2013 Local Roads Workshop
Novi
February 28, 2013
Maximizing Your Pavement Dollars

Asphalt Pavements – America’s Most Recycled Product
Presentation Outline

• Mix of Fixes
• Decision Making Process / Pavement Management System
• ASCRL (Asphalt Stabilized Crack Relief Layer)
• Cost Considerations
Mix of Fixes

Capital Preventive

Rehabilitation

Reconstruction
Mix of Fixes

Capital Preventive maintenance: Shorter Term Fixes

- 1 ½” HMA Overlay
- Milling and 1 ½” HMA Overlay
- Crack Treatment
- Overband Crack Filling
- Chip Seal
- Micro-Surfacing
- Ultra-Thin HMA Overlay
Mix of Fixes

Rehabilitation: Medium Term Fixes

- Structural HMA Overlay (Multiple Course)
- Mill and Structural HMA Overlay
- Crush and Shape
- Rubblization
- ASCRL
Mix of Fixes

Reconstruction: Long Term Fixes

- Full depth pavement removal and replacement (10 – 13 inches)
- New Construction
Mix of Fixes

Asset Management Strategy

- EXCELLENT
- GOOD
- FAIR
- POOR
- VERY POOR
- FAILED

TIME

- 40% DROP IN QUALITY
- 75% OF LIFE
- 40% DROP IN QUALITY
- 12% OF LIFE

- MAY COST $1.00 FOR RENOVATION HERE
- MAY COST $4.00 TO $5.00 HERE

Asphalt Pavements – America’s Most Recycled Product

SMOOTH | DURABLE | SAFE | QUIET
Decision Making Process

Pavement Management

Asphalt Pavements – America’s Most Recycled Product

SMOOTH | DURABLE | SAFE | QUIET
Decision Making Process

Purpose of Pavement Management System (PMS)

- Determine current pavement condition
- Predict future pavement condition with and without work
- Determine where, when and what work to do
- Justify budget needs
- Determine what works and what doesn’t (e.g., feedback loop)
Decision Making Process

PMS Process

Pavement Data Collection → System evaluation → Preventive Maint. Rehabilitation Reconstruction → Select feasible alternatives

Monitor Performance

Pavement Data Collection → System evaluation → Preventive Maint. Rehabilitation Reconstruction → Select feasible alternatives

Life - cycle costs → Non-monetary factors → Select preferred alternatives → Construction → Detailed PS & E → Monitor Performance

Asphalt Pavements – America’s Most Recycled Product
Decision Making Process

Components of PMS

- Pavement Inventory
- Inspection
- Condition Assessment based on inspection results (e.g., PASER rating, PCI, RSL, etc.)
- Prediction Modeling technology for developing deterioration trends
- Network Condition Analysis
- Annual and long Range Work Planning
Decision Making Process

Pavement Inventory

- Type of Data to be Collected
  - Physical characteristics
  - Construction and maintenance history
  - Traffic levels
  - Climate information
  - Soils information
Decision Making Process

Condition Assessment

The assessment of current condition MUST be objective and repeatable

BUT, it must also match available resources
Decision Making Process

Approaches to Collecting Pavement Condition Data

• Manual
• Semi-automated
• Automated
Decision Making Process

PASER – Pavement Surface Evaluation and Rating System

- Rating Scale 1 - 10
  - Rating of 1 represents a condition needing total replacement.
  - Rating of 10 represents the best, or new construction.

- Surface Condition
  - Important to public
  - Simplified PMS system
Decision Making Process

Michigan Transportation Asset Management Council


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• ASCRL (Asphalt Stabilized Crack Relief Layer)
• Cost Considerations
Asphalt Stabilized Crack-Relief Layer (ASCRL)

HMA Overlay

ASCRL High voids

Old pavement

Subgrade
Asphalt Stabilized Crack-Relief Layer (ASCRL)
Asphalt Stabilized Crack-Relief Layer (ASCRL)

HMA Overlay, 3.5” – 4”

ASCRL
3” – 3.5”

Old pavement

Subgrade
Asphalt Stabilized Crack-Relief Layer (ASCRL)

Table 1 Aggregate Specifications

<table>
<thead>
<tr>
<th>Gradation Requirements</th>
<th>Slab Size (inch)</th>
<th>1 1/2</th>
<th>1</th>
<th>1/2</th>
<th>No. 4</th>
<th>No. 30</th>
<th>No. 230 (LBW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Passing</td>
<td></td>
<td>100</td>
<td>90-100</td>
<td>90-100</td>
<td>30-50</td>
<td>10-25</td>
<td>5-15</td>
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<tr>
<td>Physical Requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crushed Material, Min. (MTM 117) % (b)</td>
<td></td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss, max., Los Angeles Abrasion (AASHTO T36) %</td>
<td></td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Soft Particles (max) % (c)</td>
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<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Description. Furnish, place and compact an asphalt stabilized crack relief layer (ASCRL) on a prepared pavement base according to the details shown on the plans or as directed by the Engineer. The HMA mixture will be provided according to the requirements of the 2003 Standard Specifications for Construction, except where modified herein.

b. Materials. The aggregate materials used to prepare the ASCRL shall meet the following requirements.
The coarse aggregate shall originate geologically only from natural sources. Crushed concrete or reclaimed asphalt pavement cannot be used in the ASCRL mixture.
Asphalt Stabilized Crack-Relief Layer (ASCRL)

Table 1 Aggregate Specifications

<table>
<thead>
<tr>
<th>Sieve Size (inch)</th>
<th>1 1/2</th>
<th>1</th>
<th>1/2</th>
<th>No. 4</th>
<th>No. 30</th>
<th>No. 200 (LBW) (a)</th>
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</thead>
<tbody>
<tr>
<td>Percent Passing</td>
<td>100</td>
<td>90-100</td>
<td>30-60</td>
<td>10-25</td>
<td>5-15</td>
<td>3-5</td>
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</table>
## Asphalt Stabilized Crack-Relief Layer (ASCRL)

<table>
<thead>
<tr>
<th>Physical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed Material, Min. (MTM 117) % (b)</td>
</tr>
<tr>
<td>Loss, max., Los Angeles Abrasion (AASHTO T96) %</td>
</tr>
<tr>
<td>Soft Particle (max) % (c)</td>
</tr>
</tbody>
</table>

a. Loss by Washing shall be by MTM 108. Mineral filler may used to meet the required percentage.
b. The percentage of crushed material will be determined on that portion of the sample retained on all sieves down to and including the No. 4 sieve.
c. The sum of aggregate particles retain on the No. 4 sieve identified as shale, siltstone, clay ironstone and particles which are structurally weak or are found to non-durable in service.
Asphalt Stabilized Crack-Relief Layer (ASCRL)

Mix Design

- Asphalt Binder – PG 64-28 with 0.5% liquid antistrip additive
- Asphalt content – 3 to 4%
- Surface Coating – 100% without excessive draindown (max 0.30%)
- Minimum Asphalt film thickness - 9.0 microns
- Moisture sensitivity (AASHTO T283)
Asphalt Stabilized Crack-Relief Layer (ASCRL)

Construction

• Placed in a single layer

• Compaction – steel – wheeled tandem roller (1.0 ton per foot of drum length)
  • Static mode only
  • Minimum of three passes (down and back)
  • Compaction test strip may be required (minimize breakage of Agg.)
Asphalt Pavements – America’s Most Recycled Product

Asphalt Stabilized Crack-Relief Layer (ASCRL)

MDOT Projects to Date

<table>
<thead>
<tr>
<th>Project</th>
<th># of Jobs</th>
<th>Length (miles)</th>
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</thead>
<tbody>
<tr>
<td>ASCRL</td>
<td>25</td>
<td>130</td>
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</tbody>
</table>

Started in 2001
- All are performing very well
## Asphalt Stabilized Crack-Relief Layer (ASCRL)

### MDOT Projects to Date

<table>
<thead>
<tr>
<th>Region</th>
<th># of Jobs</th>
<th>Length (miles)</th>
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<tr>
<td>Superior</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>North</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Grand</td>
<td>5</td>
<td>14</td>
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<td>Bay</td>
<td>1</td>
<td>8</td>
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<td>University</td>
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<td>28</td>
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<tr>
<td>Metro</td>
<td>5</td>
<td>52</td>
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Asphalt Stabilized Crack-Relief Layer (ASCRL)

M-21, Before Construction
Asphalt Stabilized Crack-Relief Layer (ASCRL)

M-21, 3 years old
Presentation Outline

• Mix of Fixes
• Decision Making Process
• ASCRL (Asphalt Stabilized Crack Relief Layer)
• Cost Considerations
Cost Considerations

Rubblization vs ASCRL (1 mile x 24 feet wide):

Rubblization option:

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Option</th>
<th>Mix</th>
<th>Tons</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>1.5 in</td>
<td>wearing</td>
<td>5E10</td>
<td>1161</td>
<td>$64.05</td>
</tr>
<tr>
<td>2.0 in</td>
<td>leveling</td>
<td>4E10</td>
<td>1548</td>
<td>$62.16</td>
</tr>
<tr>
<td>3.0 in</td>
<td>base</td>
<td>3E10</td>
<td>2323</td>
<td>$55.53</td>
</tr>
<tr>
<td></td>
<td>Total mix</td>
<td></td>
<td></td>
<td>$299,581</td>
</tr>
<tr>
<td>14080 syd</td>
<td>Rubblization</td>
<td></td>
<td></td>
<td>$35,200</td>
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<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>$334,781</td>
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</tbody>
</table>
## Cost Considerations

### Rubblization vs ASCRL (1 mile x 24 feet wide):

**ASCRL option:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (10^x)</th>
<th>Tons</th>
<th>Price/ton</th>
<th>Total Cost</th>
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</thead>
<tbody>
<tr>
<td>1.5 in wearing</td>
<td>5</td>
<td>1161</td>
<td>64.05</td>
<td>75,746</td>
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<tr>
<td>2.0 in leveling</td>
<td>4</td>
<td>1548</td>
<td>62.16</td>
<td>97,028</td>
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<tr>
<td>3.0 in ASCRL</td>
<td></td>
<td>2323</td>
<td>48.00</td>
<td>112,488</td>
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<tr>
<td><strong>Total mix</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$286,099</strong></td>
</tr>
</tbody>
</table>

Joint Repairs (25% of all joints):  
(75% Det 7’s, 25% Det 8’s, hand patching)  
**$6,844**

**Total**  
**$292,943**
Cost Considerations

Rubblization vs ASCRL (1 mile x 24 feet wide):

Rubblization option: $334,781

ASCRL option: $292,943

- Difference: 14%
- Very competitive
- Very good performance to date
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Questions?

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