2012 NCAT Pavement Test Track Pavement Preservation Study

SEAUPG
November 19, 2014
Nashville, TN
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

PG Sections on Lee Road 159

- 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
Final Layout

1. Rejuvenating Fog Seal
2. Fibermat Chip Seal
3. Control
4. Control
5. Crack Seal (CS)
6. Single Layer Chip Seal
7. CS + Single Layer Chip Seal
8. Triple Layer Chip Seal
9. Double Layer Chip Seal
10. Single Chip + Microsurfacing (Cape)
11. Microsurfacing
12. CS + Microsurfacing
13. Double Layer Microsurfacing
14. Fibermat Chip + Microsurfacing (Cape)
15. Scrub Seal + Microsurfacing (Cape)
16. Scrub Seal
17. Distress Demo Section
18. Fibermat Chip + HMA thinlay (HMA Cape)
19. HMA Thinlay (PG 67-22)
20. HMA + 100% Foamed Recycle Inlay
21. HMA Thinlay (PG 76-22)
22. Ultra Thin Bonded Wearing Course
23. HMA Thinlay (50% RAP)
24. HMA Thinlay (5% PCRAS)
25. HMA Thinlay (High Polymer)
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**
Nashville, Tennessee

Nuclear Moisture Measurements

Impact of Crack Sealing
L16 – Scrub Seal

Subgrade Moisture Contents

-18
-15
-12
-9
-6
-3
0
3
6
9
12
15
18

Date Under Traffic from Quarry and Asphalt Plant

Crack Seal Only
Chip Seal
Crack Seal then Chip Seal
Scrub Seal
Thin Overlay Rutting Performance

Video Crack Mapping
Progression of Cracking
Time Zero
Progression of Cracking July 2013

Progression of Cracking September 2013
Progression of Cracking
October 2013

Progression of Cracking
December 2013
Progression of Cracking
March 2014

Traffic

Progression of Cracking
April 2014

Traffic
Progression of Cracking
May 2014

Progression of Cracking
June 2014
Progression of Cracking
July 2014

Progression of Cracking
August 2014
Progression of Cracking
October 2014

Where We Are Going....
LIFE EXTENDING BENEFITS
L17 – Subsection Distress Demo

Development of Curves

Distance from Start of Section (ft)

Distance from Offset from CL (ft)
Nashville, Tennessee

Distance from Start of Section (ft)

At time 1 (t1) and time 2 (t2)

At time 3 (t3)

At time 4 (t4)

At time 5 (t5)

Percent Area Cracked

Time / Traffic

Control Cell 1 Series 3

Percent Area Cracked

Life Extension = ln(Pretreatment Condition & Treatment Type)

Time (Traffic) to Return to Pretreatment Condition

Pretreatment Condition (%Cracked)

0 10 20 30 40 50 60 70 80 90 100

0 10 20 30 40 50 60 70 80 90 100

X1, Y1 (time to return to pretreatment condition, cell 1)
Preservation Summary

- Crack sealing appears to be beneficial in all cases
- 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
Planning for the 2015 Research Cycle

- Same options as in past research cycles
- Group experiments for preservation – “PG15” to continue/expand
- Lee Road 159
- Formal link between NCAT & MnROAD – NCAT for asphalt pavements and hot climate – MnROAD for cold climate
- Planning underway for summer 2015 build.

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?

Dr. Mary M. Robbins
Assistant Research Professor

277 Technology Parkway
Auburn, AL  36830

Phone: (334) 844-7303
Cell: (334) 750-2076
Email: mmr0001@auburn.edu