Project Objectives

- Evaluate current ODOT practices
  - Crack sealing, spray injection, slot paving
- Determine best practices from other states
- Develop a construction specification for spray injection
- Develop a decision tree for pavement management and develop a guidance document for field personnel selecting projects
Presentation Overview

- Why longitudinal joints fail
- ODOT current practices
- Nationwide best practices
- Treatment life cycle comparisons
- Playbook
- Construction specification
Longitudinal Joints

STACKED JOINTS

FLEXIBLE

OVERLAY

OVERLAY

SURFACE

BINDER

COMPOSITE

HMA OVERLAY

HMA OVERLAY

PCC

AREAS OF LOW PAVEMENT DENSITY
Density Profile across the LJ

- Cold Side
- Hot Side
Best Practices

Assure proper rolldown

Specify density

Notched wedge joint

Polymerized sealant

Polymerized sealant
ODOT Repair Techniques

Slot Paving

Spray Injection

Crack Sealing
Spray Injection
Repair Sites Evaluated
Distress Evaluated

- Created a repair scoring scale for the repair condition
- Compared the conditions to repair age
- Projected where repair failure would occur
Repair Deterioration

TREATMENT LIFE COMPARISON

- Slot Paving
- Spray Patching
- Crack Fill
- Linear (Slot Paving)
- Log (Spray Patching)
- Linear (Crack Fill)
## Life Cycle Cost

<table>
<thead>
<tr>
<th>Repair</th>
<th>Treatment Life, Years</th>
<th>Cost per mile, $</th>
<th>Cost per mile per year, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot Paving</td>
<td>4.3</td>
<td>$104,464.35</td>
<td>$24,294.03</td>
</tr>
<tr>
<td>Spray Injection</td>
<td>2.2</td>
<td>$12,763.72</td>
<td>$5,801.69</td>
</tr>
<tr>
<td>Crack Sealing</td>
<td>4.5</td>
<td>$3,362.63</td>
<td>$747.25</td>
</tr>
</tbody>
</table>
**Decision Tool**

Ohio Department of Transportation
Longitudinal Joint
Treatment Selection Tool

<table>
<thead>
<tr>
<th>Decision Tool</th>
<th>Ohio Department of Transportation</th>
<th>Longitudinal Joint</th>
<th>Treatment Selection Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[Image: Restart]</td>
<td>[Image: Decision Tool}</td>
<td>[Image: State of Ohio Department of Transportation]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Select the longitudinal joint severity</strong></th>
<th>[Image: Longitudinal Joint]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Select the option that best describes the longitudinal joint</strong></td>
<td>[Image: Option]</td>
</tr>
<tr>
<td><strong>Select the width of the longitudinal joint</strong></td>
<td>[Image: Width]</td>
</tr>
<tr>
<td><strong>Select the extent of the distressed longitudinal joint</strong></td>
<td>[Image: Extent]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Recommended Treatment</strong></th>
<th>[Image: Recommended Treatment]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment Comments</strong></td>
<td>[Image: Treatment Comments]</td>
</tr>
<tr>
<td><strong>Project Length (ft)</strong></td>
<td>[Image: Project Length]</td>
</tr>
<tr>
<td><strong>Project Cost ($)</strong></td>
<td>[Image: Project Cost]</td>
</tr>
</tbody>
</table>

[Image: Restart]
Repair Playbook

<table>
<thead>
<tr>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Non-filled longitudinal crack width ≤ ⅛&quot;. Non-filled longitudinal crack width &gt;⅛&quot; and ≤ 3&quot;. Non-filled longitudinal crack width ≤ 3&quot; surrounded by low severity random cracking. Filled crack where sealant is failed and surrounded by low severity random cracking.</td>
</tr>
<tr>
<td>Medium</td>
<td>Non-filled or failed sealant longitudinal crack where width is &gt; 3&quot;, Filled or non-filled crack surrounded by medium or high severity random cracking. A crack of any width where approximately 4&quot; of pavement around the crack is severely broken.</td>
</tr>
<tr>
<td>High</td>
<td>The distress extent for the section should be identified as occasional, frequent, or extensive.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extent</th>
<th>Letter Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occasional</td>
<td>O</td>
<td>Less than 25 percent of the longitudinal joint shows distress</td>
</tr>
<tr>
<td>Frequent</td>
<td>F</td>
<td>25-70 percent of the longitudinal joint requires treatment</td>
</tr>
<tr>
<td>Extensive</td>
<td>E</td>
<td>Over 70 percent of the longitudinal joint requires treatment</td>
</tr>
</tbody>
</table>

Based on these new definitions, the observed distress characteristics, extent, and expected time in years to the next treatment, a corrective repair for the existing distress is recommended.
Recommendations

- Because crack sealing is the most economical treatment, it should be applied as soon as 0.25-inch opening occurs.

- Spray Injection
  - 2.2-year life expectation
  - Significantly cheaper than slot paving
  - Implement specification
Recommendations

- **Slot Paving**
  - Slot paving for severe LJ distress with next treatment scheduled more than 4 years in the future
  - Add density specifications
  - Use 3-ft standard width and a uniform thickness
  - Select sections for the repair that are continuous and coincide with one night’s production
## Recommendations

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Joint Width (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.125 to 1</td>
</tr>
<tr>
<td>Crack Filling</td>
<td></td>
</tr>
<tr>
<td>Spray Injection</td>
<td></td>
</tr>
<tr>
<td>Slot Paving</td>
<td></td>
</tr>
</tbody>
</table>
250 • PAVEMENT • REPAIRS

ITEM 25X • PARTIAL • DEPTH • PAVEMENT • REPAIR • BY • SPRAY • INJECTION

25X.1 • Description
25X.2 • Materials
25X.3 • Equipment
25X.4 • Repair • Demarcation
25X.5 • Weather • Limitations
25X.6 • Surface • Preparation
25X.7 • Application
25X.8 • Compaction
25X.9 • Finished • Surface
25X.10 • Opening • to • Traffic
25X.11 • Method • of • Measurement
25X.12 • Basis • of • Payment
Thank you!

For more information:

Greg Duncan
gduncan@appliedpavement.com
615.517.2178

ODOT Research Report
http://cdm16007.contentdm.oclc.org/cdm/ref/collection/p267401ccp2/id/15768