2012 NCAT Pavement Test Track

- SC Track Update

6.4M ESALs
Content

- General overview of 2012 research cycle
- Update on South Carolina’s Track section(s)
- Status of pavement preservation research
Past SCDOT Track Research

- 12.5 versus 9.5 NMAS surface mix
- “Soft” granite versus marble schist
- Standard versus high LA abrasion loss SMA
- Friction loss in experimental aggregate source
- Multi-state M-E design group experiment:
  - Virgin versus high RAP
  - HMA versus foam & additive WMA
  - PFC surface versus DGA
2012 Research Cycle

• How thick do pavements need to be built?
• How can reclaimed & recycled materials be used to reduce construction costs AND improve life-cycle performance for each structural layer?
• What are the life extending benefits of pavement preservation?
Flexible Pavement Design

- Local calibration essential for “Pvmt ME Design”
- ’93 layer coefficient increase from 0.44 to 0.54
- Perpetual pavements from 6 to 14 inches thick
- 0.15 interim layer coefficient for PFC surfaces
- Top-down rehabilitation of failed pavement(s)
- Tack rate/quality affects structural performance
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- Targeted use of reclaimed/recycled materials...
## 2012 Green Group (GG) Study

<table>
<thead>
<tr>
<th>Purpose of Each Layer</th>
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- **N5 Control**
- **S5 Higher RAP**
- **S6 RAP+RAS**
- **S13 Recyc Tires**

- Durable, Rut Resistant Surface
- **20% RAP 67-22 DGA**
- **25% RAP 67-22 SMA**
- **5% RAS 67-22 SMA**
- **VIRGIN ARB12 SMA**

- Stiff, Strain Reducing Middle
- **35% RAP 67-22 DGA**
- **50% RAP 67-22 DGA**
- **50% AGED 67-22 DGA**
- **35% RAP ARB12 DGA**

- Fatigue Resistant Base Layer
- **35% RAP 67-22 DGA**
- **35% RAP 88-22 DGA**
- **25% RAP 76-22+ DGA**
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- **VIRGIN ARB20 AZ**

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2012 Green Group (GG) Study

National Center for Asphalt Technology (NCAT)

at Auburn University
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Recycled Tire Section
CCPR Base and “FDR” Foundation
Track Research by Others

- Improved performance of PFC surfaces
- Targeted use of highly polymer modified mixes
- Reflective cracking in reclaimed/recycled inlays
- Reflective cracking w/ OGI vs triple chip seals
- Small NMAS “thinlays” for pavement preservation
Benefit of Pavement Preservation?

- Agencies have well thought out decision trees
- Life cycle for preservation treatments unknown
- Performance will vary by pretreatment condition
  - Treatments on good roads can last a long time
  - Treatments on bad roads can fail very quickly
- Track data can capture whole spectrum...
Recent Track Coring Study

Cores on Longitudinal Cracks

Cores on Transverse Cracks
Top-Down Longitudinal Cracking
Bottom-Up Transverse Cracking
14 Track Preservation Sections

- Proactive rejuvenating fog seal vs control (PFC) 8/6/12
25 Sections on Lee Road 159
Treatments & Treatment Combinations

- Fog seals (with and without rejuvenators)
- Crack seals (routing/filling versus air/lance)
- Chip seals (single, double, triple, scrub, FiberMat)
- Cape seals (on chip/scrub seals, FiberMat)
- Micro surfacing (single, double, Cape seals)
- Plant mix “thinline” (4.75 screening mix variations)
Treatments & Treatment Combinations

![Graph showing treatments and treatment combinations with distance from reference point on north end of project (ft) and transverse offset from centerline (ft).]
“Worst” Crack at Far End of L23
“Tell” from Centerline Cracking
Life Extending Benefit Curves
Life Extending Benefit Curves
Life Extending Benefit Curves

- Pretreatment % Cracked vs. Time (or Traffic) to Return to Pretreatment Condition

Graph showing an increasing trend in Pretreatment % Cracked over Time.
Preservation Summary

- Crack sealing appears to be beneficial in all cases
- Scrub seal appears to exhibit crack seal benefit
- Preservation treatments reduce subgrade moisture
- High expectations for Track-proven 4.75 plant mix
- Objective life extending benefit curves expected
- Expect extension of project in 2015 research cycle
- “Final” results presented at 2015 Track Conference
2015 Pavement Test Track Conference

March 3-5, 2015
The Hotel at Auburn University and Dixon Conference Center
Auburn, Alabama

- WMA & High RAP/RAS/GTR Mixes
- Optimized Structural Design
- Pavement Preservation
- Implementation

Official registration information will soon be available at www.ncat.us
Performance data for each section will soon be available for viewing by positioning your mouse over the section in question and left-clicking. Based on feedback from our research sponsors, the performance reports have been revised to include crack maps. The 2012 performance reports will be a fully integrated and active part of the web presentation.

- Click here for a recent rutting bar graph with ESAL update!
- Click the layout below for information specific to each section

N1 - N11, S5 - S6, and S8 - S13 are structural sections
All other sections have deep perpetual foundations
Research cycle of surface placement shown by color
Off-Track test sections on Lee Road 159 shown below

17% of ESALs on the Track as of 2300 hours on March 9, 2013 (17% of the 10,000,000 ESAL goal). Rut depths recently averaged 4 mm, while roughness.
Track Research Sponsors

Private Sector Sponsors
- Cargill Deicing Technology
- FP2
- Kraton Polymers
- Seneca Petroleum
- Oldcastle Materials
- Polycon Manufacturing
- Shell Sulfur Solutions
- Trinidad Lake Asphalt

2012, Pre-2012
2015 Research Cycle

• Traditional stand alones
  – Traffic continuation
  – Mill/Inlay
  – Structural Sections
• Preservation Group (PG)
• Track group experiments
  – “Active effective” + cracking prediction
  – Tack coat quality/rate
  – 100% RAP CCPR mix
Questions?

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