It’s a Pavement’s Life: An Overview

- Design
- Construct
- Maintain
- Reconstruct
- Rehabilitate
It’s a Pavement’s Life: What’s Important

Design ➔ Construct ➔ Maintain
It's a Pavement's Life: Our Focus

Design → Construct → Preserve (maintain)
Support for Pavement Preservation

• Anecdotal and small scale studies
• State and regional comparisons of treatments in SPS-3
• Construction reports
• Industry
A Preservationist’s Perspective

Preventive Maintenance Treatments Applied

Pavement Condition

Initial Performance Period

Preventive Maintenance Treatments Applied

No Maintenance Treatment Applied

Time

Good

Poor
NCHRP 1-48 Background

• *Incorporating Pavement Preservation into the MEPDG*

• Study started in July 2010

• Objective: Develop procedures for incorporating pavement preservation treatments into the MEPDG analysis process
MEPDG and Preservation (in quotes)

• Preservation programs and strategies are policy decisions which are not considered directly in the distress predictions.

• Preservation treatments applied to the surface of hot-mix asphalt (HMA) layers early in their life may have an impact on the performance of flexible pavements and HMA overlays.

• Consider the impact of these programs in establishing the local calibration coefficients or to develop agency-specific values.
NCHRP 1-48 Approach and Deliverables

• Identify and recommend procedures that would be integrated into MEPDG models and software

• Prepare a chapter on pavement preservation in a format consistent with the MEPDG
Brief History of Partial Failures

• NCHRP 14-14: Optimal Timing of Pavement Preventive Maintenance

• NCHRP 1-48
Featured Approaches

• Approach 1—Development of Pavement Preservation Response Models and Distress Transfer Functions
• Approach 2—Local Calibration using Pavement Preservation Performance Results
• Approach 3—Adjustment of Pavement Distress and Corresponding Life by Modification of Pavement Materials and/or Structure Properties
Approach 1

- Construct and monitor conditions of pavement preservation test sections
- Analyze data and develop performance models

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<tr>
<th>Climate Zone</th>
<th>Preservation Treatment</th>
<th>Flexible Pavements</th>
<th>Climate</th>
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Approach 2

• Collect condition and other data on existing preservation-treated pavements
• Conduct design analyses for those pavement structures (minus the treatments) using Pavement ME Design software
• Perform local calibration of MEPDG performance models using AASHTO Local Calibration Guide procedure (predicted vs. actual distress/smoothness)
Approach 2

Increase precision by reducing variation/error

Increase accuracy by reducing bias from line of equality
Approach 3

• Perform baseline pavement design (original untreated pavement) using *Pavement ME Design*

• Perform preservation-treated design that incorporates impacts of preservation treatment on pavement material properties and structure
  – Design input changes to layer moduli, thicknesses, moisture infiltration and thermal absorption properties.
  – “Adjusted/effective” performance curves
Moving Forward

• NCHRP Report 810: Consideration of Preservation in Pavement Design and Analysis Procedures

• Presents details of proposed approaches

• Works examples of the implementation of each approach using agency data
So Does Preservation Matter?

• Where is it done? Why (underlying conditions)?
• Is it properly applied?
• How does it affect performance?
  – Immediately
  – Over time
• What did it cost?
• What factors make a difference (e.g., quality of construction, materials, environment, traffic)
A Caution

• Accountable organizations insist that expenditures provide benefits
• Many organizations are spending more and promoting pavement preservation
• Are preservation funds at risk if models used for pavement design show no benefit from preservation?
Thank You!

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