

FOCUS

June
2009

INSIDE

2 Highways for LIFE extends 2009 project solicitation

3 State experiences with FHWA RealCost software showcased at technical forum

4 Excellence in Utility Relocation and Accommodation 2009

6 FHWA offers training course on bridge safety inspections

7 Highway technology calendar

A State of the Practice Guide to Prefabricated Bridge Elements and Systems

Prefab just got easier. The Federal Highway Administration's (FHWA) new *Connection Details for Prefabricated Bridge Elements and Systems* manual (Pub. No. FHWA-IF-09-010) provides transportation agencies, contractors, and consultants with information on the state of the practice for accelerated bridge construction across the country. The manual features 150 connection details from a range of accelerated bridge construction projects.

"This is exactly what's needed for States, so that they can see what works and what is being done across the country," says Mary Lou Ralls of Ralls Newman LLC. "States can look at projects similar to what they would like to do and find the connection details. This will speed their design work."

The use of prefabricated bridge elements and systems, ranging from superstructures or substructures to totally prefabricated bridges, offers both faster and safer bridge construction and better quality. The prefabricated systems can be manufactured offsite at a prefabrication plant or adjacent to the project site by the contractor, under controlled conditions, and brought to the

bridge location ready to install. Building in a controlled environment reduces weather-related delays and enhances constructibility, while also reducing traffic congestion and improving work zone safety. Accelerated bridge construction can also reduce life cycle costs and environmental impacts.

While the manual provides some guidance on general accelerated construction techniques, it focuses on the details for connections of prefabricated bridge elements and systems. "When FHWA did a survey asking State transportation departments about the obstacles they faced in using prefabricated bridge systems, they said they did not have enough details about constructing prefabricated systems," notes Vasant Mistry of FHWA's Office of Bridge Technology. "Many people have been asking for a manual such as this. As the need to replace aging bridges grows in coming years, accelerated bridge construction is going to become even more important."

The manual is divided into four chapters, covering general topics, superstructures, substructures, and foundations. Superstructure topics include decks, beams,

"As the need to replace aging bridges grows in coming years, accelerated bridge construction is going to become even more important."

www.tfhr.gov/focus/focus.htm



U.S. Department
of Transportation
**Federal Highway
Administration**

continued on page 2 >



© Utah DOT

The Utah Department of Transportation constructed the superstructure of its new 4500 South bridge in Salt Lake City offsite over a period of 4 months in 2007.

stringers, modular superstructure prefabricated systems, connections between superstructures and substructures, and miscellaneous superstructure details. The substructure chapter looks at piers, abutments, and wing walls, while the section on foundations covers footings and piles. The manual is organized so that bridge designers can pick and choose the details that will eventually make up the final bridge. In most cases, several options are presented for a particular connection. The details are presented on concise one-page data sheets, allowing designers to quickly build a "detail library" that is specific to the particular project.

For each connection detail included in the manual, contact information for the agency that provided the detail is listed, so that

users of the manual can obtain more information if needed.

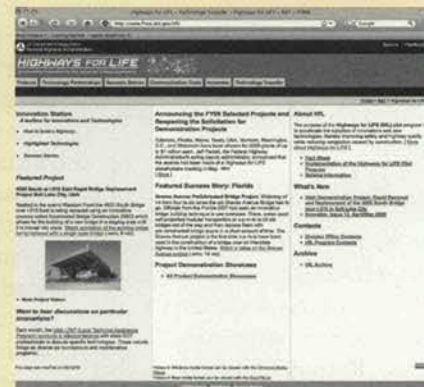
To obtain a free copy of *Connection Details for Prefabricated Bridge Elements and Systems* (Pub No. FHWA-IF-09-010), contact the FHWA Research, Development, and Technology Products Distribution Center, 814-239-1160 (email: Report.Center@dot.gov). The manual will be posted online in early July at www.fhwa.dot.gov/bridge. For more information about the manual, contact Vasant Mistry in FHWA's Office of Bridge Technology, 202-366-4599 (email: vasant.mistry@fhwa.dot.gov). Information on prefabricated bridge elements and systems is also available at www.fhwa.dot.gov/bridge/accelerated/index.cfm and on FHWA's Highways for LIFE Web site at www.fhwa.dot.gov/hfl. *

Highways for LIFE Extends 2009 Project Solicitation

The Federal Highway Administration's (FHWA) Highways for LIFE (HfL) program has extended its solicitation of grant applications for fiscal year (FY) 2009 demonstration construction projects. Up to seven additional projects can be funded in FY 2009. Applications will be evaluated on a first come, first served basis, with priority given to States that have not yet received HfL funds.

The HfL program is designed to encourage State transportation agencies to build projects using proven innovations that have been infrequently or never used by the agency. A State transportation department can apply if the project constructs, reconstructs, or rehabilitates a route or connection on an eligible Federal-aid highway and uses innovative technologies, manufacturing processes, financing, or contracting methods. The proposed innovations must be available now and ready to use. Projects should meet the HfL performance goals of improving safety, reducing congestion caused by construction, and improving quality and customer satisfaction.

Applications must be submitted to FHWA's division offices. The application form is available on the HfL Web site at www.fhwa.dot.gov/hfl/projects/080630.cfm. For more information, contact your local FHWA division office. For additional information on HfL, contact Mary Huie at FHWA, 202-366-3039 (email: mary.huie@fhwa.dot.gov). *



Visit www.fhwa.dot.gov/hfl for more information on Highways for LIFE.

State Experiences with FHWA RealCost Software Showcased at Technical Forum

At the Federal Highway Administration's (FHWA) Life Cycle Cost Analysis (LCCA) Technical Forum, held April 21, 2009, in St. Louis, Missouri, more than 60 attendees learned more about the fundamentals of LCCA, discussed their own experiences in applying LCCA principles using the FHWA RealCost software, and were introduced to the latest version of the software. Also participating through a Web link were an additional 25 online attendees. "The forum was a great opportunity for State presenters to display examples of the LCCA they performed when using the FHWA RealCost software. It also provided attendees an opportunity to discuss any issues or questions they might have regarding using LCCA or the RealCost software," says Tashia Clemons of FHWA's Office of Asset Management.

FHWA's LCCA Team, which includes representatives from the Agency's headquarters office, Resource Center, and the Turner-Fairbank Highway Research Center, made presentations on both LCCA and the RealCost software at the forum. LCCA is an analytical tool that provides a cost comparison between two or more competing design alternatives that produce equivalent benefits for the project being analyzed, evaluating agency and user costs over the life of the various alternatives. Because LCCA focuses on costs required over the life of an asset to maintain it above some minimum performance level, the lowest cost alternative is not necessarily the one with the lowest cost of initial construction.

In a survey of LCCA use conducted by Clemson University in 2005 for the South Carolina Department of Transportation, 33 State transportation departments and 2 Canadian Provinces responded. Of the respondents, 94 percent were using LCCA for pavements. Respondents noted that they typically include the following costs when calculating agency LCCA costs:

- Preliminary engineering.
- Initial construction.
- Construction management.
- Maintenance of traffic.
- Routine and preventive maintenance.
- Resurfacing and rehabilitation.
- Associated administrative expenses.

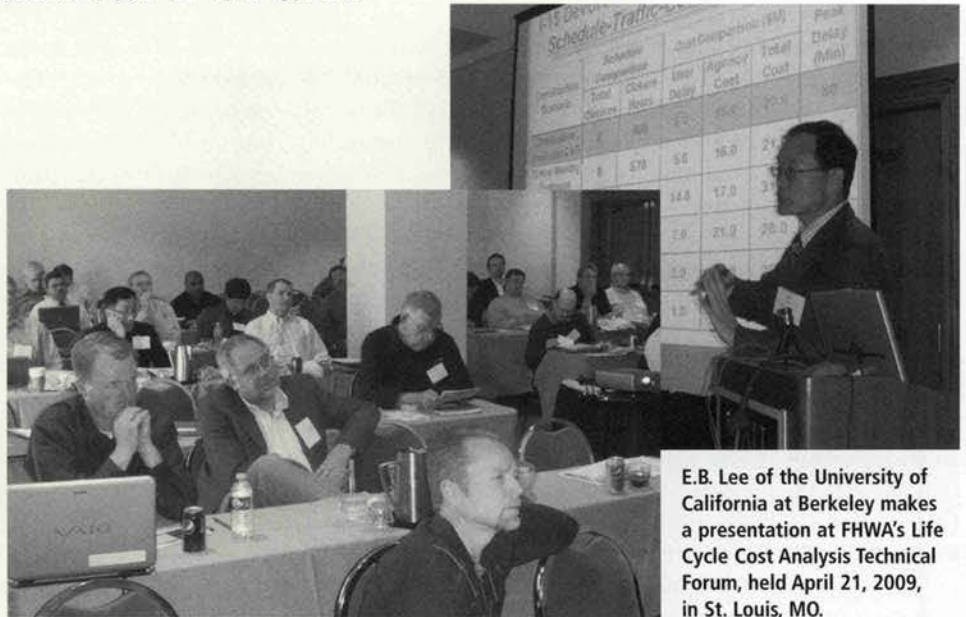
Fourteen States reported including user costs in their LCCA analysis, with 10 of them incorporating work zone user delay costs. Fifty-six percent, meanwhile, incorporated the value of recovered or recycled materials. Eighty percent were using the deterministic approach to conduct LCCA, which uses inputs with fixed values to calculate life cycle cost. The remaining 20 percent were using the probabilistic approach, which assigns a range of possible inputs to each uncertain variable to calculate a probability distribution of results. This approach allows risk to be quantified for the input variables.

At the forum, Bill Farnbach of the California Department of Transportation (Caltrans) highlighted his State's experi-

ences with LCCA. California updated the *Caltrans Highway Design Manual* in June 2006 to incorporate the use of LCCA to determine the optimum pavement design for new construction, widening, and rehabilitation projects. Caltrans' Division of Design also developed a *Life-Cycle Cost Analysis Procedures Manual* for pavements, which is available online at www.dot.ca.gov/hq/esc/Translab/ope/LCCA.html. The *Procedures Manual* walks staff through using FHWA's RealCost program, including providing data, calculations, or sources for data needed to run RealCost and information on how to analyze the RealCost results. "The goal is that any two engineers from anywhere in the State can get the same right answer on the same project in less than 1 day's time," noted Farnbach.

The Colorado Department of Transportation (CDOT) also discussed its experiences in using LCCA. CDOT has been performing LCCA since the early 1970s. Its LCCA process currently specifies that both a deterministic and probabilistic analysis be performed. "However, we have recognized the benefit in using a proba-

continued on page 8 >



E.B. Lee of the University of California at Berkeley makes a presentation at FHWA's Life Cycle Cost Analysis Technical Forum, held April 21, 2009, in St. Louis, MO.

Excellence in Utility Relocation and Accommodation 2009

Presented in Oklahoma City, Oklahoma, on April 20, 2009, the Federal Highway Administration's (FHWA) 2009 Excellence in Utility Relocation and Accommodation Awards recognize outstanding innovations that have significantly advanced how transportation agencies relocate or accommodate utilities on surface transportation improvement projects.

The biennial awards were announced in the categories of Project Development, Construction Management, Innovation, and Leadership at the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Right-of-Way and Utility Conference.

"As the demands on the surface transportation system become increasingly complex, it is extremely important to consider the needs of all stakeholders and continuously coordinate with utility companies," says Jeffrey Zaharewicz of FHWA's Office of Program Administration. "All of this year's award winners and honorable mention recipients have demonstrated consistently high standards in this regard. It is vital to begin this coordination as early as possible and maintain the effort throughout to achieve successful project development and delivery."

The awards will next be presented in spring 2011, with the call for nominations

expected to begin in fall 2010. For more information on the awards program, contact Jeffrey Zaharewicz in FHWA's Office of Program Administration, 202-493-0520 (email: jeffrey.zaharewicz@fhwa.dot.gov).

Project Development Award

Maryland Route 97/Randolph Road Intersection, Montgomery County, Maryland

This year's Project Development award recognizes a complex urban project involving a highly congested intersection. The Maryland State Highway Administration (SHA) implemented a plan designed to grade separate Maryland's Route 97 and Randolph Road intersection, using an innovative bridge and tunnel combination to lower Randolph Road by more than 7.6 m (25 ft) and carry it under Route 97. The complexities facing the project team were vast, including a 69,000-volt power line and a significant communications line running beneath the intersection. With a 3-year construction schedule forecast, the project team decided to permanently relocate all utilities beyond the existing footprint. An advance contract was advertised to relocate the utility infrastructure before commencing roadway work. Consultants were also hired to represent each utility in weekly coordination meetings and conduct real-time design

sessions. The successful collaboration led to cost reductions and reduced the utility relocation schedule from 5 to 3 years.

Award Recipients and Contacts:

Maryland SHA—John Ney (jney@sha.state.md.us); Nelson Smith (nsmith@sha.state.md.us).
KCI Technologies, Inc.—Scott Riddle (scott.riddle@kci.com).
Johnson, Mirmiran and Thompson—Kenneth McDonald, Jr. (mcdonald@jmt.com).

Project Development Award Honorable Mention

Route 17/Essex Street Interchange Reconstruction, Bergen County, New Jersey

This \$68 million project reduced congestion and improved safety by replacing the deteriorating bridge carrying Essex Street over Route 17 with a new six-lane bridge. Through an extensive project development process involving collaboration with 14 utility companies, \$10 million in utility relocations were accommodated as part of the project. The use of subsurface utility engineering (SUE), significant preconstruction relocations, and other provisions enabled the construction schedule to be reduced from 32 months to 16 months.

Award Recipients and Contacts:

New Jersey Department of Transportation—Manuel Viteri (manuel.viteri@dot.state.nj.us).
Taylor Wiseman and Taylor—Thomas Costello (costello@taylorwiseman.com); Anthony DiMauro (dimauro@taylorwiseman.com); and Colleen Richwall (richwall@taylorwiseman.com).

Ambassador Caffery Parkway Extension Project, Lafayette Parish, Louisiana

The Ambassador Caffery Parkway Extension Project in Louisiana was designed to ease traffic flow, especially during hurricane evacuations, and to foster economic development in the area. With a total cost



Maryland Route 97 in Montgomery County, MD.



Replacement of the Interstate 35W bridge in Minneapolis, MN.

of approximately \$40 million, including \$7 million of utility relocation work involving 16 utility companies and 6 major oil pipelines, the project was a major undertaking. To ensure project success, the Louisiana Department of Transportation and Development's (LADOTD) team employed the "Three C's" (Coordination, Communication, and Cooperation), beginning before final acquisition of right-of-way to ensure all the conflicting utilities would be relocated prior to project advertisement.

Award Recipients and Contacts:

LADOTD—Steven Deville (steven.deville@la.gov); Trey Jesclard (trey.jesclard@la.gov); Randy Richard (randy.richard@la.gov); and Sandra Woolie (sandra.woolie@la.gov).

Construction Management Award *Interstate 35W Bridge Over the Mississippi River, Hennepin County, Minnesota*

The 2009 Construction Management award was presented in recognition of the significant utility relocation challenges faced by the Minnesota Department of Transportation (Mn/DOT) as it worked to quickly replace the I-35W bridge over the Mississippi River. As the existing utility procedures would have been prohibitively long, all public and private utilities required to relocate participated in a fast-track schedule. A design engineer with Mn/DOT worked closely with the contractor, serving as a single point of contact

in carrying out utility coordination and agreement writing. The unique collaborative approach allowed work to be completed 3 months ahead of schedule.

Award Recipients and Contacts:

Mn/DOT—Mary Lacho (mary.lacho@dot.state.mn.us).
Flatiron Construction Corporation—Matt Semerad (msemerad@flatironcorp.com).
Cardno TBE—Jeff A. Sowers (jeff.sowers@cardnotbe.com).

Innovation Award

Utility Redline Project, Georgia Department of Transportation (GDOT)

GDOT received the 2009 Innovation Award for the development of its Utility Redline Software Application. "Our goal is to provide the tools and training that will significantly help save time and money, not only for GDOT but also for our stakeholders," says Jun Birnkammer of GDOT. The software facilitates the transmittal of utility plan mark-ups in electronic format for construction projects, thereby improving utility coordination efforts, reducing project delivery schedules, significantly increasing plan quality, and reducing printing costs.

Award Recipients and Contacts:

GDOT—Jun Birnkammer (jbirnkammer@dot.ga.gov); Glenn Robertson (grobertson@dot.ga.gov); and Glenn Williams (gwilliams@dot.ga.gov).

Innovation Award Honorable Mention *Florida Department of Transportation's (FDOT) Utility Coordination Web Site (UCW)*

The UCW was developed to coordinate utility relocations among all utility companies, FDOT staff, and contractors in Palm Beach County, Florida. "This system has recently spread to cover additional counties," says FDOT Utility Coordinator Johnny Blakeney. "I imagine it could be implemented throughout the State of Florida eventually."

Award Recipients and Contacts:

FDOT—Johnny Blakeney (johnny.blakeney@dot.state.fl.us).

Katy Freeway Reconstruction Program, Harris County, Texas

The Katy Freeway Project involved widening 43 km (27 mi) of heavily traveled urban roadway to accommodate explosive growth and relieve congestion on Houston's West side. The Texas Department of Transportation (TxDOT) used a general engineering consultant (Parsons Brinckerhoff) to coordinate the efforts of 33 utility owners through 4 utility corridors. Relocation efforts involved almost 200 legal agreements and spanned 7 years. The project's processes and tracking elements are now used as a model for other large scale projects in Texas.

Award Recipients and Contacts:

TxDOT—David Roberts; Stephen Stakemiller (sstakem@dot.state.tx.us); and Frances Willison (fwillis@dot.state.tx.us).

Parsons Brinckerhoff—Ken Stayer (stayer@pbworld.com).

Leadership Award

James H. Anspach, J.H. Anspach Consulting, and Nicholas M. Zembillas, Cardno TBE

The Leadership Award for 2009 was presented to Nicholas M. Zembillas and

continued on page 6 ➤

Excellence in Utility Relocation,

continued from page 5

James H. Anspach, who are recognized trailblazers in the highway and utility field and are greatly responsible for the growth in the use of subsurface utility engineering (SUE). Their efforts have contributed to improved construction and millions of dollars in savings on transportation projects nationwide.

Award Recipients and Contacts:

J.H. Anspach Consulting—James H.

Anspach (jhanspach@aol.com).

Cardno TBE—Nicholas M. Zembillas

(nick.zembillas@cardnotbe.com).

Leadership Award Honorable Mention

Ohio Department of Transportation (ODOT) Utility Plan Reading Training Class

The success of ODOT's Utility Plan Reading Training Class has resulted in more than 300 utility personnel from 15 companies receiving training. The 2-day course was designed to enhance the efficiency and cost effectiveness of the utility relocation process and eliminate delays.

Award Recipients and Contacts:

ODOT—Myra Binns (myra.binns@dot.

state.oh.us); G. Raymond Lorello

(ray.lorello@dot.state.oh.us); and Mark

Manzo (mark.manzo@dot.state.oh.us).

Teresa Loop, Puget Sound Energy (PSE), Washington State

Teresa Loop of PSE has helped successfully coordinate utility relocation along an important State highway corridor, and in the process is helping to change the way utility companies work together in Skagit County, Washington. Loop's proactive approach worked so well that PSE has subsequently initiated a quarterly meeting with other companies that connect to PSE utility poles.

Award Recipients and Contacts:

PSE—Teresa Loop (teresa.loop@pse.com).

FHWA Offers Training Course on Bridge Safety Inspections

Equipping participants with essential knowledge and skills for conducting bridge inspections is the goal of a course available from the Federal Highway Administration's (FHWA) National Highway Institute (NHI) entitled Safety Inspection of In-Service Bridges (Course No. FHWA-NHI-130055).

The course will be held August 3–14, 2009, in Arlington, Virginia. Based on FHWA's *Bridge Inspector's Reference Manual*, it has been designed to fulfill the requirements of the National Bridge Inspection Standards for a comprehensive training course. Successful completion of the course will provide participants with the skills to evaluate a variety of bridges and determine the critical areas for inspection, including fatigue-prone details and common points of deterioration and distress. Participants will also be able to evaluate the severity of material deterioration and member distress and assign ratings according to coding guidance developed by FHWA or their State transportation agency, as well as determine when it is necessary to close a bridge because of imminent danger or when further inspection is required.

The safety inspection course is aimed at Federal, State, and local transportation agency employees involved in inspecting bridges or in charge of a

bridge inspection unit. It is recommended that participants possess a background in bridge engineering or, alternately, have completed the NHI course, Engineering Concepts for Bridge Inspectors (Course No. FHWA-NHI-130054). The course fee is \$1,400 per participant.

Additional course sessions are scheduled to be held in Montgomery, Alabama, from August 3–14, 2009, and Topeka, Kansas, from September 14–15, 2009.

To register for any of the upcoming courses, visit www.nhi.fhwa.dot.gov/training. For more information on a particular session, contact the local coordinator listed below.

The course is designed to fulfill the requirements of the National Bridge Inspection Standards for a comprehensive training course.

Arlington, Virginia,
August 3–14, 2009—
Sherese Lyles at
FHWA, 703-235-1212
(sherese.lyles@fhwa.dot.gov)

Montgomery, Alabama,
August 3–14, 2009—Benjamin
Yates at the Alabama

Department of Transportation, 334-242-6284 (yatesb@dot.state.al.us)

Topeka, Kansas, September 14–15, 2009—Becky Welsh at the Kansas Department of Transportation, 785-291-3463 (beckyk@ksdot.org)

For more information about the course content, contact Tom Everett in FHWA's Office of Bridge Technology, 202-366-4675 (email: thomas.everett@fhwa.dot.gov).

Highway Technology Calendar

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

Eighth International Conference on the Bearing Capacity of Roads, Railways, and Airfields

June 29–July 2, 2009, Champaign, IL

The conference will cover issues relating to the bearing capacity and mechanistic-based design of highway and airfield pavements and railroad track structures. Sponsors include the Federal Highway Administration (FHWA), Federal Aviation Administration, Federal Railroad Administration, Transportation Research Board (TRB), and the Illinois Department of Transportation.

Contact: Cheryl Richter at FHWA, 202-493-3070 (email: cheryl.richter@fhwa.dot.gov), or visit www.BCR2A.org.

2009 Petersen Asphalt Research Conference and Pavement Performance Prediction Symposium

July 13–17, 2009, Laramie, WY

Current research aimed at understanding and improving asphalt pavement performance will be featured at the conference. The 3-day conference is followed by a 2-day symposium, which focuses on key aspects of pavement performance. Participants may register for both the conference and symposium or either one separately. The conference and symposium are organized by the Western Research Institute (WRI).

Contact: Steve Salmans at WRI, 307-721-2306 (email: ssalmans@uwyo.edu); or Terry Arnold at FHWA, 202-493-3305 (email: terry.arnold@fhwa.dot.gov). Information is also available at www.petersenasphaltconference.org.

Precast/Prestressed Concrete Institute (PCI)/FHWA National Bridge Conference

September 12–15, 2009, San Antonio, TX

The conference will present state-of-the-art information on precast concrete design, fabrication, and construction. Featured topics will include accelerated construction, designing for seismic forces, high-performance concrete, and innovative precast concrete structures.

Contact: Myint Lwin at FHWA, 202-366-4589 (email: myint.lwin@fhwa.dot.gov), or visit www.pci.org (click on “News and Events” and then select “PCI–FHWA National Bridge Conference”).

Eighth National Conference on Transportation Asset Management: Putting the Asset Management Pieces Together

October 19–21, 2009, Portland, OR

The conference will highlight emerging issues in transportation asset management, including trade-off analysis, optimization, system management, and

safety. Three thematic tracks will be featured: Safety, Pavement Management, and Data and Information Infrastructure. Practical examples of asset management implementation within a State, region, or local community will also be spotlighted.

Contact: Tom Palmerlee at TRB, 202-334-2907 (email: tpalmerlee@trb.org); or Francine Shaw-Whitson at FHWA, 202-366-8028 (email: francine.shaw-whitson@fhwa.dot.gov). Information is also available online at www.trb.org/conferences/2009/asset.

Fourth Asphalt Shingle Recycling Forum

November 5–6, 2009, Chicago, IL

Hosted by the Construction Materials Recycling Association, forum sponsors also include the Asphalt Roofing and Manufacturers Association, Owens Corning, FHWA, U.S. Environmental Protection Agency, National Roofing Contractors Association, and the National Asphalt Pavement Association. Three roundtables will be held on November 5 for transportation agency officials; environmental officials; and shingle recyclers, hot-mix asphalt producers, and other industry partners.

Contact: Audrey Copeland at FHWA, 202-493-0341 (email: audrey.copeland@fhwa.dot.gov), or visit www.shinglerecycling.org. *

FOCUS

Focus (ISSN 1060-6637), which is published monthly by the U.S. Department of Transportation's Federal Highway Administration (FHWA), covers the implementation of innovative technologies in all areas of infrastructure.

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.

FHWA Acting Deputy Administrator:
Jeffrey F. Paniati

Managing Editor: Zachary Ellis
Tel: 202-493-3193 (fax: 202-493-3475)
zachary.ellis@fhwa.dot.gov

Editor: Lisa Pope
Tel: 202-234-7157 (fax: 202-347-6938)
lgpope@woodwardcom.com

Federal Highway Administration (HRTM)
6300 Georgetown Pike
McLean, VA 22101-2296

Notice—The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of the article.

Publication No. FHWA-H

HIF-1/06-09(10M)E

Send address corrections to:

Woodward Communications
1420 N St., NW, Suite 102
Washington, DC 20005
fax: 202-347-6938
email: lgpope@woodwardcom.com

RealCost Technical Forum,

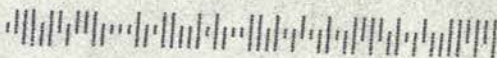
continued from page 3

bilistic analysis and the fact that it allows us to model uncertainties in our cost assumptions," said Craig Wieden of CDOT. Beginning in July 2009, CDOT will switch to using a probabilistic analysis only. This analysis is performed using FHWA's RealCost program. CDOT also uses a program known as WorkZone to calculate user costs. "This program allows for various construction work alternatives to be analyzed, and also lets us look at traffic queue lengths and delays," noted Wieden. "Alternatives that create traffic queues over 5 miles in length or delays of over 30 minutes are not allowed."

RealCost is now available in Version 2.5, which incorporates many upgrade requests submitted by various transportation agencies. The software provides a tool to perform LCCA for pavement selection in accordance with FHWA best practice methods. RealCost can also be used to perform a cost comparison for bridges and structures. The LCCA best practices are

ously analyzed has increased from two to six. Users can select up to 24 activities to be included in each design alternative, compared to the previous version of the software, where only a fixed number of seven activities could be selected. Up to four different traffic distributions, such as for a weekday or weekend, can also be defined and selected. Different traffic distributions can be selected for different activities within the same design alternative. The remaining life value calculation has been modified as well to consider both the structural and service life remaining at the end of the analysis period. RealCost has also been enhanced to reduce the file size and improve execution time. To download RealCost 2.5, visit www.fhwa.dot.gov/infrastructure/asstmgmt/lccasoft.cfm. FHWA's LCCA publications are available at www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm.

For more information on the LCCA Technical Forum or using LCCA, contact Tashia Clemons in FHWA's Office of Asset Management, 202-366-1569 (email: tashia.clemons@fhwa.dot.gov). LCCA resources, including examples of RealCost LCCA input files and reports displayed by State presenters at the forum, are available online at www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm. *



documented in FHWA's *Life-Cycle Cost Analysis in Pavement Design* (Pub. No. FHWA-SA-98-079). Among the enhancements found in Version 2.5, the number of design alternatives that can be simultane-

U.S. Department
of Transportation

**Federal Highway
Administration**

6300 Georgetown Pike
McLean, VA 22101

Official Business
Penalty for Private Use \$300

FIRST CLASS MAIL
U.S. POSTAGE
PAID
PERMIT # 448
SOUTHERN MD

Check out FOCUS online at
www.tfhr.gov/focus/focus.htm

ALL PUBS
BILL CUNNANE
FEDERAL HIGHWAY ADMINISTRATION
M-32.4 ROOM E41-301
1200 New Jersey Ave SE
Washington DC 20590-0001