

FHWA R&T Now ~ May 2010 ~

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

GENERAL/ADMINISTRATIVE

Every Day Counts Initiative

On May 22 Federal Highway Administration (FHWA) Administrator Victor M. Mendez announced the innovative technologies selected for accelerated deployment under his new *Every Day Counts* (EDC) initiative at the American Association of State Highway and Transportation (AASHTO) Spring Meeting in Natchez, Mississippi. The technologies selected include: Warm Mix Asphalt, Adaptive Signal Control Technology, Geosynthetic Reinforced Soil Integrated Bridge Systems, Safety Edge, and Prefabricated Bridge Elements and Systems. FHWA will host a series of strategic regional summits this fall to promote the deployment efforts and to more broadly engage those who will be involved in implementing the various technologies as standard practices. During the meeting Mendez informed the group “The Nation’s transportation agencies and industry have long been associated with innovation. The difference I want us to make together is the commitment to focus on rapid deployment of proven solutions that can make a difference. Our customers, the taxpayers, deserve no less.”

Under the direction of Deputy Administrator Greg Nadeau, Associate Administrator of Research & Technology, Michael Trentacoste, and Director of Technical Services, Amy Lucero, innovation deployment teams held planning retreats during March and early April 2010 to develop draft implementation plans that address each technology and their potential benefits. Performance measures, goals and outcomes, methods for evaluation, a deployment schedule and strategies, marketing and communication plans, and a proposed budget were incorporated into the detailed deployment plans. These plans will be finalized in the next few months by multidisciplinary innovation deployment teams including participants from headquarters, field offices, States and key stakeholders. In coordination with States, industry, and other key stakeholders these plans will be used to mainstream the technologies in an effort to make them standard practices where appropriate and to evaluate the benefits derived through their implementation. Accelerating these innovative technologies as a component of the EDC initiative will provide an opportunity to build FHWA’s capacity, in concert with its stakeholders, to identify best practices and address some of the most challenging highway issues facing the Nation.

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Planning for SHRP 2 Implementation

The first project research results are just coming out from the second Strategic Highway Research Program (SHRP 2). FHWA is actively working with the Transportation Research Board (TRB) and AASHTO to guide the pre-implementation planning phase of SHRP 2. To that end, a steering group comprised of representatives from FHWA, National Highway Traffic Safety Administration (NHTSA), AASHTO and TRB has adopted a framework that includes a three-pronged approach to collaborative implementation planning. This planning framework includes: (1) foundational activities to educate and position our Agencies, state departments of transportation and industry for the deployment of SHRP 2 research results; (2) initiatives to facilitate the deployment of early products; and (3) preparations for the establishment of a formal SHRP 2 Implementation Program, upon reauthorization. TRB will continue to manage the SHRP 2 research and pre-implementation activities, as authorized by the extension of the Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users through December 31, 2010. TRB has recommended that FHWA be designated the principal implementation agent for SHRP 2 in the next highway reauthorization legislation.

Within FHWA, SHRP 2 Implementation Team Director Margie Sheriff has been building awareness of SHRP 2 and its anticipated products outcomes, engaging all pertinent research, program and field staff in plans for integrating SHRP 2 implementation into FHWA processes. FHWA and the NHTSA have also been collaborating on key issues

that will guide the SHRP 2 Safety research and implementation. SHRP2 implementation is a priority within FHWA's FY2010 and FY2011 Strategic Implementation Plans.

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ADVANCED RESEARCH

FHWA EAR Program Initiates Research in New Technologies for Developing Renewable Energy in the Public Right-of-Way

FHWA entered into a cooperative agreement with the University of Nebraska–Lincoln to explore development of a novel Roadway Wind/Solar Hybrid Power Generation and Distribution System (RHPS) with the goal of achieving energy-plus roadways. “Energy-plus” stands for annual energy consumption that is less than the energy produced. RHPS represents a dramatic change in the role of the public right-of-way from an energy consumer to an energy producer and, therefore, will aid in reducing transportation system operating costs. RHPS would be a low footprint, intelligent and multi-layer power system designed for integration into urban and suburban areas, reducing the need for new distribution networks. This award is a result of a Broad Agency Announcement (BAA) for Exploratory Advanced Research (EAR) Proposals issued in the spring of 2009. For more information about the project, contact: eric.weaver@dot.gov 202-493-3153

For more information about the EAR Program, contact:

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FHWA EAR Program Initiates Two Studies in Nanoscale Sensors for Structural Health

FHWA entered into a contract with The University of Minnesota to develop a new intelligent self-sensing concrete pavement that can monitor its own structural health by continuously detecting internal stress level changes in the pavement. Compared to the current pavement health monitoring technologies, the proposed approach has several advantages including low cost, large area coverage, long service life, little required maintenance, and no structural degradation because of the embedment of external sensors. If successful, the proposed work will have significant impacts on the field of pavement structural health monitoring. In the proposed pavement structure, the concrete is mixed with carbon nanotubes (CNTs). The CNTs’ piezoresistive property will enable the concrete to detect changes in the mechanical stress. CNTs can also work as the concrete reinforcement elements that could enhance the strength and durability of the pavement structure. This award is a result of a national BAA for EAR Proposals issued in the spring of 2009.

FHWA also entered into a cooperative agreement with the Georgia Tech Research Foundation that will investigate self-powered, wireless sensors for the real-time monitoring of potentially dangerous cracks in steel bridges. The sensing elements are made by inkjet-printing nanoparticles onto flexible organic substrates. CNT-based materials will be explored for scavenging solar and vibrational energy to power the sensor nodes. For convenient access to the sensor data over the Internet, multi-scale wireless communication approaches are proposed. This award is a result of a national BAA for EAR Proposals issued in December 2008. For more information about these projects, contact: wendy.mcabee@dot.gov 202-493-3064

For more information about the EAR Program, contact:

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Fact Sheet: Mapping the Future of Hydraulics Research: A Strategic Plan to Protect Highway Infrastructure

Nearly 60 percent of failed bridges in recent years have succumbed to hydraulic forces. As our highway infrastructure ages and the risk of bridge and culvert failures rises, the need to predict, detect, and prevent water-related damage grows more urgent. To stimulate advanced research in this area, FHWA's EAR Program convened the First International Hydraulics Research Forum, gathering researchers and other stakeholders to identify research priorities.

For more information or to discuss potential advanced hydraulics research topics, contact Kornel Kerenyi, FHWA Office of Infrastructure Research and Development, at:

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<http://www.fhwa.dot.gov/advancedresearch/pubs/10034/index.cfm>

Fact Sheet: Nanoscale Approaches for Highway Research

The Federal government spent approximately \$1.5 billion on nanoscale research in FY 2008. Work directly related to highway research represented less than one-tenth of 1 percent of that figure. The FHWA is working closely with government, industry, academic, and international partners to push forward a strategic investment in nanoscale research. FHWA's EAR Program has been investigating nanoscale research conducted in relation to highways, and this process led to a March 2009 workshop involving nearly two dozen experts from academia and other Federal programs. These experts met to share their understanding of nanoscale research and to learn about key highway research issues in infrastructure, safety, operations, and environment.

For more information on FHWA's strategic direction for nanoscale research and future funding opportunities, contact:

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<http://www.fhwa.dot.gov/advancedresearch/pubs/10033/index.cfm>

Fact Sheet: Beyond Traffic Signals: A Paradigm Shift Intersection Control for Autonomous Vehicles

Traffic congestion costs the Nation billions of dollars each year in wasted fuel and lost productivity. Traditional traffic control systems cannot keep pace with this growing problem, but systems that work with self-driving vehicles may afford a more radical approach. "Intersection Control for Autonomous Vehicles," an EAR Program project, is pursuing a new way to keep traffic moving. This project, awarded by the FHWA in 2008, is being conducted at the University of Texas at Austin.

For more information on this EAR Program project, contact David Yang, FHWA Office of Operations Research and Development, at:

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<http://www.fhwa.dot.gov/advancedresearch/pubs/10023/index.cfm>

INFRASTRUCTURE

Transportation Infrastructure Reconnaissance Team Goes to Chile

On February 27, 2010, a devastating earthquake, measuring 8.8 on the Richter scale, struck off the coast of the Maule region of Chile affecting a large area including the cities of Concepcion and Santiago, the Chilean capital. A

comparative study of the affected infrastructure could lead to improvements in design codes and standards to prevent similar damages, increase resilience, and maintain sustainable infrastructure. To conduct this investigation, the FHWA Office of Research, Development, and Technology deployed a team to study a select number of bridges and tunnels in Chile.

<http://www.fhwa.dot.gov/research/topics/infrastructure/structures/tirtreport.cfm>

Report: Design and Evaluation of Jointed Plain Concrete Pavement with Fiber Reinforced Polymer Dowels

This study evaluates fiber reinforced polymer (FRP) dowel bars as load transferring devices in jointed plain concrete pavement (JPCP) under HS25 static and fatigue loads and compares their response with JPCP consisting of steel dowels.

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<http://www.fhwa.dot.gov/publications/research/infrastructure/pavements/06106/index.cfm>

Demonstration Project 39—Asphalt Recycling

The pressing need to conserve energy and minimize costs in highway construction requires that special effort be made to identify and make the maximum use of procedures that will result in reduced energy usage and minimum cost. These are the experimental projects initiated by various states between 1978 and 1983 to recycle pavement materials.

<http://www.fhwa.dot.gov/publications/research/infrastructure/recycling/index.cfm>

SAFETY

Report: Simulator Evaluation of Low-Cost Safety Improvements on Rural Two-Lane Undivided Roads: Nighttime Delineation for Curves and Traffic Calming for Small Towns

Motor vehicle crashes on the Nation's roadways extract a high toll on American productivity and quality of life. Highway and traffic engineers have been in pursuit of relatively low-cost safety improvements that might have the potential to reduce crashes, save lives, reduce injuries, and lower property damage. For many rural areas, low-cost safety treatments are the only affordable option. This report describes a driving simulator experiment designed to evaluate two sets of alternative low-cost safety improvements for rural areas.

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<http://www.fhwa.dot.gov/publications/research/safety/09061/index.cfm>

Report: Alternative Intersections/Interchanges: Informational Report (AIIR)

This report covers four intersection and two interchange designs that offer substantial advantages over conventional at-grade intersections and grade-separated diamond interchanges. It also provides information on each alternative treatment covering salient geometric design features, operational and safety issues, access management, costs, construction sequencing, environmental benefits, and applicability.

<http://www.fhwa.dot.gov/publications/research/safety/09060/>

Alternative Intersections Selection Tool (AIST)

The alternative intersections selection tool can be used for traffic analysis planning of selected types of alternative intersection designs using hourly traffic counts by movements. The innovative intersections are mostly described in the Alternative Intersections/Interchanges: Informational Report (see above). Intersections are evaluated using the method of critical lane volume summation to provide planning capacity assessment at each crossing. The entire AIST has been developed in Microsoft® Excel and basic knowledge of Excel is necessary to use it. The tool is an Excel workbook with many spreadsheets displaying the different types of intersection design.

Contact Joe Bared joe.bared@dot.gov, 202-493-3314 or Wei Zhang wei.zhang@dot.gov, 202-493-3317 for a free copy of this AIST tool.

Safety Improvement Program Manual Published

The FHWA Office of Safety recently published the Highway Safety Improvement Program (HSIP) Manual (FHWA-SA-09-029). The HSIP Manual updates the 1981 HSIP User's Manual to reflect current law, regulations and new and emerging technologies and noteworthy practices regarding state and local highway safety improvement programs and related activities. The HSIP Manual provides an overview of the HSIP and outlines procedures and tools to assist transportation professionals with the planning, implementation and evaluation phases of the HSIP.

The HSIP Manual is available online at: <http://safety.fhwa.dot.gov/hsip/resources/>

Copies may be requested from the FHWA Report Center at: report.center@dot.gov

RECENT PERIODICALS

***FOCUS* Newsletter—April 2010**

This issue includes: Recycled Materials in Roadway Construction: The Many Ways of Going Green; Enter the 2010 International Contest on LTPP Data Analysis; Paving Smarter with Intelligent Compaction; FHWA Offers Online Guidance for Unknown Foundations; Webinar Explores Optimal Timing of Pavement Preservation Treatments; and, Highway Technology Calendar.

<http://www.fhwa.dot.gov/publications/focus/10apr/index.cfm>

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***FOCUS* Newsletter—March 2010**

This issue includes: National Work Zone Awareness Week 2010: Work Zones Need your Undivided Attention; FHWA Offers Work Zone Safety Training Opportunities; Preserving the Past: National Historic Covered Bridge Preservation Program; SHRP 2: Accelerating Utilities Innovations; Highway Technology Calendar; and, 2010 NHI Catalog Now Available.

<http://www.fhwa.dot.gov/publications/focus/10mar/index.cfm>

For more information:

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Public Roads—March/April 2010-

This issue includes: Small State, Big Vision; Women in Transportation; Recruiting Effort Is a Sweet Success; Applying Lessons From a Bridge Collapse; Taking Stock: Climate Change and Transportation; Reclaiming Roads; Watching Out for Senior Walkers; and, A Decade of Safety Success.

<http://www.tfsrc.gov/pubrds/10mar/>

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Transportation and Climate Change Newsletter—March 2010

This issue includes: Obama Administration Officials Release Progress Report on Work of Climate Change Adaptation Task Force; FHWA Posts Study of State Climate Action Plans; NCHRP Publishes Study on Mechanisms for Integrating Transportation-Related Greenhouse Gas Reductions into Transportation Decision Making; Social Cost of Carbon for Regulatory Impact Analysis; Oregon Legislation Calls for a Statewide Transportation Strategy to Achieve Greenhouse Gas Emission Reduction Goals; North Carolina Holds Climate Change Adaptation Workshop; Midwest Transportation and Air Quality Summit Conference Proceedings Posted; and, 2010 TRB Energy and Environment Conference, June 6–9 in Raleigh.

<http://www.fhwa.dot.gov/hep/climatechange/newsletter/ccnews0310.htm>

Links:

Turner-Fairbank Highway Research Center: www.tfsrc.gov

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

National Highway Institute: <http://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