

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

RESEARCH AND TECHNOLOGY

FHWA Encourages Deployment of 24 Market-Ready Technologies

Improving the safety and performance of the Nation's transportation network requires using the latest research advances. To ensure that State and local agencies and private industry are aware of the most current technologies, the Federal Highway Administration (FHWA) recently updated its list of priority, market-ready technologies and innovations (T&Is) for which it is actively encouraging deployment. According to FHWA Deputy Administrator J. Richard Capka, "This list represents the select few ready-to-use products or processes that are likely to yield significant economic or qualitative benefits for State and local agencies and their industry partners to improve the Nation's transportation system."

To help T&I information reach the transportation community, FHWA developed a series of one-page fact sheets on each of the 24 selected products. Introduced by FHWA at the 2006 Transportation Research Board 85th Annual Meeting in Washington, DC, the fact sheets provide general information about the T&Is, including a description of successful applications and a list of additional resources for more information. In addition, in 2005 the FHWA Research & Technology Leadership Team committed to establishing deployment goals for the T&Is. Therefore, each fact sheet includes a deployment statement and goal, as well as information on the deployment status to date.

The 2006 list fulfills an FHWA commitment to identify technologies that are

ready for immediate deployment. This commitment was established in the FHWA Corporate Master Plan for Research and Deployment of Technology & Innovation (FHWA-RD-03-077). Six of the selected T&Is also have been approved and are being championed by the American Association of State Highway and Transportation Officials' Technology Implementation Group. The six T&Is include the air void analyzer, fiber reinforced polymers, prefabricated bridge elements and systems, cable median barriers, road safety audits, and accelerated construction technology transfer.

FHWA currently is distributing complete sets of all 24 fact sheets to its technology deployment partners. To download the fact sheets, visit www.fhwa.dot.gov/tempcrt/lifecycle/ptisafety.cfm. To download a fact sheet that summarizes all 24 T&Is, go to www.fhwa.dot.gov/tempcrt/marketready/summary.pdf. This summary sheet is a living document that FHWA will update as it identifies new market-ready T&Is. In addition, FHWA will publish future articles to highlight the deployment status of some of the current T&Is.

To support technology deployment as a corporate activity, the coordination, communica-

tion, and distribution of the facts sheets and summary list is a joint effort by FHWA's program and research offices, Office of Corporate Research and Technology, and the FHWA Resource Center. For more information or to request fact sheets, contact:

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2006

Priority, Market-Ready Technologies and Innovations

2006 List

The Federal Highway Administration's (FHWA) Research & Technology Leadership Team endorses six new priority, market-ready technologies and innovations (T&Is). This list continues to fulfill our Agency commitment established in the FHWA Corporate Master Plan for Research and Deployment of Technology & Innovation to identify market-ready T&Is.

<p>CONSTRUCTION PROJECT MANAGEMENT</p> <p>Accelerated Construction Technology Transfer (ACTT)—This undertaking promotes creative techniques to reduce construction time and enhance quality and safety. Contact: James Saranson@fhwa.dot.gov, 202-366-1333; jerry.blending@fhwa.dot.gov, 410-962-2263</p> <p>Asset Management Guide—This guide illustrates asset management principles and identifies techniques and methods for adopting the decisionmaking framework in transportation agencies. Contact: stephen.g@fhwa.dot.gov, 202-366-1335; tray.lisback@fhwa.dot.gov, 406-662-3695</p> <p>ENVIRONMENTAL</p> <p>Dispute Resolution Guidance for Environmental Streamlining—These procedures present strategies for interagency collaborative problem solving during the transportation development and environmental review process. Contact: ruff.ramich@fhwa.dot.gov, 202-366-2024; don.cole@fhwa.dot.gov, 720-962-3210</p> <p>GEOTECHNICAL & FOUNDATIONS</p> <p>Continuous Flight Augered (CFA) Piles—This technology is characterized by the grilling of a hollow-steam auger into the ground, pumping grout or concrete into the hole, and installing reinforcement in the pile. This eliminates the need for a temporary casing. Contact: silas.nichols@fhwa.dot.gov, 410-962-2400</p> <p>Expanded Polystyrene (EPS) Geofram—This lightweight material can be used as fill behind walls and other support structures. Contact: silas.nichols@fhwa.dot.gov, 410-962-2400</p>	<p>811 Traveler Information—This easy-to-remember, three-digit telephone number is available to State and local transportation agencies nationwide so that agencies can provide information readily about highway and transit conditions to travelers by telephone. Contact: robert.ruppan@fhwa.dot.gov, 202-366-1315; rna.lister@fhwa.dot.gov, 708-295-3632</p> <p>DYNAMSMART—This traffic analysis tool can integrate travel demand models into the planning process. The tool can evaluate intelligent transportation system (ITS) technologies and provide traffic operations data for all quality metrics. Contact: henry.liu@fhwa.dot.gov, 202-366-5275; john.tolles@fhwa.dot.gov, 708-295-3641</p> <p>Intelligent Transportation System Deployment Analysis System (IDAS)—This tool can predict the costs and benefits of ITS investments and provide data and information that enable agencies to analyze ITS operational improvements. Contact: robin.mayhew@fhwa.dot.gov, 260-793-9418; james.sturdevant@fhwa.dot.gov, 769-283-3622</p> <p>Maintenance Decision Support System (MDSS)—The MDSS tool uses weather forecasting and data fusion techniques to provide maintenance managers with precise surface condition forecasts and treatment recommendations, thereby reducing maintenance costs for winter operations. Contact: paul.jones@fhwa.dot.gov, 202-365-1901; reynold@fhwa.dot.gov, 769-283-3517</p> <p>QuickZone—This user-friendly computer software tool enables users to estimate and analyze the length of queues and delays in work zones. Contact: denisf.curtis@fhwa.dot.gov, 202-493-3227; debbie.graves@fhwa.dot.gov, 406-492-3912</p>
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The summary list, the first page of which is shown here, provides a brief description of the 24 priority, market-ready technologies and innovations.

The *Research and Technology Transporter* communicates FHWA research, development, and technology accomplishments, findings, information, and technology transfer opportunities. Its audience is transportation engineers and professionals in State and local highway agencies, State DOTs, Local Technical Assistance Program centers, Divisions, Resource Center, academia, and the research community. The eight-page newsletter is published monthly by FHWA's Office of Research, Development, and Technology. Editorial offices are housed at the Turner-Fairbank Highway Research Center. Comments should be sent to the managing editor at the address below. Field offices are encouraged to submit articles for publication via the appropriate agency technology leader from the editorial board listed below. The newsletter can be viewed online at www.tfhrc.gov. Subscriptions to the *Transporter* are free. Send your request to Martha Soneira at the address below, or send an e-mail to martha.soneira@fhwa.dot.gov.

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TECHNICAL ACHIEVEMENT

HIPERPAV Paves the Way With Honors

To open newly constructed pavements within days or hours after the work is completed, pavement contractors in the early 1990s used "fast-track" concrete mixes that gain strength rapidly but can be damaged severely if placed under adverse weather conditions. In response to this problem, the private firm The Transtec Group, Inc., under the direction of the Federal Highway Administration's (FHWA) Stephen Forster, former technical director for Pavement Research & Development, at the Turner-Fairbank Highway Research Center, worked collaboratively with academia, State departments of transportation, industry, pavement contractors, and materials suppliers to create the High PERFORMANCE PAVING (HIPERPAV®) software program. HIPERPAV provides guidance on the design and construction of concrete pavements.

Recently the American Concrete Pavement Association (ACPA) selected HIPERPAV as the winner of its 2005 Marlin J. Knutson Award for Technical Achievement. This annual award goes to a recipient who has made significant contributions to advance the development and implementation of innovative technical and best practice approaches in the design and construction of concrete pavements.

Released in 1996, HIPERPAV operates in a Microsoft® Windows® environment and helps pavement planners and designers predict the stresses found in early-age concrete and the early-age strength of the material. It also helps users evaluate the potential for uncontrolled cracking in new concrete pavements during construction. The program makes these predictions

by considering the potential impact of various construction procedures, mix and pavement designs, traffic levels, and environmental factors on the overall long-term performance of the pavement.

In 2005, FHWA released HIPERPAV II. This expanded version of the software contains new features and modules. The first module enables users to see the effect that early-age design and construction strategies can have on the long-term performance of jointed plain concrete pavement. The second module predicts the behavior of continuously reinforced concrete pavements for the first days and months after placement. Other improvements in HIPERPAV II include enhanced materials characterization, additional flexibility in climatic input, and a completely redesigned graphical user interface.

The HIPERPAV project team currently is working on enhancements to HIPERPAV II, which will include an innovative feature that enables users to simulate an entire day's placement. Users will be able to automatically generate and execute strategies for different placement times throughout the day. The team also is developing an enhanced output summary to provide an intuitive means to visualize the results generated by HIPERPAV II. For more information, visit www.fhwa.dot.gov/pavement/pccp/hipemain.cfm or contact:

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LTPP Service Center Relocates to Turner-Fairbank

Understanding why some pavements perform better than others is critical to building and maintaining a safe and cost-effective highway system. High-performance pavements are more durable and require less frequent maintenance, which helps reduce costs and construction-related traffic congestion and provides smoother, quieter surfaces for motorists. That is why the Long-Term Pavement Performance (LTPP) program, a 20-year study managed by the Federal Highway Administration (FHWA), is conducting a series of field experiments to monitor more than 2,400 pavement test sections across North America. The goal of the LTPP program is to help States make decisions that will lead to better performing pavements.

To bring requests for data and information on the LTPP program

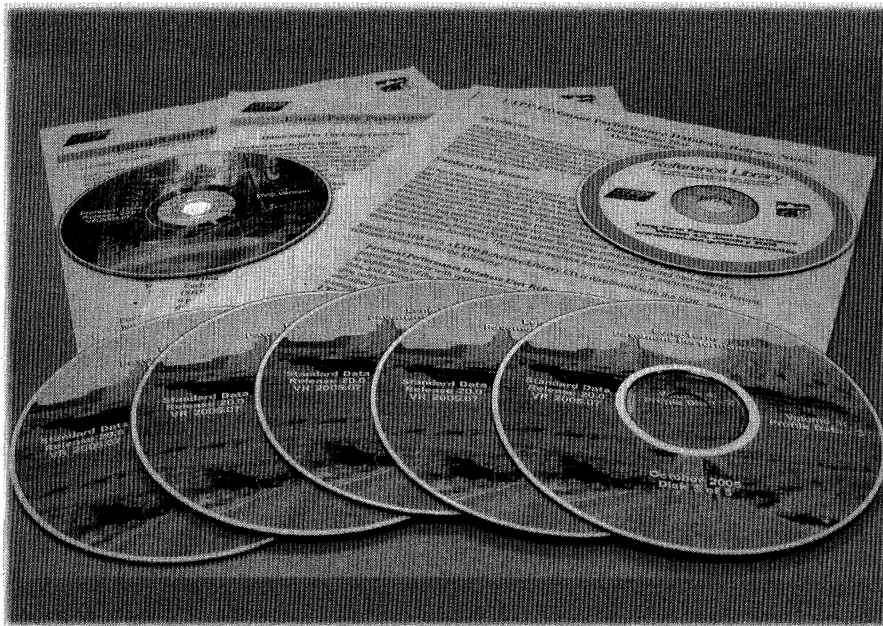
directly to the researchers and engineers at FHWA, the LTPP Customer Support Service Center was relocated in January 2006 to the Turner-Fairbank Highway Research Center (TFHRC) in McLean, VA. The center, formerly operated out of Oak Ridge, TN, was established to provide a single point of contact for LTPP information requests. The center also houses the world's largest pavement performance database, and the staff provides a range of services, including technical assistance.

At its new location, the service center will continue to provide the same customer assistance, including distribution of LTPP data, software utilities, and resource documents; guidance on selecting appropriate data for research studies and other applications; and explanation of the database structure and tools, data collection methods, and data files. The service center also will make

available other data and information collected by the LTPP program, but not stored in the pavement performance database. Known as ancillary information, this includes distress maps and photographs, drainage videos, raw profile data, and construction reports. The center will make every effort to fulfill requests for ancillary information; however, there may be some limitations, depending on the level of effort required.

An advantage of having the service center at TFHRC is that FHWA's researchers and engineers have the expertise to provide guidance to other researchers. In addition, having the center onsite is expected to provide FHWA's LTPP team with a more immediate sense of customer needs and the tools that could be developed to aid LTPP data analysis.

Since 1997 the service center has received more than 3,800 requests for data and information. The most common request is to receive the LTPP "Standard Data Release," a DVD or set of CD-ROMs containing the most current pavement performance data. Updated annually, the package includes a navigation tool and manual to assist users in searching the database. Copies of the latest edition, published in October 2005, are now available from the service center. To receive a copy, call 202-493-3035, which is the center's new telephone number, or send an e-mail to ltppinfo@fhwa.dot.gov. For more information on the LTPP program, visit www.fhwa.dot.gov/pavement/ltpp/index.cfm.



The LTPP Standard Data Release CD-ROM set (also on DVD) includes the latest LTPP data and supporting information and is available from the LTPP Customer Support Service Center.

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Going Green With U.S. Highways

In today's world, transportation planners are challenged to balance the need for a safe and efficient transportation system with the necessity to protect the environment. Without proper planning, transportation projects can adversely affect air and water quality, threatened and endangered species, and cultural and natural resources, such as historic sites, parks, forests, wetlands, and fragile ecosystems.

To minimize the impact of transportation projects on the environment, the Federal Highway Administration (FHWA), U.S. Environmental Protection Agency (EPA), and several other organizations recently created the Green Highways Partnership (GHP) to identify and promote environmental stewardship in transportation planning in the Mid-Atlantic States. According to FHWA's Office of Planning, Environment, and Realty Associate Administrator Cynthia J. Burbank, "The Green Highways Partnership is a turning point toward the creation of good will relationships and partnerships for the advancement of transportation and the environment."

GHP was created to promote innovative streamlining and market-based approaches toward sustainable solutions for transportation and environmental improvements. GHP seeks to eradicate the traditional disconnect between the transportation and environmental communities through communication and cooperation, which will allow for a mutually beneficial relationship. GHP focuses on the following three elements:

- Partnership development, which consists of integrated public-private partnerships with a broad range of stakeholders including Federal and State transportation, regulatory, and resource agencies; contractors; industry; trade associations; academic institutions; and nongovernmental organizations to create long-term institutional change
- Recognition and awards that encourage a proactive setting to pursue GHP objectives and emphasize streamlining, market-based approaches, integrated watershed planning, design, construction, maintenance, and use of recycled materials
- Opportunities for joint funding and integrated goals, joint research and technology transfer, and cross collaboration

In November 2005, GHP members held a forum in College Park, MD, to share ideas on designing GHP, which is still in the formative stage, and developing a Green Highways Recognition Program. Several hundred participants, including environmental, human health, real estate, socioeconomic, and transportation specialists, attended the 3-day event.

To kick off the forum, many attendees, including representatives from the American Concrete Pavement Association (ACPA), Natural Resources Defense Council, and U.S. Fish and Wildlife Service, participated in an executive session aimed at iden-



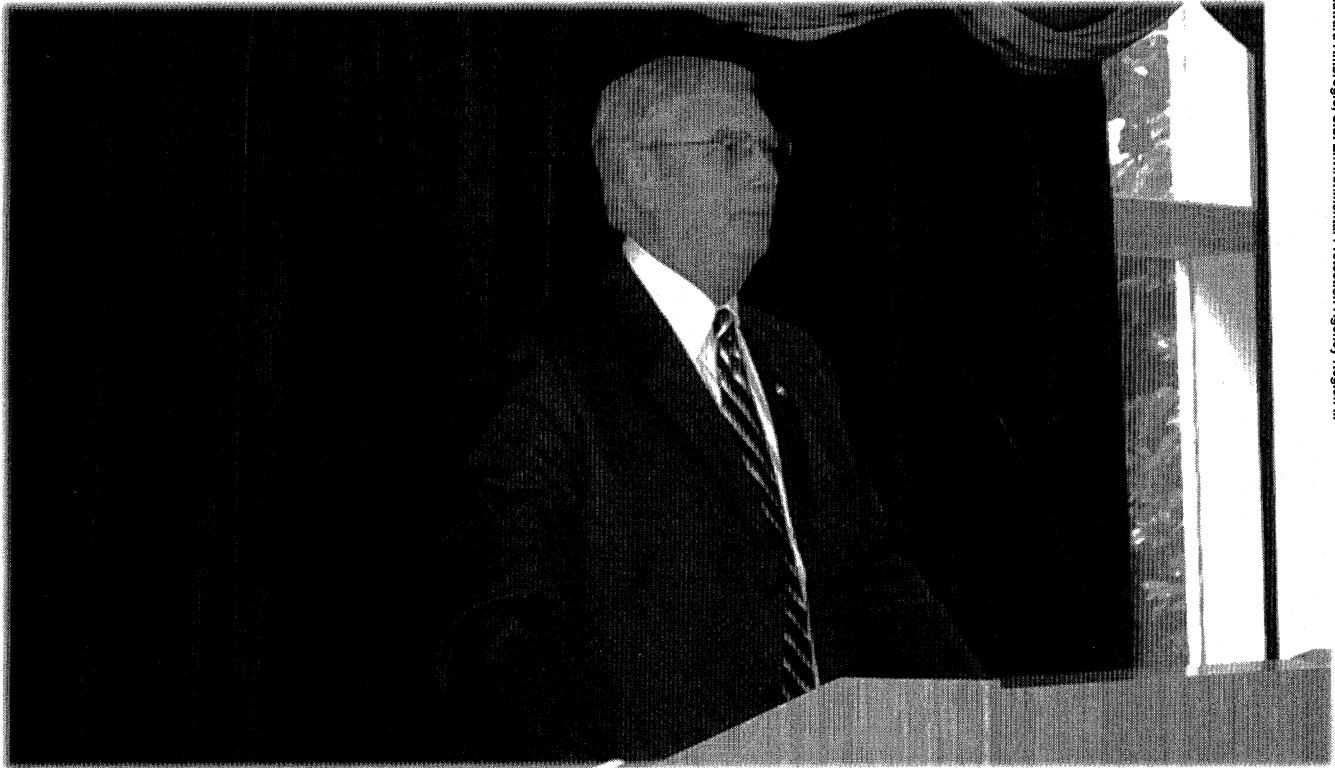
Green Highways Partnership

The Green Highways Forum logo.

tifying innovative approaches to integrating environmental stewardship into transportation planning. Participants agreed that GHP members should achieve a number of goals, including developing frameworks for integrating recycled materials into projects and disseminating information on past successes to help facilitate replication of best practices.

Also during the executive session, participants presented a draft roadmap for the rollout of GHP beyond the Mid-Atlantic States. In addition, they discussed some of the challenges GHP members face. For example, many agreed that important first steps will include persuading some in the transportation community to look beyond the view that the regulatory community represents an impediment to transportation work and securing an agreement with regulators to work together.

Participants in the executive session also discussed creating a Green Highways Recognition Program to honor highway agencies



EPA Administrator Stephen L. Johnson is shown addressing the Green Highways Partnership forum.

for outstanding efforts to incorporate environmental considerations into highway projects. GHP members suggested making participation voluntary and using the program to spotlight organizations that share their best practices throughout their respective States.

After the executive session, presentations covered numerous topics, including planning and preliminary design, final design and construction, and operations and road maintenance. ACPA's Robb Jolly, for example, spoke about the opportunities facing the concrete and cement industry from the environmental perspective, such as the increased use of recycled materials on projects and the impact of concrete on sustainability in transportation infrastructure. He also presented an agenda for advancing sustainable practices via a framework for innovation and the

launch of a new Web site for the cement and concrete industry that promotes the transfer of knowledge on environmental issues and practices.

By the end of the forum, participants agreed on the following three conclusions:

- GHP should establish more formal methods of information sharing and communication.
- A recognition program would inspire nationwide replication of best practices designed to integrate environmental stewardship into transportation planning.
- GHP should create a national roadmap for developing more environmentally friendly highways. At the conference, a draft was presented to the executive session participants.

Representatives from GHP are still finalizing the roadmap and determining how to implement it.

In addition to the recent forum, GHP is undertaking several pilot projects in the Mid-Atlantic States to demonstrate how to achieve a "better than before" outcome for the human, natural, and built environments after completion of transportation projects. Initial projects likely will focus on recycling, storm water management, conservation, and ecosystem management. Look for future articles in *Transporter* to learn more about these projects and their progress. For more information, visit www.greenhighways.org or contact:

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Colorado Summit Explores Research on Unknown Bridge Foundations

According to the National Bridge Inventory, at least 20,000 of the more than 500,000 bridges that span waterways in the United States are categorized as "scour critical" because the foundations of the bridges are in danger of erosion and possible collapse. It is likely, however, that the actual number of scour-critical bridges is higher than this due to a critical information gap.

According to the National Academy of Sciences (NAS), no designs or plans exist for many bridges, and little or no information is available on many bridge foundations. Such information is necessary for determining the scour susceptibility of bridges over waterways. To fill this information gap, NAS issued a call: "Research is needed to develop practical methods and functional equipment to determine subsurface bridge foundation characteristics such as type, depth, geometry, and materials when little or no information is available."

The Federal Highway Administration (FHWA) stepped up to this challenge in November 2005, when its Central Federal Lands Highway Division (CFLHD) joined with the Environmental and Engineering Geophysical Society to host the Unknown Foundations Summit in Lakewood, CO. The 2-day event served as a forum for discussion

about the best available techniques to manage bridges with unknown foundations.

During the summit, participants attended presentations on how State departments of transportation (DOTs)

have been handling the issue of unknown foundations.

For example, Jerry Beard, an engineer in the North Carolina

Department of Transportation's (NCDOT) hydraulics

unit, explained that his agency began addressing the unknown foundation issue by determining how many bridges had unknown foundations and then deciding which of these bridges to test for scour. NCDOT found that of the State's 13,751 bridges that span waterways, more than 5,600 have unknown foundations. NCDOT, however, decided not to test several types of bridges for scour, including those scheduled for replacement, those with average daily traffic of less than 1,500 vehicles, and those built after 1990. After eliminating these bridges from testing, NCDOT is left with 814 bridges to investigate, which consultants currently are doing using a variety of nondestructive methods.

The summit also provided an opportunity for attendees to learn about the capability, reliability, and likely cost of current nondestructive methods for determining

the type, size, structural condition, configuration, and depth of bridge foundation components. In North Carolina, for example, the consultants are using sonic echo, ultraseismic, bending wave, parallel seismic, and induction field methods to determine the nature of unknown foundations. For more information on the methods discussed at the summit, contact Frank Jalinoos at 202-493-3082 or frank.jalinoos@fhwa.dot.gov.

Also during the summit, attendees could view exhibits on the private sector's capabilities and hear related presentations. Representatives from several companies discussed the best direction for future research, agreeing that researchers should continue evaluating sound waves as a nondestructive detection technique. In addition, the company representatives noted that tomography, or the use of sound waves to produce images of the internal structures of solid objects, also could be useful for exploring unknown foundations.

At the close of the 2 days, attendees questioned a panel of experts on guidelines on unknown foundations for use by State DOTs and other bridge owners. Attendees asked, for example, what should be the roles and responsibilities of FHWA, bridge owners, industry, and academia, in the study of unknown foundations. Responses to the questions are available on a CD-ROM, which can be obtained by contacting Bill Bolles at 202-366-8027 or bill.bolles@fhwa.dot.gov. Also during the summit three teams were formed to further explore the development of policy, guidelines,



and proposals for future research. For more information, contact Jorge E. Pagán-Ortiz at 202-366-4604 or jorge.pagan@fhwa.dot.gov.

In addition to the summit, FHWA is working with several partners on technological solutions to the unknown foundations problem. For example, researchers from the Tufts University School of Engineering and INFRASENSE, Inc.

are collaborating with FHWA to develop and demonstrate a response-based parameter estimation method (RPEM). The RPEM system is based on conventional devices that measure the strain and movement of bridges caused by changes in ambient temperature and heavy loads. Researchers will use this data to compute the stiffness of an unknown foundation and match the result with values

previously determined for known foundations. When the research is complete, it is anticipated that the RPEM system will be a simple design usable by highway agencies and the consulting, engineering, and testing communities.

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OUTREACH

Summer 2006 Symposium to Promote Technology Transfer

To derive maximum return on the Nation's technological investments, the U.S. Department of Transportation encourages innovation and transfer of technology within the transportation community. The objective is to enhance the safety, mobility, global connectivity, environmental stewardship, and security of transportation. As part of this technology transfer effort, the Federal Highway Administration (FHWA) is joining with other organizations to present the 2006 Second International Symposium on Transportation Technology Transfer in St. Petersburg, FL, from July 30 to August 3, 2006. The meeting is intended to build on the success of the 2001 symposium, which led to creation of several partnerships among African, European, and U.S. transportation entities.

The goal of the 2006 symposium is to create new networking and communications channels that lead to greater sharing of knowledge internationally and within countries, geared toward preparing the transportation workforce for the future. The meeting will bring together practitioners, educators and researchers from around the world to foster partnerships and collabora-

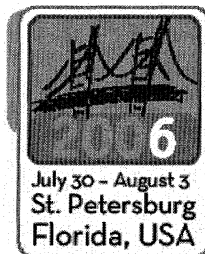
tion, examine themes in cooperative technology exchange, and explore best practices through the analysis of case studies and the assessment of successes and failures.

The symposium will focus on key technology transfer issues, including communications, program effectiveness, research and development, training, and workforce development. In addition to plenary and concurrent educational sessions, the conference will include meetings of some participating organizations before, during, and after the symposium. There also will be two pre-conference workshops, one on FHWA's Local Technical Assistance Program and Tribal Technical Assistance Program, and the other on the latest in State and local road safety products, programs, and policy.

Engineers, transportation managers, technical staff, and other professionals involved in training, the preparation or marketing of articles and newsletters, or the distribution of resources, such as technical manuals, tapes, and CDs, are encouraged to attend the symposium. Professionals responsible for providing technical advice on road maintenance, design, materials, or construction also will benefit from the event.

The symposium will be held at the TradeWinds Island Grand Beach Resort in St. Petersburg, FL. For more information, visit www.t2symposium.org, or contact lori.byrd@fhwa.dot.gov or

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Second International Symposium
on Transportation Technology Transfer

The Second International Symposium on Transportation Technology Transfer will be held this summer in St. Petersburg, FL, as indicated in this advertisement.



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TRAINING

NHI Offers New Course on Context Sensitive Solutions

Public expectations for safer, smoother roads have increased in recent decades. In addition, highway designers and builders are now paying greater attention to the wishes of communities and neighborhoods. To help meet these changing demands, transportation agencies are turning to context sensitive solutions (CSS), also known as context sensitive design. CSS is a collaborative, interdisciplinary approach to planning and implementing transportation projects that helps ensure stakeholders are involved at every stage. This involvement leads to facilities that not only address safety and mobility but also preserve scenic, historic, cultural, environmental, and community resources and values.

To increase awareness about this emerging approach, the Federal Highway Administration's National Highway Institute (NHI) is offering the course Context Sensitive

Solutions (FHWA-NHI-142050). Participants will learn the basic principles of CSS, which require that a project be designed and built with minimal disruption to the community and be seen as adding lasting value. Upon completion of the course, participants will be able to:

- Describe the importance of effective and timely decisionmaking and early and continuous stakeholder involvement
- Explain the flexibility that CSS allows in applying industry design standards while maintaining or improving roadway safety
- Explain the importance of being sensitive to environmental concerns
- Discuss how aesthetics and community values are a critical part of effective design

- Describe the best practices identified during the CSS pilot program
- Describe methods to obtain consensus among stakeholders

The course is targeted at practitioners working for transportation agencies; consulting firms; private industry; academia; and other organizations engaged in the planning, design, construction, or management of transportation projects. The course will be especially beneficial to highway, bridge, construction, and design engineers; planners; environmental specialists; and agency managers.

To schedule or register for the course, contact the NHI Training Team at 703-235-0534 or nhitraining@fhwa.dot.gov. For technical information, contact:

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