Accelerating Infrastructure Innovations

FOCUS

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INSIDE

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U.S. Department of Transportation
Federal Highway Administration

FHWA Equipment Loan Program Showcases Advances in Achieving Smoother Pavements

Use the latest equipment and test methods to measure pavement texture and friction and achieve smoother, quieter pavements with the Federal Highway Administration's (FHWA) Friction, Texture, and Profile Measurement Equipment Loan Program. Sponsored by FHWA's Pavement Surface Characteristics (PSC) Program, the initiative allows State transportation agencies and partnering academic institutions the opportunity to evaluate different types of PSC measurement devices at no charge. Equipment currently available through the program includes three Circular Texture Meters (CT Meters), three Dynamic Friction Testers (DF Testers), two GripTesters®, and one Highway Friction Tester (HFT).

A pavement's functional properties are critical to its overall performance and management. In addition to providing adequate structural strength and durability over its intended life, an optimum pavement should feature a wearing surface that is smooth, has good friction, and generates low levels of noise. Achieving this combination of properties is dependent on various components of the pavement's surface texture. For example, microtexture (surface asperities less than 0.5 mm (0.020 in) in length) largely determines low-speed friction, while macrotexture (surface asperities between 0.5 mm (0.020 in) and 50 mm (1.96 in)) has a substantial impact on friction at high speeds, as well as on the generation of exterior pavement-tire noise and splash or spray from water on the pavement. Megatexture (surface asperities between 50 mm (1.96 in) and 500 mm (19.68 in)) affects vehicle and tire damage and interior vehicle noise.

The equipment available through the loan program offer portable solutions for measuring pavement friction and texture. Launched in 2006, the loan program supports the implementation of new national guidance on PSC, including the 2008 American Association of State Highway and Transportation Officials' *Guide for Pavement Friction* and FHWA's 2010 Technical Advisory on Pavement Friction

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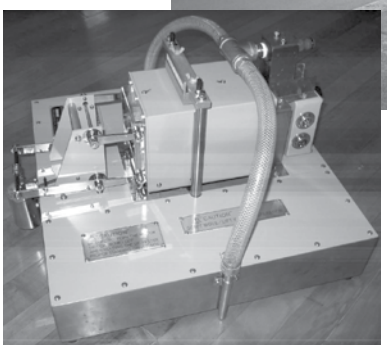

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Top: The Dynamic Friction Tester in use in Maryland.

Left: A closeup view of the Dynamic Friction Tester, which can measure pavement surface friction as a function of speed and under various conditions.

FHWA Equipment Loan Program,

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Left: The Circular Texture Meter uses a laser-displacement sensor to measure the vertical profile of a pavement surface.

Middle: The Circular Texture Meter measures the texture profile of polished, unbound aggregate.

Below: Researchers at the University of Wisconsin-Madison's Modified Asphalt Research Center use the Circular Texture Meter.

Management (Advisory T 5040.38).

State transportation departments and partnering research institutions can request equipment loans to become acquainted with the devices or to use them as part of a pavement friction or texture testing study. Loans of the CT Meter and DF Tester are administered jointly by Applied Pavement Technology, Inc., (APTech) and the Pennsylvania Transportation Institute (PTI). The CT Meter is a portable road surface macrotexture profiler that uses a laser-displacement sensor to measure the vertical profile of a pavement surface. The CT Meter software calculates and reports the mean profile depth (MPD) and root mean square (RMS) statistics, which characterize a pavement surface's macrotexture. Transportation agencies can also use the CT Meter in conjunction with friction testing equipment, such as the ASTM E 274 locked-wheel tester, to compute the International Friction Index (IFI).

The DF Tester, meanwhile, is a portable instrument for measuring pavement surface friction as a function of speed and under various conditions. It features both a measuring unit and a control unit. The measuring unit consists of a disc that is made to rotate horizontally at a specified velocity before being lowered onto a wet pavement to measure friction. The torque that is generated by the resistance between the test surface and spring-loaded sliders attached to the underside of the rotating disc is continuously monitored and converted to a measurement of friction. Users can view the recorded data using either an X-Y plotter or a laptop computer.

Both the CT Meter and DF Tester can be transported in and operated from a van, pickup truck, sport utility vehicle, or other similar vehicle. Power is supplied to the equipment directly from the vehicle's battery.

The loan period for the CT Meter and DF Tester may vary from a few weeks to several months, depending on the specific nature of an agency's request. Agencies also have the opportunity to receive onsite or remote technical assistance from the APTech–PTI team, including calibration and demonstration of the devices. The current program will run until at least September 2012.

Loan terms include:

- Equipment loans are provided on a first-come, first-served basis.
- The equipment is provided for use by government entities and partnering academic institutions only and may not be transferred to a private third party.
- Onsite demonstrations and training, as well as on-call technical assistance, are provided without charge.
- There are no restrictions on the use of data collected using the equipment.

Transportation agencies must ensure the safekeeping of the equipment and provide the APTech–PTI team with prompt notification of the loss of or any damage to the loaned items. Agencies are also asked to submit a short report documenting their findings and any future plans for using the equipment.

Participants in the loan program to date include the Maryland State Highway Administration (SHA), which has used the DF Tester to measure and study the friction value on an unbound aggregate specimen that had been subjected to polishing by a device known as an aggregate polisher.

"We have also used the DF Tester at five project sites to date," said Dan Sajedi, Chief of the Soils and Aggregate Technology Division, Office of Materials Technology, for the SHA. "It has been very helpful to have the loan of the equipment."

The Maryland SHA recently received a loan of the CT Meter, which is expected to be used to measure the macrotexture property of unbound specimens in the lab and asphalt pavement in the field. Maryland will also use the DF Tester and CT Meter together to measure the micro- and macrotexture properties of aggregate and pavement. The results will then be used to compute the IFI.

The California Department of Transportation, meanwhile, is using the two devices to help develop and implement new friction and texture specifications for bridge deck construction. And the University of Wisconsin–Madison's Modified Asphalt Research Center recently evaluated the potential of using the CT Meter and DF Tester to obtain information about the textural and frictional characteristics of pavement mix designs before construction.

Another device, the GripTester, is available through a separate FHWA equipment loan program administered by the Virginia Tech Transportation Institute. The GripTester is a rugged, compact device that can be operated while being towed by a vehicle at speeds up to 128 km/h (80 mi/hr). It provides continuous measurements of pavement friction that can be stored and analyzed on a laptop computer. Agencies can request the equipment for a loan period of up to 2 weeks. Training is provided. For more information on the GripTester loan program, contact Gerardo Flintsch at the Virginia Tech Transportation Institute, 540-231-1569

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Building a Smoother Pavement: FHWA Training Highlights Construction Quality Control

Verifying pavement smoothness and ultimately building smoother roadways is the focus of a new training course available from the Federal Highway Administration's (FHWA) National Highway Institute (NHI).

The 1-day course, Pavement Smoothness: Use of Inertial Profiler Measurements for Construction Quality Control (Course No. FHWA-NHI-131100), is designed to train inertial profiler operators in the basics of performing construction acceptance testing. "Inertial profilers measure the pavement profile using an accelerometer, a height sensor, a distance measuring instrument, computer software and hardware, a photo cell, and the most essential component—the operator," said Bob Orthmeyer of FHWA. Participants will learn how pavement smoothness data are obtained using profilers and what the data represent.

"The course also introduces ProVAL, a free software program developed by FHWA. This powerful yet easy-to-use program can assist agencies in analyzing pavement profiles," said Orthmeyer.

Studies have shown that roadways stay smoother longer and have an extended pavement life if they are initially built smooth during construction. Most State transportation agencies have specifications for smooth pavements that are used to evaluate the smoothness of newly constructed or rehabilitated roadways during acceptance testing. Many agencies also offer incentives to boost the construction of smooth pavements.

Following the NHI training, course participants will be equipped to both perform a review of the inertial profiler components to ensure that the equipment is in proper working order and to determine the impact of current surface and environmental conditions on data collection. Participants will be trained to collect profile data using appropriate operating techniques and to calculate a smoothness index, using the appropriate data processing techniques and computational procedures for construction quality control and specification compliance. They will also

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The height sensors of an inertial profiler are checked. Such profilers can be used to obtain pavement smoothness data.

FHWA Launches *Facebook* and *YouTube* Sites

Discover a whole new way to "like" the Federal Highway Administration (FHWA). The Agency's new *Facebook* page and *YouTube* channel offer opportunities 24/7 to learn about all things FHWA, including current news items, new technologies and initiatives, ongoing programs, and recent events. FHWA's *Facebook* page serves as a "news ticker," with a continuous stream of updates, photographs, and videos. *Facebook* users who link to the FHWA page will receive an update every time FHWA adds a new item to the page (simply click on the "Like" button on the page to link to the FHWA account).

The Agency's *YouTube* channel also offers a steady stream of videos spotlighting the multiple aspects of FHWA's programs and events. The channel is open to all visitors, although users who choose to subscribe will receive notification whenever new videos are posted. All FHWA content posted on YouTube is captioned for the hearing impaired.

Check out FHWA's *Facebook* page today at www.facebook.com/pages/Federal-Highway-Administration/175380479155058. To view FHWA's *YouTube* channel, visit www.youtube.com/user/USDOTFHWA.

For more information on using *Facebook*, visit www.facebook.com/facebook and click on "Resources." Guidelines for getting started on *YouTube* can be found at www.youtube.com/t/about_youtube. ✻

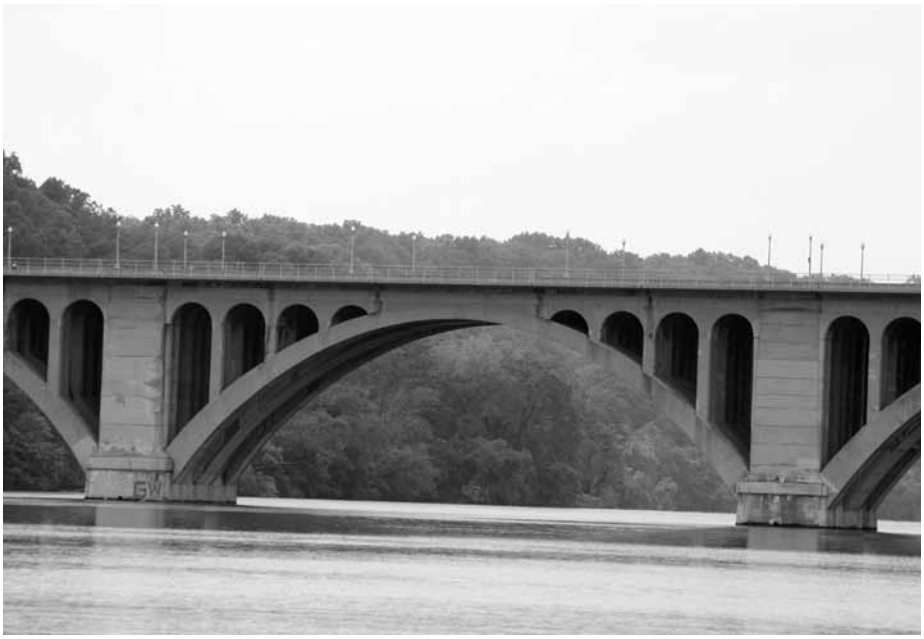
FHWA's new *Facebook* page and *YouTube* channel offer opportunities 24/7 to learn about all things FHWA.

National Bridge Management, Inspection, and Preservation Conference: Beyond the Short Term

Save the date for the National Bridge Management, Inspection, and Preservation Conference, to be held October 31–November 4, 2011, in St. Louis, Missouri. Sponsored by the Federal Highway Administration (FHWA), in conjunction with the American Association of State Highway and Transportation Officials' (AASHTO) Transportation System Preservation Technical Services Program (TSP•2), the conference will focus on how to manage the Nation's bridges beyond the short term.

Building upon FHWA's 2007 National Bridge Preservation Workshop, the event will feature separate tracks on "Effective Use of Bridge Management Systems," "Making the Case for Bridge Preservation" and "Next Generation Bridge Inspection." Attendees can also register for optional preconference workshops on Bridge Life Cycle Cost Analysis and the Bridge Inspection Nondestructive Evaluation Showcase, to be held October 31, 2011.

More details on the conference will be available this spring at www.tsp2.org/bridge. For additional information, contact Shyan-Yung Pan at FHWA, 202-366-1567 (email: shyan.pan@fhwa.dot.gov). *



Make plans now to attend the National Bridge Management, Inspection, and Preservation Conference, to be held October 31–November 4, 2011, in St. Louis, MO.

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learn how to identify the specific features in a collected profile that result in a smoothness or roughness index.

The Montana Department of Transportation (MDT) recently hosted the Pavement Smoothness course, followed by a 1-day FHWA workshop on ProVAL. "Everyone there gained new knowledge or a deeper understanding of profilers. The course was very interactive," said Mary Gayle Padmos of MDT. "The ProVAL workshop expanded on the information included in the NHI course. Our staff got a lot out of the training on how to use the software. Combining the course and workshop worked very well." Several other States are currently considering hosting the combined course and workshop.

The NHI course costs $300 per participant and is designed for those directly involved with the use of inertial profilers and the application of data obtained from profilers. The course will also be of interest to paving superintendents, project engineers, pavement engineers, and inspectors who perform data analysis, quality control, and acceptance. A minimum of 20 participants is required, with a maximum of 30. Attendees must complete 2 hours of independent study prior to the classroom training.

To schedule a session of Pavement Smoothness: Use of Inertial Profiler Measurements for Construction Quality Control, visit www.nhi.fhwa.dot.gov. For more information about the course content or to learn more about hosting the ProVAL workshop, contact Bob Orthmeyer at FHWA, 708-283-3533 (email: robert.orthmeyer@fhwa.dot.gov). To download a copy of ProVAL or for more information on the software, visit www.roadprofile.com. *

Highway Technology Calendar

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

Safety Edge Construction Webinar
June 1, 2011, 1 p.m.–2:30 p.m. (eastern daylight time)
June 6, 2011, 1 p.m.–2:30 p.m. (eastern daylight time)

FHWA will share lessons learned from the construction of more than 10 Safety Edge demonstration projects completed in 2010 and 2011. Highlights will include information on construction techniques, hardware improvements, testing results, and answers to frequently asked questions. To register for the June 1 Webinar, visit http://fhwa.adobeconnect.com/safetyedgejune1/event/registration.html. To register for the June 6 Webinar, visit http://fhwa.adobeconnect.com/safetyedgejune6/event/registration.html.

Contact: Chris Wagner at FHWA, 404-562-3693 (email: christopher.wagner@fhwa.dot.gov).

Forty-Eighth Annual Petersen Asphalt Research Conference
July 11–13, 2011, Laramie, WY

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

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

2011 Pavement Performance Prediction Symposium
July 14, 2011, Laramie, WY

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

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

Tenth International Conference on Low-Volume Roads
July 24–27, 2011, Orlando, FL

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

Contact: For more information, send an email to TRBMeetings@NAS.edu, or visit www.trb.org/LowVolumeRoadsconference/LVR10.aspx.

Second International Conference on Warm Mix Asphalt
October 11–13, 2011, St. Louis, MO

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

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

Fifth Asphalt Shingle Recycling Forum
October 27–28, 2011, Dallas, TX

Organized by the Construction Materials Recycling Association, the forum will cover all aspects of the opportunities offered by shingle recycling. Using recycled asphalt shingles in hot-mix asphalt and other construction applications can save money and conserve natural resources, while maintaining quality.

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

National Bridge Management, Inspection, and Preservation Conference
October 31–November 4, 2011, St. Louis, MO

Building upon FHWA's successful 2007 National Bridge Preservation Workshop, the conference will feature separate tracks for bridge management, inspection, and preservation topics. "Making the Case for Bridge Preservation" and "Next Generation Bridge Inspection" will also be featured themes.

The conference is sponsored by FHWA and the American Association of State Highway and Transportation Officials' (AASHTO) Transportation System Preservation Technical Services Program (TSP•2).

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

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

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

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

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

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

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

Webinar Introduces GIS Tools for Linking Transportation and Natural Resource Planning

Learn how to use geographic information system (GIS) tools to better balance the needs of transportation projects with environmental concerns at a free Webinar sponsored by the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials' Technology Implementation Group. The Webinar will be held on June 16, 2011, from 2:30 to 4 p.m. (eastern daylight time). It is part of the ongoing Innovations series, which is designed to bring representatives from State and local transportation agencies, industry, academia, and others timely information on today's highway technology advances. The series is hosted by FHWA's National Highway Institute (NHI), in conjunction with the FHWA Highways for LIFE program.

"Transportation Innovations: Linking Transportation and Natural Resource Planning Through Environmental GIS Tools" will highlight the experiences of Maryland and Texas. Both States have pioneered GIS planning approaches for transportation to improve environmental outcomes and enhance project delivery. This early collaborative planning among transportation and natural resource agencies has produced ecosystem-based frameworks to guide transportation decisions.

Using GIS tools for environmental planning has resulted in multiple benefits for States such as Maryland and Texas, including:

- Data-driven decision support systems that produce high-quality transportation projects.
- Early multi-agency integration, which speeds up project planning and completion, allows regulatory compliance to be achieved more quickly, and improves working relationships among agencies.
- A systems approach that improves quality and provides more cost-effective stewardship while increasing ecological benefits.

Participants in the Webinar will hear a range of presentations and have the opportunity to ask questions. Presentations include:

- The Benefits of Using and Developing Environmental Planning GIS Tools.
- Environmental Assessment Tools: The GIS Screening Tool and the NEPAssist Web Site.
- Maryland's Green Infrastructure Assessment and Approach: A Strategic Approach to Environmental Stewardship for U.S. 301 Waldorf.

Registration for the Webinar will open in mid May. More information and an online link for registration will be available at www.fhwa.dot.gov/hfl (click on "Communications"). Information is also available by contacting Donna Buscemi at the Maryland State Highway Administration, 410-545-8558 (email: dbuscemi@sha.state.md.us). *

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(email: flintsch@vt.edu).

FHWA expects to award a contract this month for administration of the HFT loan program.

For more information about the CT Meter and DF Tester equipment loan program or to make a loan request, visit www.appliedpavement.com/techResources_equipLoanProg_home.html. Requests can also be emailed to request@appliedpavement.com. For additional information on the PSC Program, contact Mark Swanlund at FHWA, 202-366-1323 (email: mark.swanlund@fhwa.dot.gov). To view FHWA's Technical Advisory on Pavement Friction Management (Advisory T 5040.38), visit www.fhwa.dot.gov/pavement/t504038.cfm. ✻

To learn more about FHWA's pavement smoothness resources, including publications and other guidance, visit www.fhwa.dot.gov/pavement/smoothness/index.cfm.