North Central Superpave Center Update

by

Becky McDaniel
NCAUPG Meeting
January 28, 2004
Omaha, Nebraska
What is the NCSC Up To?

- Equipment/Protocol Evaluations
  - Binder direct tension, Performance Tests, Test standardization
- Communication and Technology Transfer
  - Website, Newsletter
  - Presentations
- Research
- Training
- Future Plans
Research
HMA Surface Friction

- Funded by Iowa, Indiana and SQDH
- Optimize microtexture and macrotexture in Superpave HMA
- Maintain friction level, but reduce need for imported high friction aggregates
- Identify test methods for lab use to test mixtures, not just aggregates
- Phase I complete, Phase II - April 2005
Dynamic Friction Tester
Circular Texture Meter
Field Data Comparison

<table>
<thead>
<tr>
<th>Surface</th>
<th>DFT 20</th>
<th>CTM</th>
<th>F60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porous</td>
<td>0.51</td>
<td>1.37</td>
<td>0.36</td>
</tr>
<tr>
<td>SMA</td>
<td>0.37</td>
<td>1.17</td>
<td>0.28</td>
</tr>
<tr>
<td>HMA</td>
<td>0.52</td>
<td>0.30</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Porous and SMA tested before trafficking.
Slab Polisher
Future Applications

- Research
- Forensics
- Material selection
  - Especially new, unknown sources
- Other issues besides friction
  - Noise, for example
  - Variation in surface texture - segregation, uneven maintenance treatments, wear
Porous Asphalt for Noise Control

- Study funded by Institute for Safe, Quiet and Durable Highways
- Field trial of Porous Friction Course
  - Compare PFC, SMA and conventional
  - Compare different noise measurement techniques in field and lab
- Thanks to INDOT and Heritage Research
Sideline Noise Measurements
Close Proximity Trailer
Pavement Type/Noise (Treaded Tire, 60 mph, NCAT CPX Lead Mic. Location)

A-weighted sound pressure level (dBA)

1/3 octave center frequency (Hz)

- Porous Friction Course Asphalt
- Dense Graded Asphalt
- Stone Matrix Asphalt
- Portland Cement Concrete (Trans. Tined)
- Novachip Asphalt
Overall A-weighted Sound Pressure Level

A-weighted SPL (dB)

92.7  98.4  99  102.1

PFC  SMA  HMA  PCC

Surface Type

Overall A-weighted Sound Pressure Level
Preliminary Findings

- PFC significantly quieter than SMA or conventional HMA
- Examine spectrum of the noise
  - SMA perceived as quieter than HMA
  - Some frequencies more annoying
- In car noise significantly different and lower on PFC
Tire-Pavement Test Apparatus
Asphalt TPTA Specimens
What’s Next

- TPTA testing completed, analysis underway
- Follow-up long term performance
- Continue analysis of full spectrum data
- Report available in February or March on SQDH website

- Fundamental study of noise generation and propagation needed, proposed with NCAT
Other Research at the NCSC

- Performance Certification of Indiana Superpave Hot Asphalt Mixes Superpave Simple Performance Testing
- Effects of Hot Plant Fuel Characteristics and Combustion Conditions on Asphalt Concrete Quality - SDDOT
- Evaluation of Surface (Top-Down) Longitudinal Wheel Path Cracking in Indiana
- Stiffness of HMA
- Ignition Oven for Dolomitic Aggregates
Training in 2004

- Binder course, February 10-12
- Mix Design for Beginners, Feb 17-20
- Mix Design for Experienced, Feb 26-27
- Developing training for Local Agencies for Minnesota
- New Direct Tension testing video posted
- Customized courses available on request
Future Plans
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