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October
2006

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Highway Quality on the Move

by Dave Geiger, Doug Rose, and Mark Knight

With a coast-to-coast commemorative caravan, parades, and events in cities large and small, transportation departments, communities, and citizens of all ages celebrated the 50th anniversary of the Interstate this year. The landmark achievement transformed the Nation and brought unprecedented mobility to our daily life. As we celebrate this milestone in 2006, we also look to the future of our highways. How do we address the challenges of population and vehicle growth, aging roadways, and increased traffic congestion while improving safety? And how do we best meet the mobility needs of 21st century drivers?

To meet the challenges and discover the opportunities ahead, join the quality revolution. New partnerships, new initiatives, and an increased emphasis on meeting and exceeding our customer's expectations and sustaining the public trust are defining today's quality movement.

Building a better highway begins with partnerships. From planning and design to construction, operations, and maintenance, excellence is achieved when all parties are working toward the quality goal. On a national level, the National Partnership for Highway Quality (NPHQ) brings together State, Federal, and highway industry leaders to encourage the use of quality practices that will improve safety, product performance, and service for highway users. NPHQ's Fall 2006 Highway Quality Conference, scheduled for

November 14–15, 2006, in New Orleans, Louisiana, will focus on "Turning Highway Program Curve Balls into Home Runs." The conference will highlight innovations in keeping and training the evolving highway workforce, lessons learned from responding to Hurricane Katrina, and public-private partnership models. The 2006 NPHQ Making a Difference Award winners will also be announced at the conference, spotlighting projects that are changing the face of transportation in their communities. These projects succeed in motivating employees to achieve excellence while delivering what the customers want, adding up to a winning quality equation.

At the State level, NPHQ, the Federal Highway Administration (FHWA), and the American Association of State Highway and Transportation Officials (AASHTO) are working with transportation departments to encourage the formation of State Quality Partnerships (SQPs). An SQP is a voluntary, active group of transportation stakeholders and professionals who meet regularly and share common goals for the continuous improvement of highways, roads, and bridges. SQP members typically include representatives from the State transportation department, FHWA division office, industry associations, city and county offices, and other stakeholders. NPHQ has launched a new accreditation process for SQPs, with the goal of having an active SQP in every State.

States with active SQPs that are already

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

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making a difference every day include Georgia and Maryland. The Georgia Department of Transportation (GDOT) reinvigorated its 12-year-old Georgia Quality Initiative by launching the new intermodal Georgia Partnership for Transportation Quality (GPTQ) in 2004. GPTQ's members range from GDOT and the Georgia Highway Contractor's Association to such new partners as the Georgia Transit Association and the Association of County Commissioners of Georgia. Among the current GPTQ initiatives is workforce training, including holding workshops on reducing utility-related project delays and partnering with the Local Technical Assistance Program to provide classes on mix type design to local governments and their consultants.

The Maryland State Highway Administration (SHA) started its Maryland Quality Initiative in 1992, fostering a collaborative environment that has reduced claims and change orders for projects and encouraged the implementation of context sensitive design and design build contracts. Future plans include strengthening relationships with utilities and continuing to build stakeholder involvement by bringing the State police and environmental and occupational safety and health groups on board.

Ensuring a well-trained and qualified workforce is also crucial to the quality equation. FHWA's Transportation Curriculum Coordination Council (TCCC) has partnered with States, NPHQ, AASHTO, industry associations, and the National Highway Institute to develop more than 40 training courses and a core curriculum for training transportation personnel that States can use in their workforce development plans. The TCCC offerings range from a basic survey course for construction technicians to classes on hot-mix asphalt construction and bridge construction inspection. For further information on course descriptions and

availability, please visit the TCCC Web site at www.nhi.fhwa.dot.gov/TCCC.

Sustaining a quality workforce depends upon attracting students and young people to the profession. The Maryland Quality Initiative holds an annual Construction and Engineering Career Day to reach out to high school students and introduce them to engineering and highway construction as a future profession. The third Career Day event was held on April 25, 2006, drawing approximately 500 high school students, teachers, and counselors. Students could attend interactive presentations on each phase of the highway project development process, including planning, surveying, design, traffic, and construction management, as well as visit a simulated construction site and try out such tasks as running a concrete slump test and constructing concrete forms.

Delivering the quality product that our customers are asking for also means getting in, getting out, and staying out. Over the past 3 years, more than one-half of the States have realized the benefits of accelerated highway construction by participating in the Accelerated Construction Technology Transfer (ACTT) program. Started by the Transportation Research Board, AASHTO, and FHWA, ACTT brings State transportation agency staff together with national experts in a range of skill sets for a 3-day workshop. At the workshop, participants identify innovative approaches to reducing time, costs, and congestion for a planned highway project, while improving safety, quality, and roadway performance. These approaches consider everything from addressing environmental concerns to considering new



Among the States that have held an ACTT workshop is Montana. The 2004 workshop focused on accelerating the upgrade of US 93 between Evaro and Polson.

designs, new materials, and innovative construction staging and community relations. As a result of the 28 workshops to date, millions of dollars and years of delays have been shaved off of highway projects, which has a direct impact on increased user satisfaction. More information on ACTT is available at www.fhwa.dot.gov/construction/accelerated.

Pavement preservation programs are also playing a part in the quality equation by extending the life of this critical asset and contributing to improved highway performance. In 2005, FHWA launched a new Pavement Preservation Technical Assistance Program to partner with highway agencies to develop, expand, or improve preservation programs. Efforts are also underway to encourage the application of timely preservation interventions on structures. To learn more about pavement preservation, visit FHWA's Transportation System Preservation Web site at www.fhwa.dot.gov/preservation or the National Center for Pavement Preservation online at www.pavementpreservation.org.

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To learn more about NPHQ's 2006 Highway Quality Conference or starting an SQP in your State, visit www.nphq.org, or contact Bob Templeton at NPHQ, 512-301-9899 (email: btemplenphq@aol.com). For more information on FHWA's quality initiatives, contact Ken Jacoby at FHWA, 202-366-6503 (email: ken.jacoby@fhwa.dot.gov).

A Long-Life Future for Concrete Pavements

oming soon to a concrete pavement near you: Two-lift concrete construction and the use of a pavement design catalog are just some of the practices recommended for implementation in the United States by a scan team of concrete pavement and materials specialists that visited Canada and Europe in May 2006. The goal of the Long-Life Concrete Pavement Scan was to learn more about design philosophies, materials requirements, construction practices, and maintenance strategies used to construct and manage portland cement concrete pavements with long life expectancies. Sponsored by the Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), and the Transportation Research Board's National Cooperative Highway Research Program (NCHRP), the scan team included representatives from State transportation departments, FHWA, NCHRP, academia, and industry associations.

"Safety and mitigation of congestion are two of the most important strategic goals of the U.S. highway community," says scan co-chair Dan Dawood of the Pennsylvania Department of Transportation (PennDOT). "Long-life concrete pavements that require less frequent repair, rehabilitation, and reconstruction can help meet those goals."

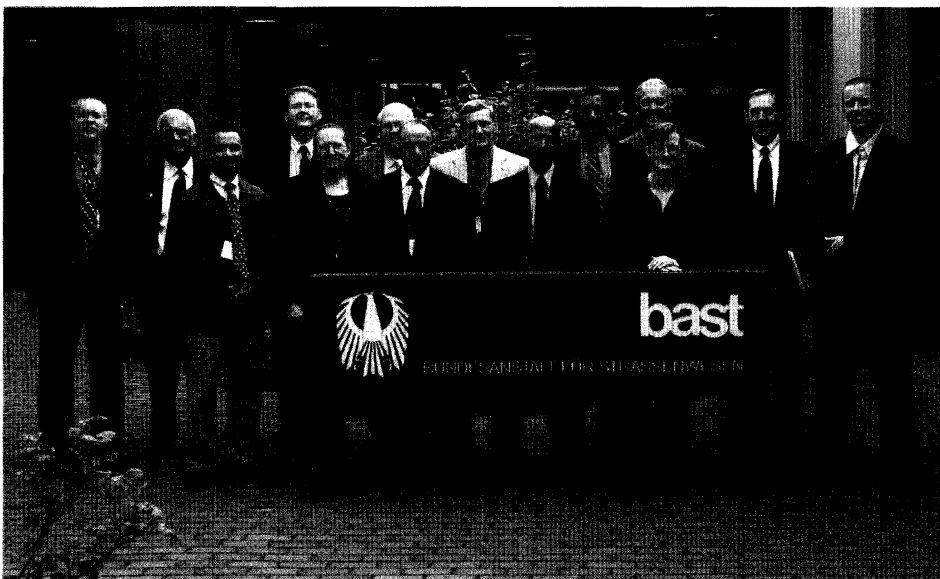
The scan team visited Canada, Germany, Austria, Belgium, the Netherlands, and the United Kingdom, meeting with representatives from Federal and provincial roadway authorities, public-private partnerships for roadway construction and management, the cement and concrete pavement industries, and transportation research laboratories. In all of the countries visited, "concrete pavement" was considered synonymous with "long life." Unlike in the

United States, no distinction was made between a long-life concrete pavement and a standard concrete pavement. Pavements in the countries visited typically have a design life of 30 years, but are expected to last up to 40 or 50 years. "Europe is continuously improving its long-life concrete pavement practices," says scan team co-chair Suneel Vanikar of FHWA.

Practices identified by the scan team and recommended for implementation in the United States include two-lift construction. A two-lift concrete slab paving process allows an agency to use

Practices identified by the scan team and recommended for implementation in the United States include two-lift construction.

recycled or other more economical materials as aggregate in most of the concrete slab, with the highest-quality aggregate reserved for use in the pavement's upper lift. Austria, Belgium, the Netherlands, Germany, and the United Kingdom are all currently using this practice to economize the use of aggregates, recycle reclaimed paving materials, and construct pavement surfaces that have improved safety and noise characteristics. Two-lift construction can accommodate the use of an exposed aggregate surface to mitigate noise and enhance friction. While two-lift construction is not new to the U.S. concrete paving industry, in recent years it has only been used on an experimental basis. The scanning team plans to develop comparisons of the costs and benefits of using two-lift construction. The team is also forming a technical working group composed of contractor and highway department representatives to examine the benefits of using the two-lift method, develop draft specifications for States and a construction technology plan for contractors,



The Long-Life Concrete Pavement Scan team in Germany.

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New Training for Underwater Bridge Inspection

Inspection of the underwater portions of the Nation's bridges is the focus of a new 3-day course now available from the Federal Highway Administration's (FHWA) National Highway Institute (NHI). Using real-life examples, Underwater Bridge Inspection (Course No. FHWA-NHI-130091) offers an overview of diving operations. The course provides bridge inspection training that is now required by the National Bridge Inspection Standards (NBIS) for all divers conducting underwater inspections. "Satisfactory completion of this course will fulfill the NBIS requirement for an underwater bridge inspection diver," says Gary Moss of FHWA. Bridge inspection program managers, structural engineers, and non-diving bridge inspectors from the

public and private sectors will also benefit from the course.

The pilot course was held in Reno, Nevada, from June 13-15, 2006. The 29 participants included representatives from the Nevada, California, Washington State, and Idaho departments of transportation, as well as from engineering firms, commercial diving firms in the United States and Canada, and the U.S. Navy. "There was a great deal of interest in the course, with attendees ranging from beginners to individuals with 20 to 25 years experience," says Dave Severns of the Nevada Department of Transportation.



In this Underwater Bridge Inspection course exercise, participants try to identify objects and their defects.

"The course was very well received. Most students indicated on evaluation surveys

Bridge Inspection Resources

Learn more about bridge inspection with the following NHI courses.

Bridge Inspection Refresher Training

(Course No. FHWA-NHI-130053)

November 7-9, 2006, Lansing, MI

December 5-7, 2006, Jefferson City, MO

This course aims to refresh the skills of practicing bridge inspectors. Core course topics include inspector qualifications and duties, record keeping and documentation, structure inventory and appraisal overview, National Bridge Inventory standard component ratings, element level ratings, and safety. The course also features case studies and a virtual bridge inspection classroom exercise.

Engineering Concepts for Bridge Inspectors

(Course No. FHWA-NHI-130054)

The 5-day course aims to familiarize bridge inspectors with basic concepts in bridge engineering. The target audience is Federal, State, and local technicians, inspectors, and engineers with basic experience relating to highway bridges. Individuals completing this course could serve on a bridge inspection team, but would require additional experience and training to qualify as team leaders.

Safety Inspection of In-Service Bridges

(Course No. FHWA-NHI-130055)

December 4-15, 2006, Springfield, IL

December 4-15, 2006, Helena, MT

January 8-19, 2007, Salt Lake City, UT

January 29-February 9, 2007, Salem, OR

February 5-16, 2007, Austin, TX

March 12-23, 2007, Shoreview, MN

Using the *Bridge Inspector's Reference Manual*, the course will highlight issues related to safety inspection of in-service highway bridges. A background in bridge engineering or completion of the NHI course, "Engineering Concepts for Bridge Inspectors," is strongly recommended for all participants. Participants will be required to complete midterm and final examinations based on course content. Satisfactory completion of this course will fulfill the training requirements of the National Bridge Inspection Standards for a comprehensive training course.

To host these courses, visit www.nhi.fhwa.dot.gov and submit a host request form (FHWA Form 1530), or contact the NHI Training Coordinator at 703-235-0534 (email: nhitraining@fhwa.dot.gov). For additional information on the courses, contact Thomas Everett at FHWA, 202-366-4675 (email: thomas.everett@fhwa.dot.gov), or Gary Moss at FHWA, 202-366-4654 (email: gary.moss@fhwa.dot.gov).

that they were quite satisfied with the training.”

Course topics include methods of underwater inspection, underwater material deterioration mechanisms and inspection techniques, scour inspection techniques, and underwater National Bridge Inventory (NBI) and element level rating. Upon completion of the course, participants will have the ability to:

- Explain the need for and benefits of inspecting the underwater portions of bridge structures.
- Describe typical underwater defects and deterioration, and identify conditions contributing to rates of deterioration.
- Identify the types of inspection equipment available and the advantages and limitations of each.
- Identify procedures for planning and performing thorough and safe underwater bridge inspections.
- Assign NBI and element level ratings for underwater components in accordance with the NBIS and agency requirements.

At the conclusion of the course, a final exam will be administered.

The course fee is \$400 per participant. The minimum class size is 20, with a maximum of 30. To host this course, visit the NHI Web site (www.nhi.fhwa.dot.gov) and complete the “On-Site Course Request” form (FHWA Form 1530). Course scheduling is subject to instructor availability.

For information on course content, contact Gary Moss at FHWA, 202-366-4654 (email: gary.moss@fhwa.dot.gov). For more information on scheduling the course, contact the NHI Training Coordinator at 703-235-0534 (email: nhitraining@fhwa.dot.gov).

Long-Life Concrete Pavements,

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and plan demonstration projects and showcase workshops for 2007 and 2008.

Another practice recommended for U.S. implementation is the use of a design features matrix/catalog. Austria, Germany, and Belgium routinely use a design catalog to select pavement thicknesses and some other pavement features. The catalog features reflect the countries’ experiences with materials, climate, and traffic levels. These catalog designs are refined about every 5 years using mechanistic principles, laboratory testing, and field observations. “The use of a catalog for selection of pavement thicknesses and other pavement design features offers obvious advantages in consistency and simplicity, compared to our present practice of custom design of individual pavements using mechanistic-empirical or empirical design procedures,” notes the scan team in its preliminary report. The scan team plans to prepare guidelines for developing pavement design catalogs that would complement the AASHTO *Mechanistic-Empirical Pavement Design Guide*. States could then use these guidelines to develop their own catalogs.

Additional recommendations include conducting a review of State aggregate quality requirements and AASHTO standards compared to European standards, as the team observed that the unbound granular materials used for concrete pavement subbases in Europe are generally better quality materials than those used as select fill and granular subbase in the United States. The team also noted the use of intelligent compaction for concrete pavements in Austria and Germany. Rollers with

intelligent compaction capabilities have a measurement and control system that continuously adapts the equipment performance to optimize compaction based on the pavement conditions. FHWA has developed a Strategic Plan for Intelligent Compaction, which proposes a 5-year study of intelligent compaction to develop draft AASHTO construction quality control specifications and assist in implementation of the technology. A new Transportation Pooled Fund project (No. TPF-5(128)) recently launched by FHWA will study the use of intelligent compaction technology for all pavement materials.

The team also observed the use of exposed aggregate surfacing as a solution to concrete pavement noise in Austria and Germany. With this type of surfacing, high-quality and durable aggregates are used in the top course of the concrete slab. A process involving set retardation and abrasion is then used to produce an exposed aggregate surface with good low-noise properties. Exposed aggregate can also increase friction and durability. The team plans to conduct additional testing at sites in Austria to collect noise and texture data and compare it to U.S. data on different types of surface finishes.

For more information on the Long-Life Concrete Pavement Scan, contact Suneel Vanikar in FHWA’s Office of Pavement Technology, 202-366-0120 (email: suneel.vanikar@fhwa.dot.gov), Dan Dawood at PennDOT, 717-787-4246 (email: ddawood@state.pa.us), or Hana Maier in FHWA’s Office of International Programs, 202-366-6003 (email: hana.maier@fhwa.dot.gov). To learn more about the Transportation Pooled Fund project on intelligent compaction technology, visit www.pooledfund.org (click on “Search” and then enter “TPF-5(128)” as the study number).

LTTP Products 2006

Transportation Planning and Asset Management

A new brochure available from the Federal Highway Administration (FHWA), *Transportation Planning and Asset Management* (Publication No. FHWA-IF-06-046), is designed to assist metropolitan planning organizations (MPOs), transportation departments, and others in balancing funding realities with mobility needs; public expectations; and community, legislative, and environmental considerations. The brochure outlines how transportation asset management provides a valuable tool to maximize system performance, improve customer satisfaction, and minimize life-cycle costs. It also looks at the role of an MPO in asset management, how to get started in implementing an asset management program, and the benefits of applying asset management during the planning process.

The brochure is available online at www.fhwa.dot.gov/infrastructure/asstmgmt/tpamb.cfm. For printed copies, contact Steve Gaj in FHWA's Office of Asset Management, 202-366-1336 (email: stephen.gaj@fhwa.dot.gov), or Robert Ritter in FHWA's Office of Planning, 202-493-2139 (email: robert.ritter@fhwa.dot.gov). For more information on transportation planning and asset management, visit FHWA's Office of Planning at www.fhwa.dot.gov/planning or the FHWA Office of Asset Management at www.fhwa.dot.gov/infrastructure/asstmgmt.



Since 1987, the Federal Highway Administration's (FHWA) Long-Term Pavement Performance (LTTP) program has collected and analyzed data across North America to better understand how and why pavements perform the way they do. This data analysis has resulted in a range of products and tools to meet today's pavement technology needs. The new *LTTP Product List* (Publication No. FHWA-HRT-06-119) outlines the many products available in such categories as Maintenance and Rehabilitation, Pavement Management Systems, and New and Reconstructed Pavements.

LTTPBind 3.1, for example, is a Microsoft Windows®-based program that can help highway agencies select the most suitable and cost-effective Superpave™ asphalt binder performance grade (PG) for a particular site. The software features a database of high and low air temperatures for nearly 8,000 North American weather stations, enabling users to select the binder PG based on temperature conditions at the site, desired level of risk, and different levels of traffic loading and speed.

The *Distress Identification Manual for the Long-Term Pavement Performance Program* (Publication No. FHWA-RD-03-031), meanwhile, provides a consistent, uniform basis for collecting distress data. The manual contains a

common language for describing cracks, potholes, rutting, spalling, and pavement distresses monitored by the LTTP program. It features photographs and text that clearly label, describe, and illustrate each type of distress. Many States have adopted the procedures established in the manual.

Users around the world can access the LTTP data through the LTTP Standard Data Release, which makes the world's largest pavement performance database available annually in Microsoft Access® format as a five-CD set or on a single DVD. Data can also be obtained through DataPave Online (www.datapave.com), a user-friendly application that includes inventory, materials testing, pavement performance monitoring, climate, traffic, maintenance, rehabilitation, and seasonal testing data from the more than 2,500 LTTP pavement test sections throughout North America.

For more information on LTTP products or a copy of the 2006 Product List, visit www.fhwa.dot.gov/pavement/ltp/index.cfm (look under "Publications" for the Product List). The *Distress Identification Manual* is available at www.fhwa.dot.gov/pavement/ltp/resource.cfm. To learn more or for information on obtaining LTTPBind 3.1, contact the LTTP Customer Support Service Center, 202-493-3035 (email: ltpinfo@fhwa.dot.gov).

The LTTP
program's data
analysis has resulted
in a range of
products and tools
to meet today's
pavement
technology needs.

Highway Technology Calendar

Highway Quality,

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

Highway Quality Conference

November 14-15, 2006, New Orleans, LA

Sponsored by the National Partnership for Highway Quality (NPHQ), the conference will highlight advances in State Quality Partnerships, the winners of the 2006 NPHQ Making a Difference Awards, and the Louisiana Department of Transportation and Development's Quality Improvement Program.

Contact: Bob Templeton at NPHQ, 512-301-9899 (email: btemplenphq@aol.com), or Ken Jacoby at FHWA, 202-366-6503 (email: ken.jacoby@fhwa.dot.gov). Details are also available online at www.nphq.org.

Geosynthetics 2007 Conference and Trade Show

January 16-19, 2007, Washington, DC

This biennial conference will bring together approximately 1,500 participants from government, academia, and the private sector. The theme for this year's conference is "GeoSolutions for the Environment, Homeland Security, and Transportation." Conference topics will heighten awareness about the benefits of using geosynthetics, with information on geosynthetic materials, research, performance, testing, design, engineering, construction, and field experience. The accompanying exhibition will feature current geosynthetic materials, products, software, equipment, and services.

Contact: Corey Bobba at FHWA, 703-948-1406 (email: corey.bobba@

fhwa.dot.gov), or visit www.geoshow.info.

Transportation Research Board (TRB) 86th Annual Meeting

January 21-25, 2007, Washington, DC

Transportation professionals from around the world will gather at the meeting to share their knowledge and perspectives on current developments in transportation research, policy, and practice. The spotlight theme for 2007 is "Transportation Institutions, Finance, and Workforce: Meeting the Needs of the 21st Century."

Contact: For information, visit the TRB Annual Meeting Web site at www.trb.org/meeting. Questions about the meeting can be emailed to TRBMeetings@NAS.edu.

National Conference on Pavement Management

May 6-9, 2007, Norfolk, VA

Conference topics will include the history and development of pavement management, engineering applications of pavement management data, integrating pavement management systems (PMS) and pavement preservation programs, and using PMS data to calibrate the new *Mechanistic-Empirical Pavement Design Guide*. The conference is sponsored by FHWA, the Virginia Department of Transportation, Virginia Transportation Research Council, and the Virginia Tech Transportation Institute.

Contact: Thomas Van at FHWA, 202-366-1341 (email: thomas.van@fhwa.dot.gov).

Quality is a key goal as well for FHWA's Highways for LIFE (HfL) program, which is dedicated to bringing a higher level of innovation and technology to improving the Nation's roadways. The program will include demonstration construction projects, technology transfer, and technology partnerships. To learn more about the HfL initiatives, visit www.fhwa.dot.gov/hfl.

As techniques such as accelerated construction move toward becoming standard practice, rather than for use in special or emergency situations only, and as we emphasize the further development of the transportation workforce and the advances possible through an SQP in every State, partnerships continue to be at the heart of the quality movement. Whether a State transportation department; a contractor, material supplier, or consultant; or the FHWA, only by working together do we achieve the quality results that our customers ask for and the mobility that they depend upon each day. Join us today in keeping America on the move.

Dave Geiger, Doug Rose, and Mark Knight are co-chairmen of the National Partnership for Highway Quality. Geiger is Director of FHWA's Office of Asset Management. Rose is Deputy Administrator and Chief Engineer for Operations of the Maryland State Highway Administration. Knight is the Vice President of Foothill Contracting, Inc., of Webster, South Dakota.

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.

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Publication No. FHWA-HRT-07-007

HIF-1/10-06(1)

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High Performance Materials Training Now on CD

The latest information on high performance materials (HPM) for bridges is now easy to access with the launch of a new two-CD set by the Federal Highway Administration's (FHWA) Resource Center. Captured on the CD are training sessions on fiber reinforced polymer composites, high performance concrete, high performance steel, corrosion-resistant reinforcing bars, and accelerated bridge construction and prefabricated bridge elements. The Resource Center's Structures Technical Service Team presented the training to the Oregon Department of Transportation (ODOT) in February and March 2006.

"The training emphasizes the use of HPMs in accelerated construction efforts and prefabricated bridge element con-

mentation," says Lou Triandafilou of the FHWA Resource Center. The more than 250 attendees in Oregon included representatives from ODOT, neighboring State

transportation departments, local highway agencies, consulting firms, and academia.

The training sessions introduce each of the HPMs and provide more detail on topics such as mechanics, design and construction issues, material properties, benefits, costs, and deployment considerations. The sessions also highlight case studies of State implementation experiences.

Benefits of the training in Oregon included the opportunity to launch continuing discussions among representatives from FHWA division offices; the Idaho, Oregon, and Washington State departments of transportation; and private industry on achieving regional uniformity of steel bridge design and fabrication details.

The CD is being distributed nationally to State transportation departments, FHWA division offices, and Local and Tribal Technical Assistance Programs. To obtain a copy or for more information on HPMs, contact Lou Triandafilou at the FHWA Resource Center, 410-962-3648 (email: lou.triandafilou@fhwa.dot.gov).

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