

# Southeastern Superpave Center News

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**SOUTHEASTERN SUPERPAVE CENTER**

## **SOUTHEAST SUPERPAVE CENTER 2000 RESEARCH PROGRAM**

The management committee of the Southeast Superpave Center has agreed to sponsor three research projects with the calendar year 2000 funds. These projects are listed below.

### **Continuation of Field Permeameter Studies**

The field permeability device developed and evaluated through the Southeastern Superpave Center pooled fund study has shown great promise in estimating the in-place density of hot mix asphalt (HMA) pavements. The 1999 field permeability study established the relationship between field permeability and in-place density for coarse graded mixtures. The objective of this study will be to determine whether the field permeability device can be used as a durability indicator for coarse graded mixtures and to evaluate the permeability characteristics of fine graded Superpave mixtures. The study will include visiting eight to ten new construction projects throughout the Southeast. At each project, field permeability tests will be conducted on newly compacted pavements. Additionally, raw materials (asphalt binder, aggregates, and plant-produced HMA) from each project will be obtained as well as cores from the roadway. The raw materials will be used to determine properties of extracted asphalt binder prior to production and after production, but prior to placement. Cores from each project will be used to determine properties of the extracted asphalt binder after placement as well as in-place density. It is also proposed to revisit each of the eight to ten projects after approximately six months, one year and two years. At the time of revisiting each project, field permeability tests will be conducted to evaluate the change in permeability over time. At each visit cores will again be obtained as well as visual observations made of each pavement to evaluate performance. Again, the cores will be used to determine properties of the extracted binder in order to evaluate stiffening of the binders due to oxidation. This testing program should indicate whether field permeability provides an indication of a pavement's durability.

### **Evaluation of VMA Requirements for Superpave Mixture**

The minimum VMA requirements now in use were developed by Norman McLeod in the 1950's for dense graded mixtures. Over 80 percent of the dense-graded mixtures used before the implementation of Superpave were on the fine side of the maximum density

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# Fine Aggregate Angularity Study

By **Moussa Issa**  
**Georgia Department of Transportation**

At the direction of the Southeastern Asphalt User Producer Group a study was conducted to evaluate the precision of the Fine Aggregate Angularity (FAA) test procedure (AASHTO T 304-96).

Samples representing four types of aggregate sources were distributed to and tested in 16 laboratories in the Southeast region. The material types considered in the analysis were:

- ◆ Natural Sand (A, B)
- ◆ Granite (C, D)
- ◆ Limestone (E, F)
- ◆ Standard Graded Sand (G)

Two samples of each type, except for the standard graded sand (G) were selected to represent materials with both high and low fine

aggregate angularity. The standard graded sand was the only material used in the original round robin testing, which resulted in the current statement in both AASHTO T 304-96 and ASTM C 1252. The test data reported by the participants was first tabulated and then examined graphically for consistency. A total of 672 samples were distributed with about 28% of the data points missing.

To analyze the data obtained from the Southeastern Asphalt User Producer Group (SEAUPG) FAA Round Robin, the Statistical Analysis System (SAS) was used. Complete details of the statistical procedures used are available in a report that you can obtain by calling Doug Hanson at NCAT (334-844-6240).

In summary, the results of the SEAUPG Round Robin testing revealed the following:

- ◆ Method C has more variability compared to the other two methods. Due to this high variability Method C should not be used in FAA determination.
- ◆ The one-sigma limit for single operator and multi-laboratory precision was found to be respectively five and three times higher than indicated in the AASHTO T 304-96 test procedure precision statement on material G.
- ◆ Test Method A and Test Method B yield similar results.
- ◆ The results of the study showed that for Method A, two properly conducted tests by two different laboratories on similar samples may differ as much as 2.12 percent (d<sub>2s</sub>). Similar conclusions can be obtained for Methods B and C.

## Research Program *continued from Page 1*

line. The procedures developed by Dr. McLeod worked reasonably well for these fine-graded mixtures. However, the use of the same VMA requirements for coarse Superpave mixtures may result in high film thicknesses. Previous work done by NCAT has indicated that Superpave mixes with gradations near the lower control points may have binder film thicknesses in the 10 to 12 micron range which is significantly higher than the 6 to 8 microns thought to be needed for durability. These mixtures may also have lower rut resistance because of the increased film thickness. The goal of this research effort is to recommend VMA requirements for Superpave mixtures. These requirements will be based on the minimum thickness needed for adequate durability and the maximum allowable thickness to prevent the potential for accelerated load-related deformations.

## **Development of Superpave Mix Design Criteria for 4.75 mm Mixes**

Within the Superpave mix design system there are mix design criteria for 9.5 mm to 37.5 mm nominal size mixes. Many agencies have expressed an interest in using a 4.75 mm nominal size mix. The potential benefits from using such a mix include a very smooth surface appearance, thin lift applications, ability to correct surface defects (leveling), increased skid resistance and decreased construction time. These mixes would have great potential as a part of a pavement preservation program and if properly designed should show excellent cracking and rutting resistance. Both Maryland and Georgia have been using a 4.74 mm mix with excellent success. The objective of this study is develop design criteria for 4.74 mm mixes [i.e. gradation, volumetric property requirements (air voids, VMA, VFA, etc.)] and to evaluate the constructability of these mixes in field applications.

## Training Course Offerings for Next Season

### Asphalt Technology:

February 5 to 9, 2001

March 5 to 9, 2001

### Superpave Mix Design:

December 5 to 8, 2000

January 23 to 26, 2001

March 13 to 16, 2001

# TEST TRACK CONSTRUCTION

A Oval Pavement Testing Facility is being constructed by the Alabama Department of Transportation (ALDOT) at NCAT. Accelerated testing will be conducted to improve the field performance of HMA mixes on a national and worldwide basis. The location of the test track is approximately 15 miles from Auburn University. The test track is approximately 1.75 miles (9240 feet) in length and has two tangent sections which are approximately 6,000 ft. in combined length. The facility allows for the evaluation of between 24 and 26 different pavement sections, each 200 feet in length, during a two year loading period. In addition to the oval test track, a fully equipped laboratory/office and a truck maintenance building are located on the site. This offers the ability to perform testing of the mix for any of the sections on site.

Placement operations for experimental surface mixes began on March 21, 2000. As you may be aware, the construction schedule had been designed to begin with test sections involving nearby materials as a protection against unanticipated overruns; thus, the first nine sections in the east curve were built with granite from Columbus, Georgia. After a series of initial delays necessary to identify minimum trial mix production runs, representative sampling methods, etc., the final lift of the ninth 100% granite section has been successfully placed to date.

The mini-study in the east curve is intended to evaluate the performance of stone mixes designed above, through and below the restricted zone using neat, SBR and SBS asphalts. As of the completion of the east curve, placement operations averaged one and one-half sections per workday. Construction is expected to commence sequentially in a counterclockwise manner as the north tangent, west curve and, finally, the south tangent are completed. The first ten sections in the north tangent involve limestone/slag mixes designed on the fine and coarse sides of the restricted zone using several different asphalts. Trial mix already run through the plant using these materials has exhibited properties that closely match the laboratory job mix formula.

Current estimates place completion of track construction during August, 2000. Trucking is planned to begin thereafter following the installation of required striping. In addition to addressing the expressed research needs of section sponsors, the project is primarily designed to investigate the effect of gradation, asphalt and aggregate type on performance. The underlying pavement structure is designed to ensure that rutting of the surface mixtures should be the predominant distress.

# SOUTHEAST SUPERPAVE CENTER TO MOVE



*The new facility will house both the administrative and laboratory functions of NCAT.*

The Southeast Superpave Center will be moving into new quarters this summer. Work began on a new building for the National Center for Asphalt Technology (NCAT) and the Southeast Superpave Center in November 1999. The new facility will house both administrative and laboratory functions of NCAT. It is located approximately five miles from the present offices on campus at the City of Auburn's Technology Park.

The move will be completed by the end of July. The building (actually three buildings) will include an auditorium style classroom with a capacity of 50, a 17,500 square foot laboratory and an administrative area of approximately 11,200 square feet. The total size for the facility will be approximately 40,000 square feet. This is a significant improvement over the current facilities of about 8000 square feet. There will be an open house and dedication of the new facilities and the NCAT Test Track on October 23, 2000. Please plan to attend.

**National Center for Asphalt  
Technology  
Southeastern Superpave  
Center**

**Auburn University  
211 Ramsay Hall  
Auburn, AL 36849**

Mr. Douglas Hanson (334) 844-6240  
Manager, Superpave  
dhanson@eng.auburn.edu

Dr. E.R. Brown (334) 844-6202  
Director, NCAT  
rbrown@auburn.campus.mci.net

Mr. Ken Kandhal (334) 844-6242  
Associate Director, NCAT  
pkandhal@eng.auburn.edu

Mr. Mike Huner (334) 884-6294  
Lab Manager  
mhuner@eng.auburn.edu  
FAX (334) 844-6248

E-mail: dhanson@eng.auburn.edu

WebSite:  
<http://www.eng.auburn.edu/center/ncat>

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Lynn J. Warble  
Coordinating Editor (765) 463-2317

# Calendar of Events

- Sept 11-12, 2000 FHWA/TRB Mixture/Aggregates ETG Meeting  
Embassy Suites, Indianapolis, IN
- Oct 11-13 Second International Symposium 3D Finite Element for  
Pavement Analysis, Design & Research  
Embassy Suites Hotel, Charleston, WV  
Contact: Dr. Samir Shoukry,  
WVU, shoukry@cemr.wvu.edu, (304) 293-3031
- Oct 22-23 NCAT Open House  
Auburn, AL  
Contact: Doug Hanson, (334) 844-6240
- Nov 14-19 Asphalt Rubber 2000 Conference  
Vilamoura Marinetel  
Portugal  
<http://www.consulpav.com/AR2000>
- Nov 15-17 Eighth Annual HMA Conference  
Regal Cincinnati Hotel, Cincinnati, OH  
Contact NAPA Tel: (301) 731-4748 or  
Toll-Free 1-888-HOT-MIXX
- Nov 28-Dec1 Transportation Research Forum  
Lowes Annapolis Hotel, Annapolis, MD  
Information call (202) 879-4701
- Dec 10-13 Asphalt Technology 2000  
University of Texas, Austin  
Contact: scampos@mail.utexas.edu or  
<http://lifelong.engr.utexas.edu/conferences/asphalt.html>
- Jan 7-11, 2001 Transportation Research Board Annual Meeting  
Washington, DC  
Contact: TRB (202) 334-3214  
website: <http://www.nationalacademies.org/trb/>



National Center for Asphalt Technology,  
Southeastern Superpave Center  
Auburn University  
211 Ramsay hall  
Auburn, AL 36849

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