Pavement Preservation

It just makes ¢ent$.

David R. Johnson, P.E.
Regional Engineer
Asphalt Institute
When you come to the end of your rope, tie a knot and hang on.

— Franklin D. Roosevelt
Time for some maintenance?
Pavement Preservation

Pavement Preservation is "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." Source: FHWA Pavement Preservation Expert Task Group
Pavement Preservation is "a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, (a) cost-effective set of practices that extend pavement life, (and) improve safety and meet motorist expectations." Source: Dave Johnson’s Shortened Version
The Components of Preservation

• Pavement Design
  – Mix Design
  – Pavement Structural Design
  – Perpetual Pavements

• Construction
  – Contracting
  – Quality Control
  – Quality Assurance

• Maintenance
  – Reactive
  – Preventive
Maintenance

• Reactive – Traditional Approach
  – Worst first
  – Waits for distress to appear
  – Costs more
  – Shortens pavement life

• Preventive – More Recent Approach
  – Proactive
  – Preformed based on triggers
  – Pavement Management System
    • Not a cure all
    • Goals
A Pavement Management System (PMS) is a set of tools for providing, evaluating, and maintaining pavements in a serviceable condition over a period of time—AASHTO
PMS Process

- **Strategic Level** – usage of PMS to support the long-term goals of an agency at a management level.

- **Network Level** – the entire transportation infrastructural system managed by the PMS. (Big Picture)

- **Project Level** – and individual project for which a plan-of-action is developed to address its specific need. (Focused Perspective)
Preventive maintenance and Pavement Management CANNOT effectively stand alone!
Preventive Maintenance

Present Serviceability Index

Years

40% drop in quality

75% of life

40% drop in quality

17% of life

Pavement deterioration with maintenance or rehabilitation

$1.00 for Renovation here

Pavement deterioration without maintenance or rehabilitation

Will cost $5.00 - 10.00 here

$1.00 for

Renovation here
Preventive Maintenance

• Pavement Preservation
  – Improves the overall condition of the pavement network
  – Extends pavement life
  – Reduces user delays
  – Improves road safety
  – SAVES MONEY
Categories of Pavement Preservation

- Pavement Preservation
  - Minor Rehabilitation
  - Preventive Maintenance
  - Routine Maintenance
## Pavement Preservation Guidelines

<table>
<thead>
<tr>
<th>Type of Activity</th>
<th>Increase Capacity</th>
<th>Increase Strength</th>
<th>Reduce Aging</th>
<th>Restore Serviceability</th>
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<tr>
<td>New Construction</td>
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<td>Reconstruction</td>
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<td>Structural Overlay</td>
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<td>Routine Maintenance</td>
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<td>Corrective (Reactive) Maintenance</td>
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<td>Catastrophic Maintenance</td>
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Preventive Maintenance

• Published in 2006
• Reviews numerous preventative maintenance operations

Pavement Distresses

- Ride (International Roughness Index – IRI)
- Cracking
  - Transverse
    - Reflective
    - Shrinkage (cold weather)
  - Longitudinal
  - Fatigue (Alligator)
  - Edge
  - Block
- Potholes
- Patches
- Surface Deformations
  - Rutting
  - Shoving
- Surface Defects
  - Bleeding/Flushing
  - Polished Aggregate
  - Raveling
LTPP Distress Identification Manual

- All pavement types
- Distress definitions
  - Description
  - Severity levels
  - How to measure
- Schematic drawings
- Color Photographs
- Data collection forms

www.tfhrc.gov/pavement/ltpp/reports/03031/index.htm
FHWA Preservation Methods

- Crack Sealing*
- Fog Seals*
- Sand Seal
- Chip Seal*
- Slurry Seal*
- Microsurfacing*
- Thin-Lift Overlay*
- Fabric Interlayer*

*FHWA Checklist Available at:
http://www.fhwa.dot.gov/pavement/pub_listing.cfm?areas=Preservation
Additional Preservation Methods

- Cape Seals
- Patching
- Rejuvenation
- Ultrathin Overlay
Example FHWA Checklist

- Preliminary Responsibilities
  - Project Review
  - Document Review
  - Material Requirements
- Inspection Responsibilities
  - Equipment Inspections
  - Surface Inspection
- Project Operational Considerations
- Common Problems and Solutions

http://www.fhwa.dot.gov/pavement/pub_listing.cfm?areas=Preservation
Preventive Maintenance

• Identify available methods
• Select method
• Predict the results
• Run additional iterations
• This is generally done within a PMS
Treatment Selection

• Factors Affecting Selection
  – Methods available
  – Pavement distresses
  – Distress severity
  – Maintenance goals
  – Available dollars

• Selection both an engineering and economic decision.
Real World Example - WSDOT

- Mid-1960s—began collecting pavement condition ratings.
- 1974—WSDOT implemented its first version of WSPMS.
- 1993—legislature required project selection based on lowest LCCA.
- Based on LCCA, determined there is a 2-3 year window when flexible pavements can be rehabilitated (12-13 years old).
Real World Example - WSDOT

- Hot-mix asphalt pavement: 10,776 lane-mi, 60 percent of network.
- Bituminous surface treatment: 4,843 lane-mi, 27 percent of network.
- Concrete pavement: 2,262 lane-mi, 13 percent of network.
Real World Example - WSDOT

From: FHWA Pub. IF-08-010
Real World Example - WSDOT

From: FHWA Pub. IF-08-010
Example Payoffs

- Michigan
  - Estimated traditional cost – $700 million
- Georgia
  - $70-80 million annually
  - 1992-1997 – 300% improvement in pavement smoothness
Preservation Partnerships – TSP²

Alaska

Hawaii

Puerto Rico

ROCKY MOUNTAIN WEST

MIDWESTERN

NORTHEAST

SOUTHEAST

D.C.
Training Opportunities

- Mix Design Methods for Slurry Seal/ Microsurfacing and for Chip Seals - $85 (Nov. 3)
- Combining Preservation Treatments - $85 (Nov. 10)
- ISSA Inspectors Manual - $85 (Nov. 17)

• Asphalt Institute publications that involve Pavement Preservation
  – MS-4 Asphalt Handbook
  – MS-16 Asphalt in Pavement Preservation and Maintenance
  – MS-19 Basic Asphalt Emulsions Manual

http://www.asphaltinstitute.org/store_category_browse.asp?ic_id=11
Thank you – Questions

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