2012 NCAT Pavement Test Track
Pavement Preservation Study

RMACES
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Denver, CO
Mary Robbins
Pavement Preservation

“A program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations”

- FHWA Pavement Preservation Expert Task Group
Pavement Preservation

“A program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that **extend pavement life**, improve safety and meet motorist expectations”

- FHWA Pavement Preservation Expert Task Group
2012 Preservation Group (PG) Study

• Quantify life extending benefit of study treatments
  – Time/traffic to return to pretreatment condition(s)
  – Test sections on the Track and Lee Road 159

• Sampling/testing for construction quality
Preservation Group (PG) Experiment

• 25 sections on local county road (Lee Road 159)
  – ≈5½” thick paved access road to quarry/asphalt plant
  – 2 control, 23 sections with treatments/combinations,
    Pretreatment condition varied by WP and direction

• 14 sections on the NCAT Pavement Test Track
  – 7” pavements placed in the summer of 2009
  – PFC sections, DGA sections (virgin, high RAP)
  – >10 million ESALs
• Low ADT roadway
• **Very high % trucks**
• Load data provided by quarry and asphalt plant
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
Lee Road 159

Distance from Reference Point on North End of Project (ft)

Direction of travel

Transverse Offset from CL (ft)

Direction of travel
<table>
<thead>
<tr>
<th></th>
<th>Final Layout</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rejuvenating Fog Seal</td>
</tr>
<tr>
<td>2</td>
<td>Fibermat Chip Seal</td>
</tr>
<tr>
<td>3</td>
<td>Control</td>
</tr>
<tr>
<td>4</td>
<td>Control</td>
</tr>
<tr>
<td>5</td>
<td>Crack Seal (CS)</td>
</tr>
<tr>
<td>6</td>
<td>Single Layer Chip Seal</td>
</tr>
<tr>
<td>7</td>
<td>CS + Single Layer Chip Seal</td>
</tr>
<tr>
<td>8</td>
<td>Triple Layer Chip Seal</td>
</tr>
<tr>
<td>9</td>
<td>Double Layer Chip Seal</td>
</tr>
<tr>
<td>10</td>
<td>Single Chip + Microsurfacing (Cape)</td>
</tr>
<tr>
<td>11</td>
<td>Microsurfacing</td>
</tr>
<tr>
<td>12</td>
<td>CS + Microsurfacing</td>
</tr>
<tr>
<td>13</td>
<td>Double Layer Microsurfacing</td>
</tr>
<tr>
<td>14</td>
<td>Fibermat Chip + Microsurfacing (Cape)</td>
</tr>
<tr>
<td>15</td>
<td>Scrub Seal + Microsurfacing (Cape)</td>
</tr>
<tr>
<td>16</td>
<td>Scrub Seal</td>
</tr>
<tr>
<td>17</td>
<td>Distress Demo Section</td>
</tr>
<tr>
<td>18</td>
<td>Fibermat Chip + HMA thinlay (HMA Cape)</td>
</tr>
<tr>
<td>19</td>
<td>HMA Thinlay (PG 67-22)</td>
</tr>
<tr>
<td>20</td>
<td>HMA + 100% Foamed Recycle Inlay</td>
</tr>
<tr>
<td>21</td>
<td>HMA Thinlay (PG 76-22)</td>
</tr>
<tr>
<td>22</td>
<td>Ultra Thin Bonded Wearing Course</td>
</tr>
<tr>
<td>23</td>
<td>HMA Thinlay (50% RAP)</td>
</tr>
<tr>
<td>24</td>
<td>HMA Thinlay (5% PCRAS)</td>
</tr>
<tr>
<td>25</td>
<td>HMA Thinlay (High Polymer)</td>
</tr>
</tbody>
</table>
Lee Road 159 Construction

2012

Jul

Aug

Sept

Oct

7/17 FiberMat Strawser

100% Foamed Inlay Lanford Brothers

Chip & Scrub Seals Microsurface Vance Brothers

Inbound Thinlays EAP

Outbound ultra thin bonded Spray Paver

8/13 Outbound Thinlays EAP

8/28

9/19 FiberMat – 159 W2 Agg Strawser
Rates Checked Prior to Placement
Actual Rates Verified During Placement
Plastic with Sample Pans
Plastic for Startup
LR 159 Testing Overview

• Weekly
  – Inertial Profiler (roughness, texture, rutting)
  – Visual inspections with notes/pictures

• Monthly
  – Video for crack mapping
  – Rut depth
  – Wet ribbed surface friction
  – Subgrade moisture readings
  – Falling weight deflectometer (FWD)

• Other
  – Ground penetrating radar (GPR)
Falling Weight Deflectometer
Nuclear Moisture Measurements
L16 – Scrub Seal
Subgrade Moisture Contents

Date Under Traffic from Quarry and Asphalt Plant

Change in Gravimetric Moisture Relative to Control Sections (%)
Thin Overlay Rutting Performance

![Graph showing average rut depth (mm) for different test sections and materials, with inbound and outbound data represented. Cape, Neat, Base, SBS, Bonded, RAP, RAS, and HiMA are compared.]
Video Crack Mapping
PROGRESSION OF CRACKING – UNTREATED CONTROL
Progression of Cracking
Time Zero
Progression of Cracking
July 2013

Traffic
Progression of Cracking
September 2013

Traffic

![Graph showing progression of cracking with traffic as an indicator.](image-url)
Progression of Cracking
October 2013

Traffic

![Graph showing progression of cracking with traffic on the x-axis and cracking level on the y-axis.]

NCAT
National Center for Asphalt Technology
at Auburn University
Progression of Cracking
December 2013

Traffic

![Graph showing the progression of cracking with traffic over time.](image.png)
Progression of Cracking
January 2014

Traffic
Progression of Cracking
February 2014
Progression of Cracking
March 2014
Progression of Cracking
April 2014

Traffic

N03

0 10 20 30 40 50 60 70 80 90 100
0 2 4 6 8 10 12
Progression of Cracking
May 2014

Traffic

N03

0 10 20 30 40 50 60 70 80 90 100

0 2 4 6 8 10 12

National Center for Asphalt Technology
at Auburn University
Progression of Cracking
June 2014
Progression of Cracking
July 2014

Traffic
Progression of Cracking
August 2014

Traffic
Progression of Cracking
October 2014
Percent of Lane Area Cracked

Avg Post-treatment Cracking

- 60%
- 50%
- 40%
- 30%
- 20%
- 10%
- 0%
Where We Are Going....

LIFE EXTENDING BENEFITS
L17 – Subsection
Distress Demo
Development of Curves

Graph showing the relationship between transverse offset from CL (ft) and distance from start of section (ft). The graph includes multiple lines indicating data points or curves across different distances and offsets.
Percent Area Cracked

Time / Traffic

Y₁

(time to return to pretreatment condition, cell 1)

Pretreatment %Cracked

Time (or Traffic) to Return to Pretreatment Condition

Life Extension = fn(Pretreatment Condition & Treatment Type)

Time (Traffic) to Return to Pretreatment Condition

Pretreatment Condition (%Cracked)
Performance data for each section can be viewed 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 2009 performance reports are now a fully integrated and active part of the web presentation.
Preservation Summary

- Preservation treatments reduce subgrade moisture
- Objective life extending benefit curves expected
- Expect extension of project in 2015 research cycle
- “Final” results presented at 2015 Track Conference
National Pavement Preservation Research Initiative
Planning for the 2015 Research Cycle

- “PG15” to continue on Lee Road 159 and expand to higher volume route
- Formal link between NCAT & MnROAD
  - NCAT for asphalt pavements and hot climate
  - MnROAD for cold climate
- Planning underway for summer 2015 build
Higher ADT Off-Track Preservation

- US-280 3 miles to east
- 17,000 ADT, >10 years old
- Westbound outside lane
- Tenth mile sections
- Duplicate Lee Road 159
- $\text{CCPR}_{F,E}$, $\text{CIR}_{F,E}$, and HIR
- High BR thin overlays.
Planning for the 2015 Research Cycle
End-of-Cycle Track Conference

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

Pavement Test Track Conference

March 3-5, 2015

The Hotel at Auburn University and Dixon Conference Center

www.ncat.us
Questions?

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