

# FOCUS

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## Building Better Pavements That Save Lives: The Safety Edge



**C**oncerned by the number of roadway departure crashes involving teenage drivers in Johnston County, North Carolina, the North Carolina Department of Transportation (NCDOT) decided to implement a simple but effective technology that can help save lives—the Safety Edge<sup>SM</sup>.

The Safety Edge is a paving technique where the edge of the pavement is shaped to approximately 30 degrees, rather than the vertical or near vertical edge that typically results from standard techniques. As the recommended paving practice of bringing the adjacent graded material (unpaved shoulder or stabilized soil) flush with the top of the pavement often only lasts for a short time and requires frequent maintenance, the resulting exposed vertical edge can contribute to drivers losing control of

a vehicle when they drift off the roadway. The Safety Edge technique allows vehicles to return to the road smoothly and easily.

“The Safety Edge provides a strong, durable transition for all vehicles and helps prevent pavement edge raveling, contributing to longer pavement life. By including the Safety Edge detail while paving, this pavement improvement and safety countermeasure can be implemented systemwide at a low cost,” said Andy Mergenmeier of the Federal Highway Administration (FHWA).

FHWA selected Safety Edge to be one of the technologies promoted by its new Every Day Counts (EDC) initiative in 2010. The EDC initiative is designed to identify and deploy proven, ready-to-go innovation aimed at shortening project delivery, enhancing

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[www.fhwa.dot.gov/publications/focus/index.cfm](http://www.fhwa.dot.gov/publications/focus/index.cfm)



U.S. Department of Transportation

**Federal Highway Administration**



The Safety Edge is a paving technique where the edge of the pavement is shaped to approximately 30 degrees.

## Better Pavements That Save Lives,

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roadway safety, and improving environmental sustainability (see June 2010 *Focus*). For more information about EDC, visit [www.fhwa.dot.gov/everydaycounts](http://www.fhwa.dot.gov/everydaycounts).

NCDOT's Asheville Division constructed North Carolina's first Safety Edge pilot projects in 2008. The Asheville Division recently incorporated the Safety Edge technique into plans for 2011 paving projects. NCDOT is also conducting a pilot project deployment of Safety Edge on eight roads in Johnston County. The study began in March 2011, with roadway monitoring to continue for the next 3 years. "Overall the construction went well, and we saw no increase in paving costs," said Shawn Troy of NCDOT.

Across the country, FHWA Division offices report that 44 States plan to construct Safety Edge projects this year or have adopted the technique as standard practice, including Iowa. FHWA's Iowa Division office initially worked with counties in Iowa to install the Safety Edge on local road projects. The Iowa Department of Transportation (DOT) then used the technology for a paving project on a narrow road. As Iowa has large numbers of wide agricultural equipment traveling on its roads and shoulders, this creates a demanding shoulder maintenance requirement. The Safety Edge has proved to be an ideal solution. Following the successful construction of Safety Edge projects, the Iowa DOT decided to make the technique standard practice across the State.

Advances in equipment over the past year have made the Safety Edge even easier to implement for both asphalt and portland cement concrete (PCC) pavements. Four commercial equipment manufacturers now offer devices for creating the 30-degree pavement edge on asphalt pavements. These devices can be attached to paving machines and are the only addi-



More than 40 States plan to construct Safety Edge projects this year or have adopted the technique as standard practice.

tional equipment needed, adding very little to construction costs. "The choice of equipment offers States more options as they look at implementing the Safety Edge for asphalt pavements," said Cathy Satterfield of FHWA. For slipforming PCC pavements, modification of the screed to create the 30-degree shape is needed.

Implementation resources available from FHWA at [http://safety.fhwa.dot.gov/roadway\\_dept/pavement/safedge](http://safety.fhwa.dot.gov/roadway_dept/pavement/safedge) include a new Guide Specification for Safety Edge, a Guidance Memorandum, examples of State specifications and policies, and field reports from State demonstration projects conducted in 2010 and 2011. Additional field reports will be added as they are completed. Also available are answers to frequently asked questions and fact sheets on such topics as "Steps to Implementing the Safety Edge" and "How Does Safety Edge Compare to Conventional Paving?"

"We are seeing more States interested in using the Safety Edge," said Mergenmeier. To continue to aid implementation efforts, FHWA is developing a Safety Edge Design and Construction Guide that will be available in fall 2011. Based

on results from the State demonstration projects, the Guide will feature general design and construction considerations, as well as specific considerations for constructing the Safety Edge in conjunction with new asphalt or concrete pavements or overlays. Also covered are details related to the use of the Safety Edge technology for pavement rehabilitation projects, such as minor widening, resurfacing, and mill and overlay.

FHWA recently hosted multiple sessions of a Webinar on Safety Edge Construction experiences. The Webinar featured lessons learned from the construction of the State demonstration projects. Highlights included information on construction techniques, equipment improvements, testing results, and answers to frequently asked questions.

For more information on the Safety Edge, visit [www.fhwa.dot.gov/everydaycounts](http://www.fhwa.dot.gov/everydaycounts). Information is also available by contacting your local FHWA Division office; Frank Julian at the FHWA Resource Center, 404-562-3689 (email: [frank.julian@fhwa.dot.gov](mailto:frank.julian@fhwa.dot.gov)); or Chris Wagner at the FHWA Resource Center, 404-562-3693 (email: [christopher.wagner@fhwa.dot.gov](mailto:christopher.wagner@fhwa.dot.gov)). \*

# Data Integration in Asset Management: Primer Highlights Steps to Success

**H**ow can data integration improve the transportation asset management (TAM) process in your agency? What important steps need to be followed? How can you overcome potential obstacles that can hinder the process? Answers to these and many other questions can be found in the Federal Highway Administration's (FHWA) newly updated *Data Integration Primer* (Pub. No. FHWA-IF-10-019).

TAM provides a strategic and coordinated approach to managing infrastructure assets over the course of their entire life cycle, thus improving performance, increasing safety, and providing greater value to the community. With an asset management approach, optimal decisions on what would be the most effective mix of maintaining, repairing, renewing, or replacing infrastructure components are based on accurate data, economic analysis, and sound engineering. Decisions are also supported by performance measures and performance-based goals.

Useful and reliable data are central to the TAM process. Data inputs are required to evaluate and monitor the condition and performance of an agency's asset inventory, develop performance objectives and measures, identify cost-effective investment strategies, and conduct asset value assessments. It is critical that the data be readily accessible and comparable, making data integration and data sharing vital components of TAM.

Data integration is the method by which multiple data sets from a variety of sources can be combined or linked to provide a more complete picture of what the data mean, and how they can be used to make informed decisions. For example, an

agency's structures team may need access to information about the performance of advanced materials in use on an aging bridge to evaluate the best design and construction method for upgrading the structure, while considering the impact of the decision on traffic and user costs. The data required to analyze the most favorable scenario may exist separately in the agency's pavement, bridge, and traffic operations units' databases.

"Being able to share this information is critical to the success of a transportation asset management program," said Vicki Miller of FHWA's Office of Asset Management. Agencies that combine or link their multiple databases can also reduce data collection and management costs and improve the accuracy and timeliness of the resulting information.

The updated Primer features an expanded section on "How to Integrate Data." Covered in this section are such steps as conducting a requirements analysis to develop criteria for the best integration strategy and preparing a detailed implementation plan once the most effective data integration alternative has been selected. Also covered are database design and specifications and software and hardware requirements.

A newly expanded section on "Challenges to Data Integration" offers States

guidance on how to overcome problems such as bad data, insufficient storage capacity, lack of data management expertise, and lack of cooperation from staff.

Perspective is offered from the early data integration experiences of the Virginia Department of Transportation (VDOT), which found that to overcome challenges, "upper management had to support the business objectives of the project and the creation of a new system to meet the objectives." A pilot data integration rollout program in three counties in Virginia (rural, urban, and mixed rural/urban) allowed VDOT to fine tune its data collection processes and technologies before expanding the program to the rest of the State.

As another tool to assist transportation agencies, FHWA offers a free 1-day Data Integration Workshop. The workshop covers the basics of TAM and data integration techniques, including discussing data needs and issues related to pavement and bridge management, safety, and economic modeling.

The Primer is available to download at [www.fhwa.dot.gov/asset/dataintegration/if10019/dip00.cfm](http://www.fhwa.dot.gov/asset/dataintegration/if10019/dip00.cfm). For more information on data integration or the Data Integration Workshop, visit [www.fhwa.dot.gov/infrastructure/asstmgmt/diindex.cfm](http://www.fhwa.dot.gov/infrastructure/asstmgmt/diindex.cfm) or contact Vicki Miller at FHWA, 202-366-2173 (email: [vicki.miller@fhwa.dot.gov](mailto:vicki.miller@fhwa.dot.gov)). \*

Data integration is the method by which multiple data sets from a variety of sources can be combined or linked to provide a more complete picture of what the data mean, and how they can be used to make informed decisions.

# 2011 Excellence in Utility Relocation and Accommodation Awards

Innovative projects, practices, and collaborative efforts from around the country were honored with the recent announcement of the Federal Highway Administration's (FHWA) 2011 Excellence in Utility Relocation and Accommodation Awards. Presented in the categories of Project Development, Construction Management, Innovation, Incentives, and Leadership, the biennial awards showcase outstanding achievements in reducing the cost or shortening the time required to accommodate or relocate utilities affected by highway improvement projects.

"The award winners demonstrate exemplary practices in successfully integrating the consideration of utilities in the planning, design, construction, and maintenance of transportation facilities," said Brooke Struve of FHWA. Award recipients were honored May 11, 2011, in St. Louis, Missouri, during the annual meeting of the American Association of State Highway and Transportation Officials' (AASHTO) subcommittees on Design and Right-of-Way and Utilities. For additional information on the award winners, visit [www.fhwa.dot.gov/utilities](http://www.fhwa.dot.gov/utilities). To learn more about FHWA's Utility Program, visit [www.fhwa.dot.gov/programadmin/utility.cfm](http://www.fhwa.dot.gov/programadmin/utility.cfm). Information is also available by contacting Brooke Struve at FHWA, 202-366-1317 (email: [brooke.struve@fhwa.dot.gov](mailto:brooke.struve@fhwa.dot.gov)).

## Excellence Award for Project Development

*Mountain View Corridor Project, Salt Lake County, Utah*

*Utah Department of Transportation, H.W. Lochner, and Parsons Brinckerhoff*

The Mountain View Corridor highway project in Salt Lake County, Utah, faced the challenge of accommodating a 91-m (300-ft) power and gas transmission corridor at several locations. The initial estimate to relocate major utilities within the transmission corridor amounted to \$30 million. In planning for this relocation, the project team proactively sought to understand the concerns, constraints, and policies of the utility companies. Strategies such as partnering agreements and cost sharing built successful and rewarding relationships among the project team and utility companies, resulting in a 39 percent reduction in the project's major utility relocation budget and a project schedule that was shortened by 1 year.

## Honorable Mention

Utility Agreements for Projects Receiving Funding from the American Recovery and Reinvestment Act of 2009, Louisiana Department of Transportation and Development (LADOTD)



Strategies such as partnering agreements resulted in a 39 percent reduction in the major utility relocation budget for the Mountain View Corridor Project in Salt Lake County, UT.



Utilities were relocated 1 year ahead of schedule for the Neches River Bridge Project in Texas, saving \$5 million.

## Excellence Award for Construction Management

*Neches River Bridge Project, Interstate 10, Beaumont and Rose City, Texas*

*Texas Department of Transportation (TxDOT) and Cobb, Fendley and Associates*

TxDOT's Beaumont District; Cobb, Fendley and Associates, Inc.; and eight communications companies worked together to accommodate the relocation of utilities for the Interstate 10 bridge replacement project over the Neches River. This collaborative process of involving stakeholders in the planning, design, and development of agreements enabled the utilities to be relocated 1 year ahead of schedule, saving \$5 million. As a result of the agreements, each company now shares a single 91-cm (36-in) conduit with 16 inner ducts, while still achieving access, security, and privacy for each utility owner.

## Honorable Mention

O'Neal Lane Project, LA 3245, Baton Rouge, Louisiana  
LADOTD and Cardno TBE

## Excellence Award for Incentives

*Segments 5 and 6, State Highway (STH) 130, Texas  
TxDOT, CSJ Engineering, HDR, and  
Cardno TBE*

The use of developer-managed and owner-managed utility relocation agreements brought needed flexibility and a spirit of cooperation to the construction of STH 130 in Texas. TxDOT selected a developer to finance, design, acquire right-of-way, adjust utilities, and construct 63 km (39 mi) of STH 130. The developer was able to manage the utility relocations and the method of necessary reimbursement using agreements that worked best for each specific location and utility owner. With the developer-managed agreements, the developer designed, constructed, and paid for the relocations. With the owner-managed relocations, meanwhile, utility owners could manage the utility adjustment themselves and receive reimbursement for eligible costs.



The Texas Department of Transportation used developer-managed and owner-managed utility relocation agreements for the construction of State Highway 130.



Innovative technologies used for a sewer rehabilitation project in Clifton, New Jersey, resulted in a \$1.4-million savings.

## Excellence Award for Innovation

*Sewer Rehabilitation, Route 3 Project at  
Passaic River, Clifton, New Jersey  
Dewberry-Goodkind*

Innovative technologies used to strengthen a 90-year-old concrete arch sewer in Clifton, New Jersey, resulted in a \$1.4-million savings over traditional utility relocation and accommodation methods. The Route 3 project involved the addition of 12 m (40 ft) of fill, which required strengthening the arch sewer that conveys 150 million gallons a day. Using a robotic camera and laser probe to survey the exact shape and details of the sewer pipe's interior, the project team at Dewberry-Goodkind designed a custom-fabricated liner that could be installed under flow conditions.

## Honorable Mention

Utility Permitting System, Georgia Department of Transportation (GDOT)

## Excellence Award for Leadership—Team

*GDOT Utility Program, GDOT Office of  
Utilities*

GDOT's Utility Program created and implemented a Coordination Program, which led to improved partnering with utility owners on the planning and development of highway improvement projects. This removed a major roadblock to delivering projects on time and within budget.

## Excellence Award for Leadership—Individual

*Chuck Schmidt, New Hampshire Department  
of Transportation (NHDOT)*

This award recognizes Chuck Schmidt for his leadership, vision, and commitment to advancing practices nationally to enhance the accommodation and relocation of utilities. In addition to his work at the NHDOT, Schmidt is an Executive Board member of the AASHTO Highway Subcommittee on Right-of-Way and Utilities and has served as chair for the AASHTO Subcommittee on Utilities. Under his leadership, numerous National Cooperative Highway Research Program projects have been funded, a strong network of State transportation department representatives established to work on utility issues, and a commitment made to coordinate and cooperate with utility interests. \*

# Highway Technology Calendar

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

## **Forty-Eighth Annual Petersen Asphalt Research Conference**

July 11–13, 2011, Laramie, WY

Organized by the Western Research Institute (WRI), the conference will present current research aimed at understanding and improving asphalt performance. Topics covered range from fundamental compositional research to applied field engineering. Attendees are also invited to participate in an open mic discussion.

*Contact:* Steve Salmans at WRI, 307-721-2306 (email: [ssalmans@uwyo.edu](mailto:ssalmans@uwyo.edu)), or Jack Youtcheff at the Federal Highway Administration (FHWA), 202-493-3090 (email: [jack.youtcheff@fhwa.dot.gov](mailto:jack.youtcheff@fhwa.dot.gov)). Information is also available at [www.petersenasphaltconference.org](http://www.petersenasphaltconference.org).

## **2011 Pavement Performance Prediction Symposium**

July 14, 2011, Laramie, WY

Presented by WRI in cooperation with FHWA's Turner-Fairbank Highway Research Center, the symposium will take an indepth look at the effects of asphalt binder, mix design, and construction on the durability of pavement.

*Contact:* Steve Salmans at WRI, 307-721-2306 (email: [ssalmans@uwyo.edu](mailto:ssalmans@uwyo.edu)), or Jack Youtcheff at FHWA, 202-493-3090 (email: [jack.youtcheff@fhwa.dot.gov](mailto:jack.youtcheff@fhwa.dot.gov)). Information is also available at [www.petersenasphaltconference.org](http://www.petersenasphaltconference.org).

## **Tenth International Conference on Low-Volume Roads**

July 24–27, 2011, Orlando, FL

Sponsored by the Transportation Research Board (TRB), the conference

will feature the latest information about low-volume road management, design, construction, safety, maintenance, and other topics. Attendees will also have the opportunity to participate in a half-day field trip to observe and study low-volume road issues.

*Contact:* For more information, send an email to [TRBMeetings@NAS.edu](mailto:TRBMeetings@NAS.edu), or visit [www.trb.org/LowVolumeRoadsconference/LVR10.aspx](http://www.trb.org/LowVolumeRoadsconference/LVR10.aspx).

## **Second International Conference on Warm Mix Asphalt**

October 11–13, 2011, St. Louis, MO

Sponsored by the National Asphalt Pavement Association and FHWA, the conference will provide a progress report on the implementation of warm-mix asphalt. Featured topics will include mix design, long-term performance, accelerated performance testing, effects on binder properties, and innovative temperature reduction processes. The conference will be of interest to engineers, researchers, contractors, and transportation agency personnel.

*Contact:* Matthew Corrigan at FHWA, 202-366-1549 (email: [matthew.corrigan@fhwa.dot.gov](mailto:matthew.corrigan@fhwa.dot.gov)), or visit [www.warmmixasphalt.com](http://www.warmmixasphalt.com).

## **Fifth Asphalt Shingle Recycling Forum**

October 27–28, 2011, Dallas, TX

Organized by the Construction Materials Recycling Association, the forum will cover all aspects of the opportunities offered by shingle recycling. Using recycled asphalt shingles in hot-mix asphalt and other construction applica-

tions can save money and conserve natural resources, while maintaining quality.

*Contact:* Audrey Copeland at FHWA, 202-493-3097 (email: [audrey.copeland@fhwa.dot.gov](mailto:audrey.copeland@fhwa.dot.gov)), or visit [www.shinglerecycling.org](http://www.shinglerecycling.org).

## **National Bridge Management, Inspection, and Preservation Conference**

October 31–November 4, 2011, St. Louis, MO

Building upon FHWA's successful 2007 National Bridge Preservation Workshop, the conference will feature separate tracks for bridge management, inspection, and preservation topics. "Making the Case for Bridge Preservation" and "Next Generation Bridge Inspection" will also be featured themes. The conference is sponsored by FHWA and the American Association of State Highway and Transportation Officials' (AASHTO) Transportation System Preservation Technical Services Program (TSP•2).

*Contact:* Shyan-Yung Pan at FHWA, 202-366-1567 (email: [shyan.pan@fhwa.dot.gov](mailto:shyan.pan@fhwa.dot.gov)). Information is also available at [www.TSP2.org/bridge](http://www.TSP2.org/bridge).

## **Industrial Byproducts Conference**

November 1–2, 2011, Austin, TX

Sponsored by 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@fhwa.dot.gov](mailto:jason.harrington@fhwa.dot.gov)), or visit [www.RMA.org](http://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. The conference themes are 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; TRB; and FHWA.

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

**Seventh RILEM International Conference on Cracking in Pavements**

June 20–22, 2012, Delft, The 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@fhwa.dot.gov](mailto:katherine.petros@fhwa.dot.gov)), or visit [www.rilem2012.org](http://www.rilem2012.org). \*

## Making the Switch to 3D Design Modeling: An Online Introduction

**T**hinking of making the switch to using 3D design modeling for transportation projects?

Make plans now to participate in the Federal Highway Administration's (FHWA) July 21, 2011, Webinar on "3D Design Modeling: Improved Method for Project Plans Yields Improved Projects, Improved Quality." The free Webinar will be held from 2:30 to 4 p.m. (eastern daylight time).

The 3D Design Modeling session is part of the ongoing Innovations series, which 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.

The Webinar will feature a panel of representatives from the Iowa and Wisconsin departments of transportation and software vendors Bentley Systems, Inc., and Autodesk. Panel members will discuss:

- The capabilities, advantages, and benefits of using 3D design.
- Steps to transitioning from 2D design to 3D design modeling.
- The importance of design standards in achieving quality projects.
- Guidance on overcoming potential implementation obstacles.

The panel will also host a question and answer session for Webinar participants.

Other featured topics include responsibility and accountability for 3D design data and how to make 3D design data available to project bidders while minimizing the risk of contract claims and disputes.

For more information on the Webinar or to register, visit [www.nhi.fhwa.dot.gov/about/innovationseries.aspx](http://www.nhi.fhwa.dot.gov/about/innovationseries.aspx). \*

Mark your calendar for upcoming Innovations Webinars. The following Webinar topics are scheduled for 2011:

- August 18, 2011, Precast Bridge Bent System for Use in High Seismic Regions
- September 15, 2011, Crack Control in Concrete

As more information on each Webinar becomes available, details will be posted at [www.fhwa.dot.gov/hfl](http://www.fhwa.dot.gov/hfl) (click on "Communications"). To download recordings from past Webinars, visit [www.nhi.fhwa.dot.gov/about/innovationseries.aspx](http://www.nhi.fhwa.dot.gov/about/innovationseries.aspx).

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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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## Training Offers Guide to Superpave 101

One of the latest courses added to the Federal Highway Administration's (FHWA) National Highway Institute (NHI) training catalog is Superpave Mix Design Process and Analysis (Course No. FHWA-NHI-131131). The 2-hour online training session, prepared in partnership with the Transportation Curriculum Coordination Council (TCCC), is designed to give hot-mix asphalt (HMA) materials engineers and technicians a better understanding of the Superpave mix design process and analysis. The course is available for scheduling at any time.

Aimed at those who are responsible for the laboratory testing and evaluation of Superpave mix designs, Module One of the new course covers the design of an asphalt concrete mix and how a Superpave mix design is analyzed. Module Two covers asphalt mixture volumetrics and how to use phase diagrams to calculate volumetric properties. Upon completion of the course, partici-

pants will have learned the procedures involved in Superpave mix design, how to select proper materials for a Superpave mix, and how a Superpave mix is compacted. They will also be able to define HMA volumetric terms and understand factors that can influence key mass-volume relationships and calculations.

Launched in 2000, the TCCC is a partnership that includes representatives from FHWA, NHI, regional State training and certification groups, several American Association of State Highway and Transportation Officials subcommittees, and industry associations.

To register for this free course or to find details on other NHI training opportunities, visit the NHI online course catalog at [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov). For more information on the Superpave Mix Design Process and Analysis training, contact Christopher Newman at FHWA, 202-366-2023 (email: [christopher.newman@fhwa.dot.gov](mailto:christopher.newman@fhwa.dot.gov)).

FOCUS on Training

