NCAT Update

AFK10 Annual Meeting
March 17, 2004
NCAT Activities

- Automated QC & Real-time Testing
- NCAT Pavement Test Track
- Laboratory Performance Testing Of OGFC Mixtures
- Verification Of Superpave Ndesign Compaction Levels
- Noise Characteristics Of Hot Mix Asphalt Pavement
- International Symposium - Design And Construction Of Long Lasting Asphalt Pavements
Automated QC & Real-Time Testing

- Can we assure agencies of product quality in a simpler and more efficient manner?
- What do we need to measure?
- Can we automate those measurements (remove the human element)?
  - minimize sampling & testing errors
  - increase frequency of measurements
  - provide rapid feedback (data acquisition/output)
Belt Sampling Device

- Removes sample of aggregate while plant is running.
- Plan to have a belt sampler on aggregate incline conveyor and RAP conveyor.
Aggregate Sample Drier

- Receives aggregate from belt sampler and dries it before the automated gradation device.
Automatic Gradation Unit

- Sieves/weighs aggregate to produce gradation.
- Currently does not sieve fine sizes (< No.8 sieve)
- Data sent to PC in control house or lab
Automated Asphalt Content Using Plant Controls

We already measure binder flow rate (gal./min. → tons/hr) with a flow meter or non-powered positive displacement pump.

And we measure feed rates of aggregates and RAP (tons/hr) with belt scales, tachometers and a computer integrator.
In-Line Viscometer & Temperature System

• Measures the viscosity & temperature of the binder.
• Mounts on a by-pass line from AC tank to injection point.
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Opelika, AL 36804
(334) 844-6855
FINAL RUTTING ON 2000 TRACK
2003 MIXED EXPERIMENT

Red – Mill and Inlay New Rutting Sections (14)
Blue – Excavate and Install New Structural Sections (8)
Black – Extend Original Rutting Study to 20M ESALs (23)
STRUCTURAL EXPERIMENT

![Diagram of structural experiment with color-coded sections and a legend for mix types.]

- **Mix run with modified binder at optimum**
- **Mix run with unmodified binder at optimum**
- **Mix run with unmodified binder at opt + 0.5%**

- Mixes 1 & 3: 3/8" ARZ Superpave in 1" Lifts
- Mixes 2, 4 & 6: 3/4" ARZ Superpave in 2" Lifts
- Mix 5: 3/8" SMA in 1" Lifts
Welcome to the home page for the NCAT Pavement Test Track. The primary objective of this site is to successfully communicate our experiences to the world as we strive to assist governmental agencies nationwide in streamlining the practical application of research designed to extend the life of flexible pavements. We appreciate your feedback.

Sponsor Meeting Information - This cooperatively funded research project provides for 2 onsite meetings each year as a benefit of sponsorship. The purpose of these meetings is to ensure that research efforts are meeting sponsors’ expectations. During the last onsite meeting (on June 11th and 12th), sponsor representatives decided to next meet same time in November or December. This timeframe is intended to...
Laboratory Performance Testing of OGFC Mixtures
Areas Needing Evaluation

• Draindown
• Raveling
• Permeability
Effect of Fiber and PG on Draindown
Traprock – Pg 67-22 @ 6.0%

Before

After
Traprock - PG 76-22 @ 6.0%
## Permeability Results - Granite

<table>
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<tr>
<th>Gradation</th>
<th>Binder</th>
<th>AC(%)</th>
<th>Perm. (m/day)</th>
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<td>6</td>
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VERIFICATION OF SUPERPAVE NDESIGN COMPACITION LEVELS
Marshall Projects Averaged 0.3% More AC

Asphalt Content Comparison - All Mixes

Marshall
Superpave
Rutting Comparison

Rut Depth Comparison

- Marshall
- Superpave

Project

Rut Depth (in)

1 3 5 7 9 11 13 15 17 19 21 23 25

0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50
Relationship of VMA to Mix Type and Design Method
Relationship of Field Air Voids to Compaction Level

Marshall $R^2 = 0.0029$

Superpave $R^2 = 0.0002$
Relationship of Air Voids to Traffic Volume

WP Air Voids vs Traffic

- Marshall
- Superpave

Linear (Superpave): $R^2 = 0.0002$
Linear (Marshall): $R^2 = 0.0142$
Noise Characteristics of Hot Mix Asphalt Pavement
Tire/road noise generation

- Driving direction
- Block ‘snap out’
- Block impact
- Air pumping/resonance
- Road surface
- Contact length
Pavements tested

• Locations
  – NCAT test track, Michigan, Alabama, New Jersey, Maryland, Colorado, Nevada, California, Arizona, Texas

• Numbers of surfaces tested
  – Total – 221 surfaces
  – HMA – 178 surfaces
  – PCCP – 43 surfaces
## Summary of Data

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<tr>
<th>Wearing Course</th>
<th>Average</th>
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<th>High</th>
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International Symposium on Design and Construction of Long Lasting Asphalt Pavements

June 7 - 9, 2004

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