6.3mm Thin Asphalt Overlay
(Thin Hot Mix Asphalt Overlay or Thinlay)

Neal Fannin
Pavement Materials Engineer
CMD
Specification features

- **New Section 412 in Pub. 408**
  - SUPERPAVE MIXTURE DESIGN, CONSTRUCTION OF PLANT-MIXED HMA/WMA 6.3MM THIN ASPHALT OVERLAY COURSES

- **Pub 242 changes**
  - Usage guidance in chapter 5.
  - Changes to add this new material to chapters 9, 10, 11, & 12.
Specification features

• Aggregates: Changes to Section 703
  – SRL
    • Coarse Aggregate – SRL as listed in Bulletin 14.
      – 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.
Specification features

• Aggregates:
  – Consensus properties:
    • Same as superpave except:
      – Flat and Elongated Maximum 10 percent for 1:5 ratio, **and**
        Maximum 20 percent for 1:3 ratio.

• Can make WMA or HMA.

• RAP & RAS
  – No RAP or RAS allowed
• **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.
Specification features

- **Mixture Acceptance:**
  - Certification or Lot.
    - Lot acceptance includes
      - Asphalt content.
      - Percent passing 200 sieve.

- **Density Acceptance:**
  - Optimum rolling pattern
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.
Weather limitations

THMAO Project - N. Cameron Street, WB, Passing Lane
Mat Temperature (Spot Measurement) - 7/23/12 - 7/24/12

Location 1
Location 2
Location 3

Pavecool Prediction (Wind Speed = 5 mph)

Data is courtesy of Mr. Garry Hoffman
# Thinlay 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>15 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. 70 °F</th>
<th>Wind Speed 5 mph</th>
<th>Sky Clear &amp; Dry</th>
<th>Latitude 41 ° North</th>
<th>Surface Temp. 110 °F</th>
</tr>
</thead>
</table>

### Graph

- **Cooling Curve**
- **Start Rolling**
- **Stop Rolling**

**Mix Temperature, °F**

**Time, minutes**: 0 to 120

15 Minutes
Thinlay Compaction

PaveCool 3.0 Report

Project: 6.3mm Thinlay

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</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>

<table>
<thead>
<tr>
<th>Mix Temperature, °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
</tr>
<tr>
<td>300</td>
</tr>
<tr>
<td>280</td>
</tr>
<tr>
<td>260</td>
</tr>
<tr>
<td>240</td>
</tr>
<tr>
<td>220</td>
</tr>
<tr>
<td>200</td>
</tr>
<tr>
<td>180</td>
</tr>
<tr>
<td>160</td>
</tr>
<tr>
<td>140</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

- Cooling Curve
- Start Rolling
- Stop Rolling

10 Minutes
## PaveCool 3.0 Report

**Date & Time**
- Start Rolling*: 2 minutes (248 °F)
- Stop Rolling*: 9 minutes (175 °F)

**Mix Type**
- Fine/Dense

**Binder Grade**
- PG 58-34

**Thickness**
- 1.00 in.

**Delivery Temp.**
- 300 °F

**Air Temp.**
- 50 °F

**Wind Speed**
- 5 mph

**Sky**
- Clear & Dry

**Latitude**
- 41 ° North

**Existing Surface**
- Granular Base

**Moisture**
- Dry

**State**
- Unfrozen

**Surface Temp.**
- 50 °F

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[Graph showing temperature over time with a red arrow pointing to 9 Minutes]
**PaveCool 3.0 Report**

*Project: 6.3mm Thinlay*

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<td>7 minutes (175 °F)</td>
</tr>
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**Air Temp.**

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<tbody>
<tr>
<td>5 mph</td>
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**Existing Surface**

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<th>State</th>
<th>Surface Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
<td></td>
<td>40 °F</td>
</tr>
</tbody>
</table>

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Increasing the thickness to 1.5 inches increases time available to 14 minutes.
Summary

- Thin Asphalt A Good Tool for Surface Treatment.
- Improved Ride and Friction.
- Minimal Rutting Observed.
- Reflective cracking will occur.
Summary

- Proper Base Repair is a **MUST**.
- Pay special attention to tack coat application.
- Thin layers loose 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.
Current Status

- Should see the CT very soon.
- Hope to have available for Districts to specify in contracts by end of summer.
Questions?