2012 NCAT Pavement Test Track

• Research Overview
Content

- Significant Track findings
- Virginia’s 2012 test sections
- Thinner pavement designs
- Thinlays for preventive maintenance
- UltraFuse versus NovaBond
- 2015 NCAT Pavement Test Track
Significant Track Findings

- Mix designs
- Aggregate characteristics
- Binder characteristics
- Structural design (E & M-E)
- Tire-pavement interaction
- Predictive testing
Virginia’s Track Research

- W10, S1, S12, N3, and N4
- “Minimizing Road Noise Using Pavement Type Selection and GTR in Sections W10, S1, and S12”
- “Overlay Thickness of Conventional Asphalt Mixes on 100 Percent Foamed Recycle Mix in Sections N3 and N4”
- “Full Depth Reclamation versus Conventional Base and Subgrade Construction in Sections S12 and N3”
Virginia Noise Research

\[
\text{\text{\textfrac{3}{4}} Octave Band Sound Intensity dB(A)}
\]

\[
\text{Frequency (Hz)}
\]

- SBS
- GTR
- SMA
- DGA
- PFC
- W10
- S1
- S12
- N3
- N4
- N5

0  500  1000  1500  2000  2500  3000  3500  4000  4500

60  65  70  75  80  85  90  95  100
Virginia Structural Research

![Graph showing relationship between mid-depth temperature and longitudinal microstrain for different asphalt layers.](image)

- **4” AC**:
  - Equation: $y = 108.27e^{0.015x}$
  - $R^2 = 0.7483$

- **6” AC**:
  - Equation: $y = 67.953e^{0.0158x}$
  - $R^2 = 0.5619$

- **FDR & 4” AC**:
  - Equation: $y = 97.765e^{0.0046x}$
  - $R^2 = 0.1629$

Legend:
- N3
- N4
- S12
Thinner Pavements

• Stiff subgrade & dense crushed granite base
  – 9 inch perpetual versus 24 inch ‘93 AASHTO design
• Soft subgrade with shallow lime modification
  – 10 inch failure versus 14 inch proven perpetual
• Highly polymer modified mix (HiPM)
  – 5¾ inch perpetual (?) via high fatigue tolerance
  – 10 inch on soft subgrade mill/inlay perpetual (???)
• Pre-ME AASHTO layer coefficient 0.44 ⇒ 0.54
  – ≥ 0.15 for Open Graded Surface Courses
Pavement Preservation Research
Thinlay Mix Design
L18 – Thin HMA Overlay on FiberMat (HMA Cape)
L19 – Thin HMA Overlay
L20 – Thin HMA Overlay on 100% RAP Mix Base
L21 – Polymer Thin HMA Overlay
L22 – Bonded Thin HMA Overlay
L23 – 50% RAP
Thin HMA Overlay
L24 – 5% RAS
Thin HMA Overlay
L25 – HiMA Thin HMA Overlay
Enhanced Pavement Interlayers
Enhanced Pavement Interlayers

N1A eTac 0.10/0.06

N1B UltraFuse 0.15/0.15

N2 Trackless 0.05/0.03
Enhanced Pavement Interlayers

- Bonded
- Trackless
- eTac
- UltraFuse

Values:
- Average of BOND_STRENGTH
- Sum of % INTERFACE

2009 Test Track

2012 Test Track
Enhanced Pavement Interlayers

Crack Map (Trucking Percent Complete via Height of Gray Map Date Box)

N1A - eTac

Cracked Areas: Lane: 10% LWP: 16% RWP: 17%

N1B - UltraFuse

Cracked Areas: Lane: 1% LWP: 6% RWP: 5%

N2 - Trackless

Cracked Areas: Lane: 6% LWP: 16% RWP: 17%
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.

177K 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...
Enhanced Pavement Interlayers

N1 - N11, S5 - S6, and S8-S13 are thinner structural sections;
All other sections have deep perpetual foundations;
Research cycle shown by color (red=2006, yellow=2009, green=2012);
Blue outline for WMA and hatching for high recycled contents
End-of-Cycle Track Conference

- WMA & high RAP/RAS/GTR mixes
- Optimized structural design
- Pavement preservation
- Implementation

Pavement Test Track Conference
February, 2015
The Hotel at Auburn University
and Dixon Conference Center
www.ncat.us
2015 Research Cycle

- Traffic continuation
- Mill/Inlay
- Structural
- Pavement preservation
- True innovation
- Product/process evaluations
- Cracking test study
Track Research Sponsors

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

FHWA

2012, Pre-2012
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