North Central Superpave Center News

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NCSC Vision and Mission:

To be an industry-recognized source of Superpave expertise and to lead further development and implementation of Superpave technology byproviding services to its customers, through excellence in research, training, and communication.

North Central Superpave Center

NCSC Embarks on New Research Initiatives

The NCSC is beginning several exciting new research projects as part of its goal of conducting research to support further refinement of the Superpave system. Descriptions follow of some of the projects we are now initiating. For more information on any of these or our other projects, contact the NCSC.

Simple Performance Tests

Dr. Matt Witczak and colleagues at Arizona State University and the University of Maryland have been working since 1995 to develop simple tests for rutting and, if possible, cracking that can used in conjunction with the Superpave volumetric mix design system. They are also working on the development of advanced material characterization procedures and models to predict performance.

The research team has developed several test protocols that are being evaluated for their potential as simple performance tests. The rutting tests include determinations of dynamic modulus (E*), flow time and flow number. Dr. Witczak and his team at ASU recently hosted representatives from the Superpave Centers, Asphalt Institute and other places for a one-of-a-kind training session on the candidate test protocols. At that training session, Dr. Witczak strongly suggested that states begin looking at typical materials to develop a library of test results for future use.

This library is especially important for the dynamic modulus test, since it will be a key element in structural pavement design in the AASHTO 2002 Design Guide, which Dr. Witczak is also working on under a separate project. Dynamic modulus has the potential to provide information on stresses and strains for pavement design, on fatigue cracking, on thermal cracking and as a simple test for rutting. The verdict is still out on whether this one test can do it all, but it is a tantalizing prospect.

The NCSC is now collecting samples from around the North Central region to give member states a first look at how their materials will perform in the candidate simple performance tests. We will also be looking at using the protocols to test SMA mixtures. Lastly, the evaluation will provide feedback on the ease of implementing the protocols and issues that agencies may need to address as they implement the new procedures. This effort will begin amassing the libraries that states can use for future designs.

Each state in the region was invited to submit materials for testing. Sample collection is ongoing at the current time. Eight to ten different materials will be tested. Results of the simple performance tests will also be compared to some of the tests we have grown accustomed to, such as some of the Superpave shear tests. Samples of some of the materials will be sent to Washington State University where Dr. Eyad Masad will analyze their internal structure using x-ray tomography, building another tie between technologies.

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NCAUPG Annual Meeting to be held in Detroit, MI, Jan 29-31, 2002

Mark January 29-31, 2002, on your calendar.

The North Central Asphalt User/Producer Group (NCAUPG) will hold its 2002 annual meeting at the Detroit Marriott Renaissance Center in Detroit, Michigan.

The hotel's toll-free phone number is (800) 228-9290 or make your reservations through their website at http://marriotthotels.com. Please make your reservations by January 16, 2002, and refer to the North Central Asphalt User/Producer Group Meeting. The conference rate is $139 for a single or double room.

There is an airport van service called "Airport Commuter Transport." The cost is $19/person one-way. Please call (800) 488-7433 for information and reservations. Taxis are also available for an approximate cost of $30/one way. Parking is available at the hotel for a fee. Please reserve a parking space when you call in your room reservation.

The North Central Asphalt User Producer Group will hold aTechnician's Workshop on Tuesday and Wednesday, January 29-30, 2002, for agency and industry technicians from the North Central region. This workshop has an open forum format which gives participants the opportunity to exchange information with other practicing technicians. The workshop will begin at 1:00 pm on the 29th and end at noon on the 30th. Registration is required.

The North Central Superpave Center (NCSC) will have their Annual Steering Committee meeting on Wednesday, January 30, 2002 from 7 until 10 a.m. The meeting will begin with a working breakfast for Steering Committee members only but visitors are welcome to attend the meeting. An agenda will be posted at a later date.

The NCAUPG Annual Meeting will begin at 1:00 pm on Wednesday, January 30 and end at noon on the 31st.

A registration form and tentative agenda are available on the North Central Superpave Center website at http://bridge.ecn.purdue.edu/~spave. Please call the NCSC at (765) 463-2317 ext. 224 for additional information.

NCSC Announces 2002 Superpave Training Course Offerings

Several courses will be offered this training season. Two Superpave Binder Courses, one Superpave Volumetric Mix Design Course for Beginners, and one Superpave Volumetric Mix Design Course for Experienced Marshall Design, will be offered. The 2002 courses will be held at the NCSC Binder Branch located at the Indiana Department of Transportation, Division of Materials and Tests in Indianapolis.

Superpave Binder
January 8-10 and March 5-7, 2002

This classroom and laboratory training course provides detailed instruction on the Superpave Performance Graded (PG) binder specifications and testing procedures. The binder course is designed for laboratory technicians and managers who need to understand the binder specifications and test procedures. No prior knowledge of the Superpave specifications is required, but some experience with asphalt testing is helpful.

Superpave Volumetric Mix Design for Experienced Marshall Designers
February 25-26, 2002

This course provides a classroom overview of Superpave volumetric mix design. This course is designed for contractors, agency personnel, and others involved in mix design and testing. Some knowledge of basic principles of mix design and mixture volumetrics is needed.

Superpave Volumetric Mix Design Fundamentals for Beginners
February 11-14, 2002

This is a four-day intensive course for those unfamiliar with mix design or testing. This classroom and laboratory course offering is intended for contractors and agency personnel who are to be involved in mixture design and testing but who are still unfamiliar with basic test procedures. No knowledge of the basic principles of mix design or mixture volumetrics is required. Nearly half the course is hands-on or demonstrations in the laboratory or calculations workshop.

Customized Training

We also offer on-site training. We have several different training packages available for technicians, engineers and managers, or we can customize a training course to fit your specific needs. We are available to industry groups, DOT's, and others. Please contact us at your earliest convenience to schedule any training you might need.

A training brochure and registration form will be mailed to everyone on the NCSC mailing list. Registration forms are also available on the NCSC website at http://bridge.ecn/purdue.edu/~spave. If you have additional questions please contact us at (765) 463-2317.

NCAUPG Agenda Topics

- FHWA Superpave Update - John D'Angelo, FHWA
- Superpave Center Update - Becky McDaniel, NCSC
- Validation of Gyratory Compactor - Tom Harman,FHWA, and Tom Brovold, Test Quip, Inc.
- TRB Mix/Aggregate ETG Update - Jim Musselman, Florida DOT
- Smoothness Lightweight Profilers - Laurin Lineman, Eastern Federal Lands
- SMA: Contractors Experience - John Volker, Wisconsin DOT
- Open Forum Q & A - Gerry Rohrbach, MinnDOT and Rich Wolters, MAPA
- Standardization of Test Procedures - Mike Heitzman,Iowa DOT and Rich Wolters, MAPA
- NCAT Test Track & TRB Report - Buzz Powell, NCAT
- Technician Certification Coordination Council (TCCC)& Multi-RegionalTraining and Certification (M-TRAC) - Chris Anderson, Iowa DOT
- Longitudinal Joint Construction Panel-Mike Frankhouse, Michigan DOT
- Report on Technicians Workshop-Erv Dukatz, Mathy Construction
- Where Do We Go From Here?

Research *continued*

We at the NCSC are very fortunate that Dr. Terhi Pellinen has recently joined the Civil Engineering faculty at Purdue. Dr. Pellinen was a student of Dr. Witczak and has worked extensively with the simple performance tests. She will be a tremendous resource to us as we begin this effort.

Testing is expected to begin this fall with results available next summer. The work is being funded by the Federal Highway Administration.

Friction Study

Another new project is also at the sample collection stage. The Indiana and Iowa Departments of Transportation had both expressed interest in investigating the frictional properties of Superpave surfaces. A joint study is underway to investigate common issues. One primary question is whether the coarser texture typically provided by Superpave mixtures increases the pavement macrotexture and can reduce the reliance on aggregate microtexture while still maintaining acceptable friction levels.

The first phase of the project involves identifying a technique that can be used to evaluate the frictional properties of hot mix asphalt samples in the laboratory. This differs from most laboratory friction techniques that focus on frictional and polishing properties of the aggregates alone. This is critical because aggregate tests essentially measure microtexture and polishing. They cannot capture the effects of pavement macrotexture. New and innovative technologies, plus modifications to some current tests, are under consideration.

Following the selection of a suitable test method, a baseline friction level will be established by testing current surface types. Then various nominal maximum aggregate sizes, aggregate types, mixture gradations and other factors will be evaluated. The objective is to optimize the macro- and microtextures to maintain the current friction. This may allow refinement of current aggregate classifications and required properties for different traffic levels.

Lastly, we will evaluate other mixture properties to evaluate the effects of changing the mixtures to optimize friction on other properties. Do changes in the aggregate composition to optimize friction have a positive or negative impact on stiffness or cracking potential? In this phase of the project, we also plan to evaluate the noise generation properties of selected mixtures. Increased pavement surface texture may have positive effects on both the pavement friction and noise generation.

This 32-month project is being funded by the Indiana and Iowa Departments of Transportation with contributions from the Institute for Safe, Quiet and Durable Highways (SQDH). The work is being conducted by the NCSC and Dr. Brian Coree at Iowa State University.

Mix Contamination Study

The NCSC and Dr. John Haddock, of the Purdue University School of Civil Engineering, are also starting an intensive investigation into the effects of various burner fuel types and combustion conditions on the properties of plant-produced hot mix in a study funded by the South Dakota Department of Transportation.

The project, beginning this month, will evaluate mixes produced using 11 different types of fuel in a hot mix plant operating with the burner under optimum, excess oxygen and insufficient oxygen conditions. Aggregates will be run through the plant first to see if they pick up any contaminants, then hot mix will be produced and sampled under the different fuel-combustion conditions.

The aggregates will be "rinsed" with a solvent, which will then be analyzed using chromatography to detect traces of unburned fuel. The binder will be extracted from the hot mix and similarly analyzed. The mix will also be tested in various other ways to determine if any contamination that may exist has affected the mix properties. It is suspected that mix contamination may result in mix tenderness, lower stability, increased tendency to strip and possibly other problems.

Plant operations will be monitored during production to look for a way to determine, in the field, if proper combustion is being achieved. Possible ways to do this may include the use of a flame eye to monitor the color of the flame, measuring exhaust gas temperatures or composition, etc.

Mix contamination was the subject of a research project at Purdue in 1990 when Thomas Nelson, now a professor at the University of Wisconsin, Plattville, and Leonard E. Wood, professor at Purdue, developed chromatographic techniques to detect fuel contamination. Their techniques, which will be used in this study, were successful at detecting laboratory contamination. When plant-produced mixes from Indiana were analyzed, no contamination was discovered. In that study, the plants were not deliberately misfired, however, so there was probably not any contamination to detect.

This is a fast-paced project scheduled for completion in November 2002, with a draft final report in August 2002.

Summary

Several other research projects are still in progress, including projects looking at the use of fibers in hot mix asphalt, evaluating the performance of Indiana Superpave mixtures, and field evaluations of various mixture types. One project dealing with porous asphalt mixtures is slated to begin when matching funds become available in the near future.

Research, then, is going strong at the NCSC as we continue our efforts to help with the implementation and refinement of Superpave. We try to coordinate or at least publicize these efforts on a national level to share the benefits and avoid duplication of effort. Working closely with the FHWA, Asphalt Institute, NCAT, the other Superpave Centers and others, we think we have been pretty successful.

NCSC Unveils New Searchable Superpave Website

If you haven't visited the NCSC website lately, you should. Several additions and changes were made this summer. The popular website is located at

http://bridge.ecn.purdue.edu/~spave/

The updated website is easy to navigate and includes a new listing of Superpave research projects in the North Central Region's states, along with other key topics.

The biggest addition to the site, however, is an expansive searchable database of Superpave information. This is located as a link from the home page at the following address:

http://rebar.ecn.purdue.edu/Superpave/search.asp

The searchable database is intended to aid your search for Superpave information. We update the database continually as we strive to make it as comprehensive as possible. The database includes publications, field experiences, research projects and reports, and will soon include lab practices and training videos.

To search for information, type in a keyword and click on "submit." It will then search for all items in the database containing that word.

We hope you find this searchable database helpful. We look forward to hearing your comments and opinions on what we hope will become an extremely valuable resource for you.

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The National and Regional Superpave Newsletters are published three times a year and are coordinated by the North Central Superpave Center. The NCSC is one of five Superpave Regional Centers established to assist with implementation of the Superpave performance-based system for designing asphalt pavements. The NCSC is a joint effort of Purdue University, the Indiana Department of Transportation, and the Federal Highway Administration and is administered by the Joint Transportation Research Program at Purdue University.

Calendar of Events

2001

Nov 13-15 **Beneficial Use of Recycled Materials in Transportation Applications**
Crystal Gateway Marriott, Arlington, Virginia
Contact: The Recycled Materials Resource Center, Phone: 603/862-4704
Fax: 603/862-3957 Website: www.rmrc.unh.edu/2001conf/overview.asp

Nov 14-16 **Asphalt Pavement Alliance Asphalt Pavement Conference**
Doubletree Hotel, Austin, Texas
Contact: Asphalt Pavement Alliance, 888/468-6499, www.asphaltalliance.org

Nov 27 **Annual Asphalt Pavement Analyzer Users Group Meeting**
Hilton, County Line Road, Jackson, MS
Send discussion questions to rcwest@ashland.com, fax: 404/603-2770

Nov 30-Dec 4 **AASHTO Annual Meeting**
Fort Worth, Texas
Website: http://www.aashto.org/mtng_events/

December 4-5 **44th Annual Asphalt Conference**
University of Missouri-Rolla, Rolla, MO
Phone: 573/341-4200 Fax: 573/341-4992 Web: http://www.umr.edu/~conted

Dec 11-13 **Second Annual Asphalt/Concrete Materials and Testing Workshop for FHWA Engineers: 2002 Pavement Design Guide**
Turner Fairbanks Highway Research Center, McLean, Virginia

2002

Jan 13-17 **Transportation Research Board Annual Meeting**
Washington, DC Contact: TRB 202/334-2934 FAX: 202/334-2003
website: http://www.national-academies.org/trb/

Jan 29-31 **NCAUPG Annual Meeting**
Detroit, Michigan Contact: NCSC, (765) 463-2317 ext. 224
Website: http://bridge.ecn.purdue.edu/~spave/

March 18-20 **Meeting of the Association of Asphalt Paving Technologists**
Doubletree Hotel, Colorado Springs, CO
Contact: AAPT, (651) 293-9188 Website: http://www.asphalttechnology.org/

April 14-17 **International Center for Aggregates Research (ICAR)**
10th Annual Symposium
Baltimore, MD Contact: ICAR, www.ce.utexas.edu/org/icar

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