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
SEPTEMBER 1, 2003

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

Chapter 52

Chapter 56

The Indiana Design Manual
Part 5 Chapters 40-57

Road Design
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**

<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
- Flushing
- Frost Heave
- Longitudinal Cracking
- Polishing
- Raveling
- Reflective Cracking
- Rutting
- Stripping
- Thermal Cracking
- Alligator / Fatigue Cracking
- 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……..

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

One = 6000

ESAL Comparison

<table>
<thead>
<tr>
<th>Entering AADT</th>
<th>Minimum ESALs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1000</td>
<td>226,000</td>
</tr>
<tr>
<td>1000 – 4,000</td>
<td>1,300,000</td>
</tr>
<tr>
<td>4,000 – 8,000</td>
<td>7,700,000</td>
</tr>
<tr>
<td>8,000 – 40,000</td>
<td>20,000,000</td>
</tr>
<tr>
<td>&gt; 40,000</td>
<td>40,000,000</td>
</tr>
</tbody>
</table>

ESALs for HMA Mixtures
Figure 52-3B
### HMA ESAL Traffic Categories

#### Design Typical Thickness (inches)

<table>
<thead>
<tr>
<th>ESAL Category*</th>
<th>ESAL</th>
<th>Base 25.0 mm</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>Base ESAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 M</td>
<td></td>
<td>8</td>
<td>2.5</td>
<td>1.5</td>
<td></td>
<td></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>
<td></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>
<td></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>
<td></td>
</tr>
</tbody>
</table>

* Use 19.0 mm or C19 mm

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*Note: For Open Gradated Mixtures (C19 and C25), the ESAL category is 3.

ESAL FOR QC-QA HMA MIXTURES

*Keep on Rolling*

**Thank You**