Integration of Pavement Management and Preservation

Do the **Right Treatment**
On The **Right Road**
At the **Right Time**
National Statistics:
3,963,262 miles of Roads &
590,000 Bridges
PRESERVATION GOALS

RIGHT TREATMENT

Crack Sealing
Surface Seals
Recycling
CIR/HIR
Milling & Thin
OL’s
Drainage Maint.
Joint Sealing
Grinding/Grooving
Patching – Partial/Full
DBR
Whitetopping

GOOD STRUCTURE

“Acceptable” Distresses
Age
Expected Rehab
Traffic
Environment

RIGHT ROAD

PAVEMENT MANAGEMENT SYSTEM

LIFE CYCLE COST ANALYSIS

RIGHT TIME

RIGHT ROAD

RIGHT TIME

RIGHT TREATMENT
A Pavement Management System (PMS) is a set of tools that assist decision-makers in finding **optimum strategies** for providing, evaluating, and maintaining pavements in a serviceable condition over a period of time.
In Other Words

- Pavement management supports an agency’s decision processes
- Today, that means more than ever before with the increased demands associated with:
  - Preserving our Infrastructure with Less
  - Performance based Fed-Aid Program
  - Accountability Requirements
5 Core Questions

• What is the current state of my pavements?
• What is the required level of service?
• Which pavements are most critical to achieving our performance objectives?
• What are the best strategies for Maintenance & Operations and Capital Improvement investments?
• What is the best long-term funding strategy?
Role of Pavement Management in a Preservation Program

• Assist with project and treatment selection
• Determine best project timing
• Establish program funding needs
• Build program support
• Provide accountability
Project and Treatment Selection

• Analyze pavement performance
  – Assess type of deterioration present
  – Assess extent of deterioration present

• Identify factors that lead to the selection of preventive maintenance treatments
Analyzing Pavement Performance
Pavement Condition Survey Equipment
Structural HMA Distress

- Load
  - Plastic Deformation
  - Rutting
  - Fatigue Cracking
Functional Deterioration

• Most pavement surface distress somehow affects a pavement’s function by increasing roughness or reducing friction
# Treatment Selection Guidelines

<table>
<thead>
<tr>
<th>HMA Distresses</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Occasional</td>
<td>Occasional</td>
<td>Occasional</td>
</tr>
<tr>
<td></td>
<td>Frequent</td>
<td>Frequent</td>
<td>Frequent</td>
</tr>
<tr>
<td>Fatigue Cracking</td>
<td>Fog Seal, Do Nothing</td>
<td>Fog Seal, Chip Seal</td>
<td>Chip Seal, Chip Seal, Slurry Seal</td>
</tr>
<tr>
<td>Edge Cracking</td>
<td>Do Nothing, Crack Seal or Fill</td>
<td>Crack Seal, Patching</td>
<td>Patching, Patching</td>
</tr>
<tr>
<td>Longitudinal Cracking</td>
<td>Crack Seal, Do Nothing</td>
<td>Crack Seal, Chip Seal</td>
<td>Patching, Crack Seal, Chip Seal</td>
</tr>
<tr>
<td>Bleeding</td>
<td>Do Nothing</td>
<td>Do Nothing, Chip Seal</td>
<td>Mill + Chip Seal, Thin HMA Overlay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chip Seal, Do Nothing, Mill</td>
<td>Mill + Chip Seal, Thin HMA Overlay</td>
</tr>
</tbody>
</table>
Project Timing

• Predict pavement deterioration
• Estimate when a more substantial treatment will be needed
# Time-Based Schedule Example

New York State Initial Guidelines for Treatment Application Cycles

<table>
<thead>
<tr>
<th>Treatment Type</th>
<th>Appl. Cycle, yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCC pavement joint and crack sealing</td>
<td>8</td>
</tr>
<tr>
<td>HMA pavement crack sealing</td>
<td>4</td>
</tr>
<tr>
<td>Thin HMA overlays (38 mm [1.5 in])</td>
<td>12</td>
</tr>
<tr>
<td>Surface treatments of HMA pavements</td>
<td>4</td>
</tr>
<tr>
<td>Surface treatments of shoulders</td>
<td>4</td>
</tr>
<tr>
<td>Clean drainage</td>
<td>10</td>
</tr>
</tbody>
</table>
Program Funding

From Indiana DOT for its Interstates

Rehabilitation/ Preventive Maintenance

- $100 million/ $15 million
- $125 million/ $12.5 million
- $125 million/ $25 million
Program Support

- Promote concepts
- Demonstrate cost effectiveness
- Illustrate impacts with and without preventive maintenance
- Justify expenditures
Good Roads Cost Less

Condition Deterioration & Treatment Triggers / Resets

- Original Pavement
- Seal Coat
- Thin Overlay
- Structural Overlay
- Reconstruction

Remaining Service Life (RSL) = 0

Condition Index

Years / AADT (ESALs)
Kansas DOT

% of System in Level

Time, years

91.1%

0.90%
Accountability
Setting Performance Targets

Plot end points versus annual budget

- Do Nothing
- $5M/year
- $25M/year

Accountability

Percent Pavement in Good Condition vs Time (Years)
Setting Performance Targets

Percent Pavement in Good Condition in 10 Years

Relative Budget, $Millions/Year

- $25M/year
- $5M/year
- Do nothing

Accountability
Setting Investment Levels

Pavement Condition in 10 Years

Average Target Condition

$0 Budget

$50 Million/Year

$100 Million/Year

Millions

200 400 600 800 1000

$50 Million/Year

$100 Million/Year

$0 Budget
Enhance Accountability

- Pavement Management Plans

  - Background
  - Commitment to the Users
  - Performance Metrics
  - Description of Services Provided
  - Description of Pavement Conditions
  - Description of Targeted Service Level
  - Financial Requirements and Funding Strategies
  - Program Descriptions
  - Commitment to the Users
Pavement Management Plan

Oklahoma Department of Transportation

TRANSPORTATION INVESTMENTS FOR THE FUTURE
2006 Statewide Pavement Management Report

City of Portland
Office of Transportation

Pavement Asset Management Plan

April 2006
Benefits of Integrating Pavement Preservation to Pavement Management

• Help Identify the factors that trigger preventive maintenance treatments
• Help you track performance of preventive maintenance applications
• Help you establish the “window of opportunity”
• Can establish guidelines on the amount of deterioration that can be addressed with preventive maintenance treatments
Benefits of Integrating Pavement Preservation to Pavement Management

- Help you identify appropriate funding level for your pavement preservation program
- Help you link funding levels to performance targets
- Help you prepare Pavement Management Plans showing what type of treatment, where, when and how much is needed for each section of the network.
Additional Benefits of Pavement Management
Pavement Information Availability
Integrate and Relate Data Collected to Pavement Performance Using GIS
Show Network Condition
Historical and Structural Information
Making Improvements

• Address the core questions
• Identify factors to which pavement preservation can be integrated into your pavement management system
• Enhance the capabilities of your Pavement Management System.
• Creating a Pavement Preservation Engineer position
• Keep moving forward!
5 Core Questions

• What is the current state of my pavements?
• What is the required level of service?
• Which pavements are most critical to achieving our performance objectives?
• What are the best strategies for Maintenance & Operations and Capital Improvement investments?
• What is the best long-term funding strategy?
Moving Forward

Identify Your Needs

Develop A Plan For Addressing Gaps

Determine What’s Available

Identify Any Gaps
Useful Resources

• FHWA Pavement Preservation:  
  www.fhwa.dot.gov/preservation

• FHWA Asset Management:  
  www.fhwa.dot.gov/infrastructure/asstmgmt

• National Center for Pavement Preservation:  
  www.pavementpreservation.org
CD’s

Pavement Preservation 2: State of the Practice

National Pavement Preservation Forum II
CHECKLISTS

1. Crack Seal Application
2. Chip Seal Application
3. Thin Hot-Mix Asphalt Overlay
4. Fog Seal Application
5. Microsurfacing Application
6. Joint Sealing PCC Pavement
7. Diamond Grinding
8. Dowel Bar Retrofit
9. Partial-Depth Repair
10. Full-Depth Repair
“Anytime you have an opportunity to make things better and you don’t, then you are wasting your time on this earth.”

Roberto Clemente
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