PAPA REGIONAL MEETING TOPICS

6.3 mm Thin Asphalt Overlay
Tack Coat
Long Life Asphalt Pavements

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CMD
Topics

• 6.3mm Thin-Lift asphalt overlay
• Tack coat specification changes
• SMA in PA
Section 412 - 6.3mm Specification Features

- Aggregates: Changes to Section 703
  - SRL
      - AASHTO #89 and #9 Being added to Section 703.
      - AASHTO #9 Need to be sampled and pass quality and SRL testing to be used in 6.3mm asphalt.
      - AASHTO #89 Will be approved based on the AASHTO # 8 quality and SRL test results.
  - Fine aggregate –
    - Manufactured
      - fine aggregate must be manufactured from the same parent rock as SRL rated coarse aggregate.
    - Natural Fine Aggregate – Must be sent for SRL determination.
Section 412 - 6.3mm Specification

Features

- Design Gyrations for all roadways = 75
- Design VMA = 16.5% minimum
- Drain down test (AASHTO 305) required for mixes with greater than 7.0% asphalt content.
- Binder grade is PG 76-22 only. Possible future inclusion of PG 64-22.
- RAP & RAS
  - No RAP or RAS allowed
Section 412 - 6.3mm Specification Features

• **Tack coat:**
  - Proper application and adequate quantity's of tack are very important for thin asphalt layers.
  - New tack specification **SOL 481-17-01**.

• **Weather limitations:**
  - Air and Surface Temperatures 50° and rising.
  - For paving season extensions, compaction needs to be completed in less than 10 minutes.
  - Use **PaveCool** developed by MnDOT. Google PaveCool or go to: http://www.dot.state.mn.us/app/pavecool/
6.3mm Compaction

**PaveCool 3.0 Report**

**Project:** 6.3mm Thinlay

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Start Rolling*</th>
<th>Stop Rolling*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3/2017 9:25 AM</td>
<td>2 minutes (248 °F)</td>
<td>10 minutes (175 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mix Type</th>
<th>Binder Grade</th>
<th>Thickness</th>
<th>Delivery Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine/Dense</td>
<td>PG 76-22</td>
<td>1.00 in.</td>
<td>300 °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air Temp.</th>
<th>Wind Speed</th>
<th>Sky</th>
<th>Latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 °F</td>
<td>5 mph</td>
<td>Clear &amp; Dry</td>
<td>41 ° North</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Existing Surface</th>
<th>Moisture</th>
<th>State</th>
<th>Surface Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
<td></td>
<td></td>
<td>70 °F</td>
</tr>
</tbody>
</table>

**Graph:**
- Mix Temperature, °F
- Cooling Curve
- Start Rolling
- Stop Rolling

**10 Minutes**
6.3mm Mix Spec. Possible Changes

- 6.3mm asphalt currently only allows PG76-22 asphalt with no RAP

- Research project constructed in 2018 is evaluating PG64-22, and the use of PG 64-22 asphalt and 10% RAP in these mixtures

- Centre Co., SR 1001
Summary

- Pay special attention to tack coat application

- Thin layers lose heat faster and need to be compacted sooner *(Within 10 minutes)*

- Aggregate producers that anticipate making this mixture can submit Type A, AASHTO #9s for quality testing and SRL now
Tack Coat Specification Update
Section 460
Change in Tack Material

- New Tack is similar to CSS-1h emulsified asphalt.
  - The Minimum residual asphalt is 57% instead of 28%
  - The application temperature is 90F to 150F (AET - 75F to 140F)

- Non-tracking Tack is also an option now.
  - Minimum residual asphalt is 50%
### Change to Application Rate

Application Rate depends on surface placed on.

<table>
<thead>
<tr>
<th>Surface Type</th>
<th>Uniform Asphalt Residue Rate (RR) (Gallons per square yard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Bituminous Paving</td>
<td>0.03 to 0.05</td>
</tr>
<tr>
<td>Existing Bituminous Paving</td>
<td>0.04 to 0.07</td>
</tr>
<tr>
<td>Milled Surface (Bituminous &amp; PCC)</td>
<td>0.04 to 0.08</td>
</tr>
<tr>
<td>Portland Cement Concrete</td>
<td>0.04 to 0.07</td>
</tr>
</tbody>
</table>
CT making tack coat mandatory between each layer is in circulation and should be effective for this construction season.
History

- First SMA project placed in 1994 in PA in District 8. (Harrisburg area)

- 1997 District 9 placed their first SMA project.

- 2001 District 9 placed 2 projects
  - 2003 – 1 project
  - 2004 – 1 project
  - 2005 – 1 project
  - 2006 – 2 projects
  - 2007 – 3 projects (6 state wide)

2009 to 2016
Long Life Asphalt Projects

- 5 Projects paved in 2018
- 6 Projects to be paved 2019 thru 2022
WMA SMA in 2017


- WMA technology at hot mix temperatures.
  - Compaction aid
Current Initiatives

• **SMA on Interstates**
  - Most Districts have switched to SMA wearing courses on Interstate and high value routes

• **RAP use in SMA**
  - Dist. 11 initiated a research project to evaluate the inclusion of 10% RAP in SMA for roadways with lower traffic. (collectors, some arterials)
  - The ability of Districts to specify **NO RAP SMA** on any road will be preserved
  - Work Plan is being revised to include a more diverse materials sample
• **Illinois DOT** allows the use of up to **15% of FRAP** in SMA mixes
• **Illinois Tollways** allows up to **20% of FRAP** in SMA mixes
• **Virginia DOT** allows up to **20% of RAP** in wearing courses
• **Maryland State Highway Administration** allows up to **20% of RAP** in SMA
• **Texas DOT** allows up to **15% of FRAP** in wearing courses
• **Alabama DOT** allows up to **20% of RAP** in SMA
• Work Plan Testing
  – Asphalt Binder Testing
    • Base binder true grade
      – $\Delta T_c$
    • RAP binder true grade
      – $\Delta T_c$
    • Combined binder true grade
      – $\Delta T_c$
  – Completed mix testing
    • Hamburg Wheel Tracking test
      - AASHTO T 324
    • Flexibility Index Test – AASHTO TP 124
• **District 11** - Allegheny Co.
  - ECMS 91790 - Let 2/28/2019
  - SR 0885 (Boulevard of the Allies)
  - Mill, scratch, and overlay with 1.5” 9.5mm SMA
RAP in SMA Research Projects

- **District 4 - Lackawanna Co.**
  - ECMS 102557 - Let 6/6/2019
  - SR 6006, Mill, scratch and overlay with 9.5mm SMA
RAP in SMA Research Projects

- **District 6** - Chester Co.
  - ECMS 108918 – Work Order
  - SR 0030, Mill, scratch and overlay with 9.5mm SMA
Questions?