Accelerating Infrastructure Innovations

FOCUS

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INSIDE

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U.S. Department of Transportation
Federal Highway Administration

Fast 14: Accelerating Bridge Replacements in Massachusetts

Meet the "Fast 14." Using accelerated bridge construction (ABC) techniques and materials, the Massachusetts Department of Transportation (MassDOT) replaced 14 bridges on I-93 in Medford, outside of Boston, in 10 weekends between June and August 2011. With associated work such as final paving and lane striping completed by October 2011, the I-93 Rapid Bridge Replacement Project accomplished all of the bridge replacement tasks in less than a year, cutting 3 years off a conventional schedule and greatly reducing the impacts and inconvenience experienced by drivers.

ABC innovations used to speed up the project included design-build contracting, prefabricated bridge elements for the superstructure that were constructed off site and brought to the bridge location ready to install, and rapid-setting concrete. The $98 million project received a $1 million grant from the Federal Highway Administration's (FHWA) Highways for LIFE program, which aims to raise awareness in the highway community so that new technologies can be moved from the state-of-the-art to the state-of-the-practice much more quickly.

Built approximately 60 years ago, the 14 Medford bridges had reached the end of their service lives. Through the Rapid Bridge Replacement Project, MassDOT replaced the bridges' superstructures and repaired the bridge substructures, which were still in good condition. For each replacement, the roadway was closed at 8 p.m. on a Friday and traffic directed to the other side of I-93, where the opposing lanes were separated by a moveable barrier. The existing superstructure was then demolished and the new modular superstructure installed. Temporary barrier systems were erected and line striping performed before I-93 was reopened to traffic by 5 a.m. the following Monday. Additional work such as substructure repairs, barrier installation, and paving was accomplished on weekdays and weeknights, but no work was done during rush hours.

While the roads were closed for the bridge installation, MassDOT implemented local

continued on page 2 ➢

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The Massachusetts Department of Transportation replaced 14 bridges on I-93 in Medford between June and August 2011.

Fast 14,
continued from page 1

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Left and middle: FHWA sponsored a showcase on July 16–17, 2011, providing an opportunity for nearly 150 participants to learn more about the innovations used in the Fast 14 project.

Below: Accelerated bridge construction techniques used to speed up the project included prefabricated bridge elements and systems.

The I-93 Rapid Bridge Replacement Project accomplished all of the bridge replacement tasks in less than a year, cutting 3 years off a conventional schedule.

detour routes aimed at minimizing the impacts on traffic. Information on the project was widely distributed to residents, businesses, and commuters through mailings, approximately 80 community meetings and public information sessions, emails, and variable message signs, providing advice on how drivers could best avoid delays.

"Our outreach strategy featured a large social media component, including using Twitter, Flickr®, and YouTube. We also used all of our available State resources, ranging from billboards and messages at toll booths to Highway Advisory Radio and our 511 service," said Richard Davey, MassDOT Secretary and Chief Executive Officer. A project Web site (http://93fast14.dot.state.ma.us), meanwhile, was continually updated with the latest information and offered the opportunity to sign up for customized traffic and project alerts. MassDOT also coordinated with local emergency responders to ensure that emergency services could operate without interruption throughout the duration of the project.

"We achieved a high level of traffic diversion for the project," said Davey. "Our goal throughout was to give people the information they needed to make good decisions, so that they could plan alternate routes and modes of travel."

MassDOT is now conducting a user satisfaction survey for the project. To view the survey, visit www.I93fast14survey.com.

Highways for LIFE sponsored a project showcase on July 16–17, 2011, providing an opportunity for nearly 150 representatives from highway agencies across the country, industry, and academia to learn more about the innovations used in the project. Attendees visited the project site to observe the weekend work in progress and received briefings on how MassDOT successfully used innovations such as pre-

continued on page 8 ➢

Prefabricated bridge elements and systems and design-build contracting are among the priority technologies being deployed through FHWA's Every Day Counts (EDC) initiative. The EDC initiative is designed to identify proven, ready-to-go innovation aimed at shortening project delivery, enhancing roadway safety, and protecting the environment. For more information on these and other EDC technologies, visit www.fhwa.dot.gov/everydaycounts.

PaveSuite: Transforming Pavement Data into Informed Decisionmaking

Learn how to take the next step in using pavement data with an upcoming Webinar in the Federal Highway Administration's (FHWA) free Innovations series, "PaveSuite: Transforming Pavement Data into Informed Decisionmaking." The session is scheduled for November 17, 2011, from 2:30 to 4 p.m. (eastern standard time). The ongoing Innovations series is designed to bring representatives from State and local transportation agencies, industry, academia, and others timely information on today's highway technology advances. This series is hosted by FHWA's National Highway Institute (NHI), in conjunction with the FHWA Highways for LIFE program and the American Association of State Highway and Transportation Officials' (AASHTO) Technology Implementation Group (TIG).

Developed by the Florida Department of Transportation (FDOT), PaveSuite is a collection of advanced tools for performing faster and more comprehensive pavement analysis. The tools provide critical information to support data-driven decisionmaking and the selection of cost-effective strategies to rehabilitate and preserve existing highway infrastructure while ensuring safety. PaveSuite was selected as a 2011 focus technology by the AASHTO TIG.

The Webinar will highlight PaveSuite's four advanced pavement evaluation technologies:

1. *Enhanced Pavement Test Data Analysis Methodology*—This tool uses contour plotting—a two-dimensional representation of three-dimensional data—to provide a more comprehensive data analysis.
2. *Automated Faulting Method*—The technology uses data from a high-speed inertial profiler to detect transverse joints in concrete pavements and estimate faulting, which is the difference in elevation of these joints. Faulting has a direct impact on roadway life-cycle and vehicle operation costs. While highway agencies have traditionally measured faulting manually using a faultmeter, this method is slow and labor intensive. The automated faulting method is not only faster, but avoids traffic disruptions and is safer for both workers and motorists.
3. *Identifying Vibration-Sensitive Work Zones*—Vibrations caused by large vibratory rollers during pavement construction in urban areas can adversely affect nearby businesses, residences, and underground infrastructure. This technology uses falling weight deflectometer data to assess the potential for structural damage caused by vibratory rollers.
4. *Automated Cross-Slope and Drainage Path Method*—The tool identifies areas on roadways that are prone to water retention or have inadequate cross-slope, which can cause hazardous driving conditions. Based on cross-slope and vertical grade data, the program calculates the drainage length and generates results in tabular form, as well as two- and three-dimensional plots. The technology can also be used to evaluate the effectiveness of various corrective actions.

Featured speakers will include Hyung Lee, a Pavement Performance Engineer with FDOT, Abdenour Nazef, a Pavement Evaluation Engineer for FDOT, and N. Mike Jackson, Professor of Civil Engineering at the University of North Florida in Jacksonville, Florida.

More information on the Webinar and a link for registration is available at www.fhwa.dot.gov/hfl/commtool.cfm. To learn more about PaveSuite, visit the AASHTO TIG Web site at http://tig.transportation.org. *

PaveSuite is a collection of advanced tools for performing faster and more comprehensive pavement analysis.

Customize Your 2011 NHI Training Catalog

The Federal Highway Administration's (FHWA) National Highway Institute (NHI) 2011 catalog is available online at www.nhi.fhwa.dot.gov/training/down_catalog.aspx, providing the transportation community with a comprehensive source of classes and online instruction.

The 2011 catalog can be customized and then downloaded, offering such options as organizing courses by delivery format and program area. The download page also offers the option to order a printed copy of the catalog.

NHI's in-person, instructor-led courses are supplemented by Web-conference training (live, online training that takes place at a set time) and Web-based courses (online courses available 24/7 for participants to take at their own pace).

To learn more about NHI, visit www.nhi.fhwa.dot.gov. *

Customize your 2011 NHI catalog at www.nhi.fhwa.dot.gov/training/down_catalog.aspx.

Infrastructure Innovation Webinars

These free Federal Highway Administration (FHWA) Webinars provide a quick introduction to the latest infrastructure innovations and technologies.

PaveSuite: Transforming Pavement Data into Informed Decisionmaking

November 17, 2011, 2:30–4 p.m. (eastern standard time)

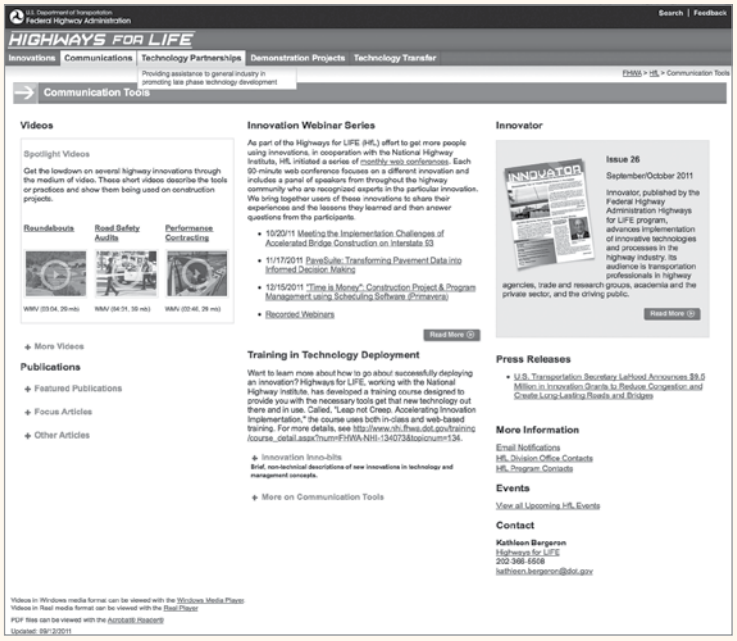
Developed by the Florida Department of Transportation, PaveSuite is a collection of advanced tools for performing faster and more comprehensive pavement analysis. The Webinar will highlight how the tools can be used to support data-driven decisionmaking. This session is hosted by FHWA's National Highway Institute (NHI), in conjunction with the FHWA Highways for LIFE program and the American Association of State Highway and Transportation Officials' Technology Implementation Group.

Time Is Money: Construction Project and Program Management Using Scheduling Software

December 15, 2011, 2:30–4 p.m. (eastern standard time)

Learn how scheduling software can be customized to manage most aspects of a highway construction project, including optimizing project timing and generating detailed data for performance measures. The New York State Department of Transportation will discuss its experiences in implementing a scheduling program. This Webinar is hosted by NHI, in conjunction with FHWA's Highways for LIFE program.

More information on the Webinars and a link for registration is available at www.fhwa.dot.gov/hfl/commtool.cfm. *



To learn more about these infrastructure innovation Webinars, visit www.fhwa.dot.gov/hfl/commtool.cfm.

International Conference on Long-Life Concrete Pavements to Showcase Innovation

From advances in design and construction practices to breakthroughs in materials technology, the International Conference on Long-Life Concrete Pavements will spotlight how to make long-life concrete pavements not just attainable but a part of everyday practice. Scheduled for September 18–21, 2012, in Seattle, Washington, the conference is being organized by the Federal Highway Administration (FHWA) and the National Concrete Pavement Technology Center.

The event is a follow-up to FHWA's 2006 International Conference on Long-Life Concrete Pavements and 2010 International Conference on Sustainable Concrete Pavements.

"Many State highway agencies, in conjunction with industry, are implementing innovative features to achieve long-life concrete pavements that are both economical and sustainable," said Sam Tyson of FHWA. These innovations encompass everything from concrete mixtures and construction equipment to construction process management and testing procedures.

> "Many State highway agencies, in conjunction with industry, are implementing innovative features to achieve long-life concrete pavements that are both economical and sustainable."

To achieve a long life of 40 years or more, pavements must not exhibit premature failures and must have a reduced potential for cracking, faulting, spalling, and materials-related distress. To be sustainable, concrete pavement design and construction practices must also reduce the carbon footprint resulting from initial construction, as well as future maintenance, repair, and rehabilitation activities. The life-cycle impact, including life-cycle costs and impacts on the environment and surrounding community, should be considered as well.

The conference is targeted at pavement, materials, and geotechnical engineering professionals, including Federal, State, and municipal engineers; consulting engineers; contractors; materials suppliers; and members of academia. Sessions will cover such topics as:

- U.S. transportation agency practices for building long-life concrete pavements.

continued on page 7 ➢

© Shiraz Tayabji

Long-life concrete pavement under construction along a section of I-90 near Syracuse, NY.

Highway Technology Calendar

The following events provide opportunities to learn more about products and technologies for accelerating infrastructure innovations.

Industrial Byproducts Conference
November 1–2, 2011, Austin, TX

Sponsored by the Federal Highway Administration (FHWA), the Industrial Resources Council, and the Rubber Manufacturers Association, the conference will highlight the use of industrial byproducts in road construction.

Contact: Jason Harrington at FHWA, 202-366-1576 (email: jason.harrington@dot.gov), or visit www.RMA.org.

Second Road Dust Best Management Practices Conference
November 7–9, 2011, Las Vegas, NV

Best practices in road dust management and lessons learned will be featured at the conference, which addresses environmental compatibility and sustainability, general and international best practices, and unique and extreme conditions. Sponsors include Montana State University; the University of Nevada, Las Vegas; Transportation Research Board (TRB); and FHWA.

Contact: For more information, visit http://roaddustinstitute.org/conference.

FHWA Intelligent Compaction (IC) National Workshop
December 13, 2011, Atlanta, GA

The workshop will highlight the fundamentals of IC and discuss the route to successful IC implementation. As the size of the free workshop is limited, registration will be available on a first-come, first-served basis.

Contact: Jennifer Rutledge at The Transtec Group, Inc., 512-451-6233, ext. 236 (email: jennifer@thetranstecgroup.com), or Lee Gallivan at FHWA, 317-226-7493 (email: victor.gallivan@dot.gov). Registration information is available at www.IntelligentCompaction.com.

TRB 91st Annual Meeting
January 22–26, 2012, Washington, DC

More than 10,000 transportation professionals from around the world will gather at the meeting to share perspectives on current developments in transportation research, policy, and practice.

Contact: For information, visit the TRB Web site at www.trb.org (click on "Annual Meeting"). Questions about the meeting can be emailed to trbmeetings@nas.edu.

Ninth National Conference on Transportation Asset Management: Making Asset Management Work in Your Organization
April 16–18, 2012, San Diego, CA

Sponsored by TRB, the American Association of State Highway and Transportation Officials (AASHTO), and FHWA, conference topics will include asset management implementation, pavements and bridges, beyond pavements and bridges, and transit state of good repair.

Contact: To learn more, visit www.trb.org/conferences/assetmanagement2012.

2012 Design-Build in Transportation Conference
April 25–27, 2012, Phoenix, AZ

Join transportation leaders in discussing lessons learned in the use of the design-build project delivery method for transportation projects. The discussions will cover choosing the right delivery method, contracting approaches, risk allocation, and performance contracting. The conference is cosponsored by FHWA, AASHTO, and various industry groups.

Contact: Jerry Yakowenko at FHWA, 202-366-1562 (email: gerald.yakowenko@dot.gov), or visit www.dbtranspo.com/index.cfm.

Seventh RILEM International Conference on Cracking in Pavements
June 20–22, 2012, Delft, Netherlands

Conference topics will include the detection, prediction, and mitigation of cracking in pavements; laboratory and field model validation; and accelerated pavement testing. Organized by RILEM (the International Union of Laboratories and Experts in Construction Materials, Systems, and Structures), conference partners include FHWA and AASHTO.

Contact: Katherine Petros at FHWA, 202-493-3154 (email: katherine.petros@dot.gov), or visit www.rilem2012.org.

International Conference on Long-Life Concrete Pavements
September 18–21, 2012, Seattle, WA

Organized by FHWA, in partnership with the National Concrete Pavement Technology Center, the conference will address various aspects of concrete pavement design, construction, and materials technologies that result in long-life, sustainable concrete pavements.

Contact: Shiraz Tayabji at Fugro Consultants, Inc., 410-302-0831 (email: stayabji@aol.com), or Sam Tyson at FHWA, 202-366-1326 (email: sam.tyson@dot.gov). Conference information is also available at www.fhwa.dot.gov/pavement/concrete/2012conf.cfm. *

Long-Life Concrete Pavements,
continued from page 5

- International practices.
- Innovations in joint systems, materials, and construction.
- Surface characteristic requirements for long-life concrete pavements.
- Effective maintenance, repairs, and rehabilitation to extend service life.
- Life-cycle cost considerations for long-life pavements.
- Lessons learned from early failures of concrete pavements.
- Use of precast concrete pavement technologies for longer-lasting repair and rehabilitation of existing pavements.

A mini-symposium on concrete paving durability will be held the last day of the conference. "Concrete durability under site-specific exposure conditions is a primary requirement for achieving long-life concrete pavements," said Conference Cochair Shiraz Tayabji of Fugro Consultants, Inc.

For more information on the conference, visit www.fhwa.dot.gov/pavement/concrete/2012conf.cfm. Information is also available by contacting Shiraz Tayabji at Fugro Consultants, Inc., 410-302-0831 (email: stayabji@aol.com), or Sam Tyson at FHWA, 202-366-1326 (email: sam.tyson@dot.gov). *

A Guide to FHWA's Infrastructure Publication Resources

Searching for transportation infrastructure-related reports, fact sheets, and other publications? The Federal Highway Administration (FHWA) offers a multitude of easily accessible resources.

For a list of FHWA research reports and technical publications, visit www.fhwa.dot.gov/research/publications/technical. The site also features quick links to FHWA publications in such topic areas as Advanced Research, Federal Lands, Pavements, and Structures and Bridges.

FHWA's topic-based Web sites offer electronic versions of many publications:

Asset Management—
www.fhwa.dot.gov/infrastructure/asstmgmt

Bridge Library—
www.fhwa.dot.gov/bridge/elibrary.htm

Construction—
www.fhwa.dot.gov/construction

Design—
www.fhwa.dot.gov/design

Geotechnical Engineering—
www.fhwa.dot.gov/engineering/geotech

Hydraulics Engineering—
www.fhwa.dot.gov/engineering/hydraulics

Pavements—
www.fhwa.dot.gov/pavement

Preservation—
www.fhwa.dot.gov/preservation

The sites bring together a range of resources in one convenient location. Instead of visiting various FHWA Web sites to collect information on a particular topic, one stop is all you need. In addition to publications, featured information includes details on conferences, policy and guidance memos, research, software, training and workshop opportunities, and staff contacts.

A range of infrastructure-related publications are also posted on FHWA's Office of Infrastructure Web site (visit www.fhwa.dot.gov/infrastructure and click on "Publications").

Printed copies of many publications are available from the FHWA Research and Technology Product Distribution Center:

Phone: 814-239-1160

Fax: 814-239-2156

Email: report.center@dot.gov

For additional assistance in locating an FHWA publication, contact the FHWA Research Library at 202-493-3071 (email: fhwalibrary@dot.gov). *

FHWA's topic-based Web sites bring together a range of resources in one convenient location.

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FOCUS

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Its primary mission is twofold: (1) to serve the providers of highway infrastructure with innovations and support to improve the quality, safety, and service of our roads and bridges; and (2) to help promote and market programs and projects of the various offices of FHWA's Office of Infrastructure.

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Fast 14,

continued from page 2

fabricated bridge elements and design-build contracting to accelerate the bridge replacement initiative.

To learn more about the Fast 14 project, visit http://93fast14.dot.state.ma.us. Information on ABC is available at www.fhwa.dot.gov/bridge/abc/index.cfm. For details on using design-build contracting, visit www.fhwa.dot.gov/everydaycounts/projects/methods/index.cfm#design-build. For more information on the Highways for LIFE program, visit www.fhwa.dot.gov/hfl, or contact Mary Huie at FHWA, 202-366-3039 (email: mary.huie@dot.gov). *