Pavement Analysis: DOT Preservation Techniques through Optimization Analysis

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Product Manager
Overview of Pavement Analyst™

- Track Key Performance Metrics
- View Inventory & Condition
- Generate Optimized Work Plans
- Model Future Performance
- Determine Preservation Strategies, Funding Levels & Consequences

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Overview of Pavement Analyst™

- Asset Data
- Pavement Condition
- Traffic
- Pavement Structure

Aggregation

- Engineering Framework
  - Models
  - Decision Rules
  - Treatments

- Master Files

Optimization Analysis

Outputs

- Work Plans
- Projections
- Reports
Why Focus on Preservation

**Sustainable**
- 80% non-renewable resources < $R^2$

**Economic Vitality**
- 25% jobs > $R^2$

**Maximize ROI**
- $1 == ($6 to $10)$

**Higher LOS and Safety**
- Less traffic disruptions/delays and improved roadway condition

**Business Drivers**
Preservation Technique: Define Treatments

Categorize treatments

Non-Preventive Maintenance

- PCC Lane Replacement
- Crack Seat and Overlay
- HMA Thick Overlay
- Full Depth Reclamations
- PCC Overlay
# Preservation Technique: Define Treatments

<table>
<thead>
<tr>
<th>Treatment No.</th>
<th>Treatment Name</th>
<th>Unit Cost</th>
<th>Comment</th>
<th>Selection Priority</th>
<th>Exclusion Priority</th>
<th>Exclusion Years</th>
<th>Cost</th>
<th>Budget Group</th>
<th>Work Code</th>
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<tbody>
<tr>
<td>194</td>
<td>Seal Coat - Corrective</td>
<td>$94,000</td>
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<td>Unit Cost Per Lane Mile</td>
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<td>Thickness greater than 0.</td>
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<td>3</td>
<td>Unit Cost Per Lane Mile</td>
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<td>Medium Overlay</td>
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<td>$345,000</td>
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<td>Unit Cost Per Lane Mile</td>
<td>CAPM</td>
<td>Cold In-Place</td>
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<td>10</td>
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<td>Preventive Maintenance</td>
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<td>CAPM</td>
<td>Cold In-Place</td>
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<td>Dogouts - Corrective</td>
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<td>9</td>
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<td>Corrective Maintenance</td>
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<td>Slab Replacement with Asphalt</td>
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<td>Unit Cost Per Lane Mile</td>
<td>Preventive Maintenance</td>
<td>Seal Coat</td>
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</table>

## Improvements

- **Condition Attributes**
  - IRI AVG (in/mi)
  - CRACKING - HMA WI
  - Mean Prof Depth
  - Flexible Total Crack
  - Alligator A (%) (New PC model)
  - CRACKING - PCCP Sl

- **Future Detr Type**
  - New PC model

- **Condition Improvement Script**
  - Improve to - 60
  - Improve to - 0
  - Improve to - 1,000

- **Effective for... years**
  - New PC model

## Other Improvements

- **Changing Attributes**
  - Alligator A pct
  - % Unsealed Flex Cracks
  - Work Code
  - Pavement Type

- **Condition Improvement Script**
  - Reset to 0
  - Improve to - 0
  - Set to Flexible

- **Other**
  - Date Update
  - User Update
  - Comment
  - 04/27/2016
  - 02/01/2013
  - 08/19/2013
  - 03/13/2012
  - 01/25/2012
  - CONFIG
  - PAVEM-PROXY
  - PAVEM-PROXY
  - ERIC
  - VYSHNAVI
Preservation Technique: Decision Trees

- **Root**: strategy
- **Level 1**: condition
- **Level 2**: condition, decision
- **Level 3**: decision, decision
Design scenarios with sub-divided budget constraints
### Scenarios

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<thead>
<tr>
<th>Scenario Number</th>
<th>* Scenario Name</th>
<th>Analysis Scope</th>
<th>* Analysis Period (Years)</th>
<th>* Save Details</th>
<th>Work Plan Type</th>
<th>Analysis Type</th>
<th>Skip Init. Deterioration</th>
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<td>IB-Statewide GHG-Fine (actual $)</td>
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<td>KA - Pre/Post 3 Projects</td>
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### Is Objective?

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<tbody>
<tr>
<td>Performance - IRT/Tral</td>
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<td>Preventive Maintenance</td>
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<td>Budget ($)</td>
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<td>PM, CM, CAPM, and Rehab</td>
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<td>Total</td>
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### Reporting Functions

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<td>Budget ($)</td>
<td>Total</td>
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Summary

- Decision Tree Criteria
- Treatments, Benefit/Cost and Condition Reset
- Optimization constrained by budget group
- Use existing preservation-based work plans

- Quality Data
Questions
Thank you!

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