bridge, and Infrastructure Health Monitoring**

This report covers the workshop, "Use of Vehicle Noise for Roadways, Bridge, and Infrastructure Health Monitoring," held on August 20 and 21, 2013. The objectives of the workshop were to discuss the possibilities of using vehicle noise for roadways, bridge, and infrastructure health monitoring and to use a noise-based data collection system that could assess infrastructure for proactive and efficient infrastructure maintenance and operations, higher infrastructure safety, and less traffic congestion.

This report is available at [www.fhwa.dot.gov/advancedresearch/pubs/14059/14059.pdf](http://www.fhwa.dot.gov/advancedresearch/pubs/14059/14059.pdf). For more information about the workshop, contact Mohammed Yousuf, 202-493-3199, [mohammed.yousuf@dot.gov](mailto:mohammed.yousuf@dot.gov). For more information about the EAR Program, contact David Kuehn, 202-493-3414, [david.kuehn@dot.gov](mailto:david.kuehn@dot.gov).

## **INFRASTRUCTURE**

### **Report: Mitigation of Wind-Induced Vibration of Stay Cables: Numerical Simulations and Evaluations**

The objective of this report is to supplement the existing knowledge base on some of the outstanding issues of stay cable vibrations and develop technical recommendations that may be incorporated into design guidelines. The report discusses a project focused on the effectiveness of cable crossties, external dampers, and the combined use of crossties and dampers. Finite element simulations were carried out on the stay cable systems of constructed stay cable bridges under realistic wind forces in order to address these issues. Explicit time-history analysis enabled the performance of stay cable systems with different mitigation strategies to be assessed and compared for their relative advantages and disadvantages.

This report will be of interest to bridge engineers, wind engineers, and consultants involved in the design of cable-stayed bridges. It is available at

[www.fhwa.dot.gov/publications/research/infrastructure/structures/bridge/14049/index.cfm](http://www.fhwa.dot.gov/publications/research/infrastructure/structures/bridge/14049/index.cfm). For more information, contact Harold Bosch, 202-493-3031, [harold.bosch@dot.gov](mailto:harold.bosch@dot.gov).

### **Report: Fatigue Testing of Galvanized and Ungalvanized Socket Connections**

The fatigue resistance of welded traffic signal support structure details is an ongoing research topic being addressed at multiple universities primarily through state funding mechanisms. Researchers have hypothesized that some premature failures of these structures were caused by cracking in the zinc metal bath during galvanizing. This led to a fatigue testing matrix of socket connection geometries in a galvanized and ungalvanized state. Specimens were attained from two different pole manufacturers and fabricated using their own techniques.

This report describes how the specimens were tested along with the results showing the difference in fatigue life between galvanized and ungalvanized structures. It is available at [www.fhwa.dot.gov/publications/research/infrastructure/bridge/14066/14066.pdf](http://www.fhwa.dot.gov/publications/research/infrastructure/bridge/14066/14066.pdf). For more information, contact Justin Ocel, 202-493-3080, [justin.ocel@dot.gov](mailto:justin.ocel@dot.gov).

## **SAFETY**

### **FHWA Releases 2014 Version of Interactive Highway Safety Design Model**

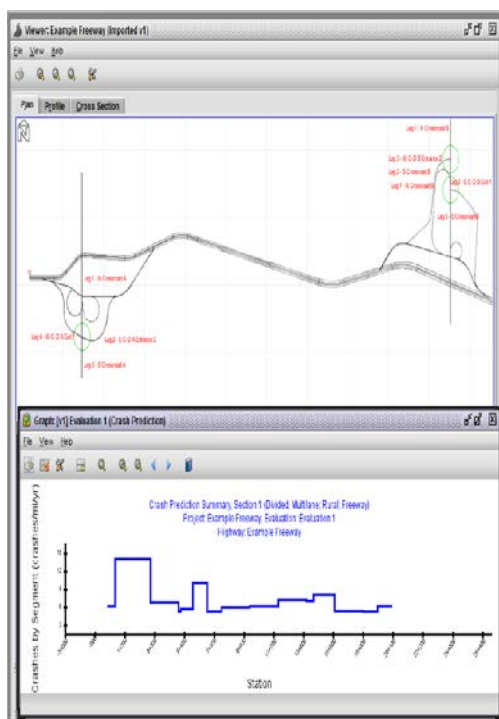
On September 9, 2014, FHWA released version 10.0.0 of the Interactive Highway Safety Design Model (IHSDM), which implements AASHTO's Highway Safety Manual (HSM) Part C Predictive Methods and includes the following major enhancements:

- An extension of Crash Prediction Module site-based data input and analysis capabilities to freeway ramps, collector-distributor (C-D) roads, and ramp terminals. Similar capabilities were



previously implemented for rural two-lane highways, rural multilane highways, urban/suburban arterials, and freeway segments.

- An extension of the IHSDM Calibration Utility to freeway ramps, C-D roads, and ramp terminals. The Calibration Utility assists agencies in implementing the calibration procedures described in the Appendix to HSM Part C.



### The IHSDM Crash Prediction Module implements Highway Safety Manual Part C Predictive Methods.

First released in 2003, IHSDM has six evaluation modules: crash prediction, policy review, design consistency, intersection review, traffic analysis, and driver/vehicle. The modules provide quantitative safety performance measures, check designs against applicable guidelines, and diagnose factors contributing to safety.

IHSDM, which is supported by FHWA's Geometric Design Laboratory at TFHRC, covers two-lane rural highways, multilane rural highways, urban and suburban arterials, freeway segments, and ramps/interchanges. It is

an essential resource in support of AASHTO's Highway Safety Manual, Part C: Predictive Methods.

The software is available for free download at [www.ihsdm.org](http://www.ihsdm.org). For more information, please contact Clayton Chen, 202-493-3054, [clayton.chen@dot.gov](mailto:clayton.chen@dot.gov).

### Report: Design Criteria for Adaptive Roadway Lighting

Adaptive lighting is a design methodology where the light output of a system is adjusted as traffic conditions change. This report provides the background and analysis used to develop criteria for the implementation of an adaptive lighting system for roadways. Based on the analysis of crashes and real-world lighting performance, a series of criteria and the associated design levels have been developed to provide an approach for light level selection and the adjustability of the light level based on the needs of the driving environment. The data, the analysis, and the developed methodology are all considered in the document.

Results from this research are expected to assist jurisdictions in making sound safety-based decisions when considering adaptive lighting approaches. This analysis of real-world lighting data is intended to serve as the foundation for future roadway lighting analyses.

This report is available at [www.fhwa.dot.gov/publications/research/safety/14051/index.cfm](http://www.fhwa.dot.gov/publications/research/safety/14051/index.cfm). For more information, contact Craig Thor, 202-493-3338, [craig.thor@dot.gov](mailto:craig.thor@dot.gov).

### RECENT PERIODICALS

#### **Public Roads—September/October 2014**

This issue includes: Your Go-To Data Source for Roadway Safety Research; The ABCs of Designing RCUTs; Celebrating a Century of Cooperation; A Crowning Achievement; The Case for Cutting-Edge Construction in Puerto Rico.



It is available online via [www.fhwa.dot.gov/publications/publicroads/14sepoct/index.cfm](http://www.fhwa.dot.gov/publications/publicroads/14sepoct/index.cfm). For more information, contact TaMara McCrae, [tamara.mccrae@dot.gov](mailto:tamara.mccrae@dot.gov).

***Innovator: Accelerating Innovation for the American Driving Experience—July/August 2014***

This issue includes: Arizona Captures Local Audience with Novel Approach; Wisconsin Builds a Winner in Traffic Incident Management; CM/GC Benefits Oregon Bridge Project; 3-D Workshop Helps Arkansas Get Ready for Change; Fast Moves: Colorado Accelerates Bridge Repair; First Responders Learn Lifesaving Teamwork; States Innovate!; Calendar.

The issue is available online via [http://www.fhwa.dot.gov/hfl/innovator/e-version/issue\\_43/](http://www.fhwa.dot.gov/hfl/innovator/e-version/issue_43/). For more information, contact Kathleen Bergeron, [kathleen.bergeron@dot.gov](mailto:kathleen.bergeron@dot.gov).

**Links:**

**Turner-Fairbank Highway Research Center:**

<http://www.fhwa.dot.gov/research/>

**Resource Center:**

<http://www.fhwa.dot.gov/resourcecenter/>

**National Highway Institute:**

<http://www.nhi.fhwa.dot.gov/home.aspx>

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Suggestions may be submitted to: [FHWA\\_Now@fhwa.dot.gov](mailto:FHWA_Now@fhwa.dot.gov)

