NCAT Pavement Test Track

Research Update
NCAT Track, US-280, and Lee Road 159
NCAT Pavement Test Track

- Help state DOTs implement positive change
- Promote real innovation for the industry

- Mix and materials
- Structural pavement design
- Pavement preservation.
# Surface Performance

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Track</th>
<th>Lee Road 159</th>
<th>US-280</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roughness</td>
<td>Weekly</td>
<td>Weekly</td>
<td>Weekly</td>
</tr>
<tr>
<td>Rutting</td>
<td>Weekly</td>
<td>Weekly</td>
<td>Weekly</td>
</tr>
<tr>
<td>Macrotexture</td>
<td>Weekly</td>
<td>Weekly</td>
<td>Weekly</td>
</tr>
<tr>
<td>Crack Mapping</td>
<td>Weekly</td>
<td>Monthly+</td>
<td>Monthly+</td>
</tr>
<tr>
<td>FWD</td>
<td>Weekly</td>
<td>Monthly</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Surface Friction</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Monthly</td>
</tr>
<tr>
<td>Permeability</td>
<td>Quarterly</td>
<td>-</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Noise</td>
<td>Quarterly</td>
<td>Quarterly</td>
<td>Quarterly</td>
</tr>
</tbody>
</table>
Rutting

Equivalen Single Axle Loadings in 2009 Research Cycle

MnROAD at AUBURN UNIVERSITY

National Center for Asphalt Technology
Cracking

Crack Map (Recent Cracks in Solid Red, Potential Reflective Cracks in Blue, Patches Outlined in Green, and Trucking Percent Complete via Height of Gray Map Date Box)

Approx. Cracked Areas:  
- Lane: 21%  
- LWP: 16%  
- RWP: 22%

1/13/14
2015 NCAT Pavement Test Track

- Safe, sustainable, & cost effective pavements
- Optimizing the use of RAP & RAS (rejuvenation)
- Durability of small/fine surplus sand thinlays
- Improved longitudinal joint performance
- Cold recycle (CR) construction & performance
- Preventing surface & reflective cracking (CG)
- Pavement preservation (PG15).
Cracking Group (CG) Experiment
Cracking Group (CG) Experiment

- **Flexibility Index**
  - **Reheated**
  - **Critically Aged**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Flexibility Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1 (20% RAP Ctrl)</td>
<td>3.6 (0.6)</td>
</tr>
<tr>
<td>N2 (High Dens Ctrl)</td>
<td>1.9 (0.1)</td>
</tr>
<tr>
<td>N5 (Low AC/Dens Ctrl)</td>
<td>2.7 (0.8)</td>
</tr>
<tr>
<td>N8 (Ctrl + 5%RAS)</td>
<td>0.4 (0.1)</td>
</tr>
<tr>
<td>S5 (35%RAP w/58-28)</td>
<td>6.3 (1.8)</td>
</tr>
<tr>
<td>S6 (Ctrl w/ HiMA)</td>
<td>4.5 (3.8)</td>
</tr>
<tr>
<td>S13 (15%RAP AZ GTR)</td>
<td>10.4 (4.3)</td>
</tr>
</tbody>
</table>

MnROAD at Auburn University

National Center for Asphalt Technology
VDOT Sections with CCPR Base

S12
4-inch AC
5-inch CCPR
8-inch FDR
Subgrade

N4
4-inch AC
5-inch CCPR
6-inch Agg
Subgrade

N3
6-inch AC
5-inch CCPR
6-inch Agg
Subgrade
VDOT Sections with CCPR Base Track

- N3-6"AC
- N4-4"AC
- S12-FDR
- PerRoadLimit

Simulated Tensile Microstrain vs Cumulative Percentile Graph
Lee Road 159 Low Traffic Preservation

790k ESALS

70k ESALS

Lee Road 159
Pavement Preservation Experiment to Reduce the Cost to Maintain Your Roads
Funding Provided by: Alabama, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, and FP2 via Auburn University and the Lee County Commission
CCPR Base in Section L20
Benefits of Preservation (PG)

- Graph showing the relationship between age (in years) and percentage cracking.
- Lines represent different preservation treatments.

[Graph Image]
Benefits of Preservation (PG)
US-280 High Traffic Preservation

4.3M Vehicles, 1.2M ESALs
RAP+RAS Thinlays on Cold Recycle $F_E$

CCPR

No Rutting

CIR

No Cracking

MnROAD

National Center for Asphalt Technology (NCAT)
Summary

• Non-surface cold recycle has high potential
• Optimism about cracking test(s) for design and QC
• True innovation via balance mix design approach
• Preservation benefit function of MAP-21 condition
• Performance of standalone thinlay surfaces
• Role of route/fill versus blow/band crack sealing
• Performance of combination emulsion treatments.
Dr. R. Buzz Powell, PE
Assistant Director & Test Track Manager

277 Technology Parkway
Auburn, AL  36830

Phone: (334) 844-6857
Cell: (334) 750-6293

Email: buzz@auburn.edu
Web: www.pavetrack.com
Twitter: www.twitter.com/pavetrack