Repair and Maintenance of HMA Roads
-Overlays-

2004 Road School
March 10, 2004
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Tools of the Trade

INDIANA
DEPARTMENT
OF
TRANSPORTATION

STANDARD
SPECIFICATIONS
APPLICABLE FOR LETTINGS
JUNE 1, 2003
VALID THROUGH
SEPTEMBER 1, 2003

1999

The Indiana Design Manual
Part 5 Chapters 40-57
Road Design

www.in.gov/dot/div/contracts/standards/dm/

Chapter 52

Chapter 56
Partial 3R Projects

- Preventative Maintenance (PM)
- Functional Treatment
- Structural Treatment

Preventative Maintenance

- Arrest light deterioration
- Retard progressive damage
- Reduce need for routine maintenance
- Perform before severe distress, structural problems, moisture or aging related damage

Common PM Treatments

- Chip sealing
- Crack sealing
- Micro surfacing
- HMA inlay (mill and fill)
- HMA thin overlay
- Sand sealing
- Sawing and sealing

HMA Inlay

- Mill existing surface & replace with HMA to original elevation
- Guidelines in Chapter 52-11.0
- Minor surface defects, but no significant potholes, cracks or major distress
- Rutting > 13 mm (1/2")
- To improve surface friction
### HMA Inlay Guide

- **HMA Surface Milling**
- Depth: 1 - 1 1/2”
- Minimum mixture size: 2 X maximum particle size
- Recommended mixtures
  - HMA 9.5 mm @ 1 1/2” thickness
  - HMA 4.75 mm @ 1” thickness (new)
  - Designed for the appropriate ESALs (Superpave®)

### AASHTO MP 2

4.75 mm Gradation Specification

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5 mm (1/2)</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>9.5 mm (3/8)</td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>4.75 mm (#4)</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>2.36 mm (#8)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.18 mm (#16)</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>.075 mm (#200)</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

### PM HMA Overlay

- Single course
- Guidelines in Chapter 52-11.0
- Preserve ride quality
- Correct minor surface problems
- Rutting < 13 mm
- Raveling, weathering

### HMA Overlay Guide

- Depth: 1 - 2”
- Minimum mixture size: 2 X maximum particle size
- Recommended Mixtures
  - HMA 12.5 mm @ 2” Thickness
  - HMA 9.5 mm @ 1 1/2” thickness
  - HMA 4.75 mm @ 1” thickness (new)
  - Designed for the appropriate ESALs

### Functional Treatment

- Restores pavement smoothness to structurally sufficient pavement
- 2 course lay, should be preceded by milling
  - Intermediate
    - HMA 19.0 mm
    - HMA 12.5 mm
  - Surface
    - HMA 9.5 mm
    - HMA 4.75 mm
- Wedge and level?

### Structural Treatment

- Strengthens pavement structure to current design requirement
- Restores Pavement smoothness
- Design according to Chapter 52-9.0
- Minimum 3 course lay
  - HMA Base- 25.0mm (1 or more lifts)
  - HMA Intermediate- 19.0mm, 12.5mm
  - HMA Surface – 12.5mm, 9.5mm
HMA Pavement Distress
- Block Cracking
- Reflective Cracking
- Flushing
- Rutting
- Frost Heave
- Stripping
- Longitudinal Cracking
- Thermal Cracking
- Polishing
- Alligator / Fatigue Cracking
- Raveling
- Weathering

Treatment Evaluation
- Pavement Management System
- Needs Assessment
- Pavement Condition Rating (PCR)
- Paser Condition Rating
- Visual and other subjective means
- Pavement Condition Rating Guide (LTAP)

Pavement Design
- DARWIN Program (AASHTO)
- Chapter 52-13.01, Typical Sections based on ESALS

What is an ESAL?
- Not an ESAL……

ESAL Comparison
18 kip - ESAL’s (Single Equivalent Axle Load)

One = 6000

ESAL Comparison Table

<table>
<thead>
<tr>
<th>Entering AADT</th>
<th>Maximum ESALs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1000</td>
<td>216,000</td>
</tr>
<tr>
<td>1000 - AADT &lt; 15,000</td>
<td>3,000,000</td>
</tr>
<tr>
<td>15,000 - AADT &lt; 30,000</td>
<td>7,500,000</td>
</tr>
<tr>
<td>30,000 - AADT &lt; 40,000</td>
<td>20,000,000</td>
</tr>
<tr>
<td>≥ 40,000</td>
<td>40,000,000</td>
</tr>
</tbody>
</table>

ESALs for HMA Mixtures
Figure 53-3B
### HMA ESAL Traffic Categories

<table>
<thead>
<tr>
<th>ESAL Category</th>
<th>Minimum ESAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt; 200,000</td>
</tr>
<tr>
<td>2</td>
<td>&lt; 2,000,000</td>
</tr>
<tr>
<td>3</td>
<td>&lt; 10,000,000</td>
</tr>
<tr>
<td>4</td>
<td>&gt; 25,000,000</td>
</tr>
</tbody>
</table>

*For Open-Graded Mixtures (C19.0 and C21.6), the ESAL category is 3.*

**ESAL FOR QC-QM HMA MIXTURES**

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### Design Typical Thickness (inches)

<table>
<thead>
<tr>
<th>ESAL</th>
<th>Base 25.0 m</th>
<th>Interim. Drainage C25 mm</th>
<th>Base 25.0 mm</th>
<th>Interim. 19.0 mm</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 M</td>
<td>*</td>
<td>*</td>
<td>8</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>1-&lt;10M</td>
<td>3*</td>
<td>2.3*</td>
<td>2.5*</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>10-&lt;30M</td>
<td>4</td>
<td>2.75</td>
<td>4</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>&gt;30M</td>
<td>4</td>
<td>4.2</td>
<td>4</td>
<td>2.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Use 19.0 mm or C19 mm

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*Keep on Rolling*

**Thank You**