What is the NCSC Up To?

- Research
- Equipment/Protocol Evaluations
- Training
- Communication and Technology Transfer
- Staffing
- 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
HMA Surface Friction

- Phase I completed October 2003
  - Preliminary report on SQDH website http://widget.ecn.purdue.edu/~sqdh/
- Identified techniques for lab polishing; lab and field friction and surface texture measurement
- Phase II underway
- Project completion - 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
Overall A-weighted Sound Pressure Level

A-weighted SPL (dB)

<table>
<thead>
<tr>
<th>Surface Type</th>
<th>A-weighted SPL (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFC</td>
<td>92.7</td>
</tr>
<tr>
<td>SMA</td>
<td>98.4</td>
</tr>
<tr>
<td>HMA</td>
<td>99</td>
</tr>
<tr>
<td>PCC</td>
<td>102.1</td>
</tr>
</tbody>
</table>
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
Lab Testing

- Test in TPTA and impedance tubes in lab
- Correlate lab to field
- Predict noise levels without constructing field test sections
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
Other Research at the NCSC

- Pending
  - Research for Mineral Wool Manufacturer
  - NCAT Pooled Fund study on Noise
  - Other new projects

- Planning
  - Bidding on NCHRP work

- Open to research collaborations and suggestions
Equipment/Protocol Evaluations

- FHWA sponsored evaluation of candidate simple performance tests
  - Testing completed, analysis underway
- Ruggedness testing on Binder Direct Tension completed
  - 600+ samples
- Iowa DOT/FHWA evaluation of various performance tests
Test Standardization

- AASHTO T166, Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens
- Sent survey in October
- Responses from five states, one contractor and one province
- Need to follow up with remaining states
  - Could not locate test methods on-line
Test Standardization

- Most differences seem relatively minor
  - Some specify room temperature in addition to water temperature, others do not
  - Most use Method A, some use C for cores
  - MN specifies weighing to nearest tenth and drying and weighing within 15 seconds
  - KDOT has rapid method, Corelok method and T166 and method for open graded
Test Standardization

- Now have student to help with compiling and comparing information
- Will follow up with remaining states
- Summarize differences
- Prepare white paper
- Target date: March 24
Training in 2004

- Continued Emphasis
- Binder course, February 10-12
- Mix Design Fundamentals for Beginners, February 17-20
- Mix Design for Experienced Designers, February 26-27
- Customized courses available on request
Superpave Guidelines for Local Agencies

- Sponsored by Minnesota DOT
- Developing guidelines for gyratory designs for Minnesota agencies
  - Training materials
  - Written guidelines
  - Flow charts and summaries, etc.
- Largely completed in February 2004
Video Production

- New binder direct tension video has been posted on website. SGC and DAV being considered.
  - DSR, BBR, RV already there.
- RAP video, completed in 2002, will be distributed soon by TRB and/or NAPA.
  - Will be posted on our website by 2/1/04.
Communication

- Another major emphasis area
- Newsletter (regional and national editions)
  - hard copy mailed to ~4000 people
  - electronic copies available on web page
  - coordinated, printed and distributed by NCSC three times a year for two centers
  - Northeast may rejoin the effort through U Conn
  - Current contract with NCSC and SESC only
  - Next issue Late Winter 2004 (February)
Website

- **Website**
  - Maintained and updated periodically
  - Addition/expansion continuing
- **Searchable database well received and expanding**
- **Training Videos**
- **Calendar**
- **Technical Information**
- **Links**
  http://bridge.ecn.purdue.edu/~spave/
Presentations

- Western Cooperative Test Group
- Association of Asphalt Paving Technologists
- TRB Committee on General Asphalt Problems
- Ohio Transportation Engineering Conference
- Kansas Asphalt Paving Conference
- Minnesota Association of Asphalt Paving Technologists
- ASTM
Staffing

- The “regulars” – Jan Olek, Becky McDaniel, Lynn Warble, Ayesha Shah, Steve Bowman
- James Esler – left in April 2003 for position in mechanical engineering
- Students – Rolando Garcia, Will Thornton (through SQDH)
Future Plans
INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF RESEARCH
AND
NORTH CENTRAL SUPERPAVE CENTER.
More info:

Rebecca S. McDaniel
Technical Director
North Central Superpave Center
P. O. Box 2382
West Lafayette, IN  47906
765/463-2317 ext. 226
rsmcdani@purdue.edu
http://bridge.ecn.purdue.edu/~spave/