 Virginia Department of Transportation

VDOT Hi-Polymer Asphalt – Field Perspective

Virginia Asphalt Association Fall Conference
Richmond, VA

October 4, 2015

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Hi-Polymer Applications in NoVa

Subdivision
• Summerwood Circle and cul-de-sacs
• Completed paving in August, 2014
• SM-9.5A HP and control SM-9.5A HR

Interstate, I-95
• I-95 in Prince William County
• Paving in Summer/Fall, 2015
• SM-12.5E HP, SM-9.0E HP, SMA-9.5 HP

Interstate, I-495
• I-495 NB in Fairfax County
• Paving in Summer 2016
• Full depth, full width joint patches with BM-25.0 HMHB
• SM-12.5E HP
Summerwood Subdivision
Summerwood Subdivision

Background

- Typical subdivision streets
- CCI ratings 6 to 34, average 20
Summerwood Subdivision

Pavement Structures
- Cul-de-sac
- Typically 3” AC over 6” aggregate
- Fatigue and thermal/environmental cracking
Summerwood Subdivision

Pavement Structures

- Summerwood Circle
- Typically 4.5” AC over 8” aggregate
- Thermal /environmental cracking
Summerwood Subdivision

Milled Surfaces (Cul-de-sacs)
- Thin structures
- Base layers cracked
Summerwood Subdivision

Milled Surfaces – Summerwood Circle
- Thicker structure
- Mostly block cracking
Summerwood Subdivision
Summerwood Subdivision
I-95 in Prince William County

**Background**

- Composite pavement (PCC overlaid with 4”-5” of AC)
- Reflective cracking at transverse joints
- Last milled/resurfaced with SMA in late 1990s
Reflective Cracking
• Medium Severity
I-95 Pavement Conditions

Reflective Cracking
• High Severity
I-95 Pavement Conditions

Complete Failure

- Very high severity cracking
- Base failure
I-95 in Prince William County

Projects Completed in 2015

- Prince William County Parkway to Mine Road, SB and NB
- Mill 2”
- Resurface with 2” SM-12.5E
I-95 in Prince William County

Projects Completed in 2015

- Mine Road to Stafford County Line, SB and NB
- Mill 2”, patch at joints
- Resurface with 2” SM-12.5E (HP)
Projects Completed in 2015

- Occoquan River Bridge to Prince William Parkway, SB
- Mill 2”, patch at joints
- Resurface with 1” SM-9.0 (HP) and 1.5” SMA-9.5 (HP)
I-495 in Fairfax County

Background

- Composite pavement (PCC overlaid with 4”-5” of AC)
- Severe concrete deterioration near transverse joints
- Longitudinal joint in wheelpath
I-495 Joint Repairs

Scope of Work

• Perform full-depth transverse joint repairs
• Ty. III Patches 1,325 tons BM-25.0 +0.4 HMHB
• Mill 2”
• Place 2” SM-12.5E (HP) – 5,002 tons
• Rideability specification
I-495 Joint Repairs
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I- 495 N/B MP - 5.56 to 6.63

Typical Full Depth Joint Patching:

Section View (A-A)  
(Not to Scale)

Sequence and Narrative

- Only selected joints will be repaired. The Engineer will identify joints to be repaired.

- Perform full depth patch repair flush with existing surface. This includes saw cutting to the bottom of the PCC layer as shown, removing the existing asphalt concrete and PCC layers, and use BM-25.0D (HMHB+0.4) High Modulus High Binder PG 70-22 to bring flush with existing surface as shown.

- Mill 2" full lane width and replace with 2" SM-12.5E (HP).
I-495 Joint Repairs
I-495 Joint Repairs
I-495 Joint Repairs
Hi-Polymer Lessons Learned

Binder
- Stiffer than conventional 76-22
- Short shelf life
- Good coordination with field crews

Field Placement
- Mix has to be hot (>300 degrees)
- Ambient temp. has to be hot
- Temps. very important for SMA (HP)
- Produce at hot mix temps.
- Use warm mix additives to aid workability
Hi-Polymer Lessons Learned

SM-12.5E
- No major issues with placement and compaction
- Tends to set quickly especially with cooler temperatures

SM-9.0E
- More workable than SM-12.5E (HP)
- Excellent for shallow joint repair patching

SMA-9.5E
- Most difficult of the mixes to place
- Hard on equipment
- Hand work extremely difficult
- Not recommended for shoulders/ramps
**Hi-Polymer Lessons Learned**

**2015 Bid Prices (PM9I-96A-F15, N501)**

<table>
<thead>
<tr>
<th>Mix Type</th>
<th>Quantity</th>
<th>Price/ton</th>
</tr>
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<tbody>
<tr>
<td>SMA-9.5 (HP)</td>
<td>6,627</td>
<td>$135</td>
</tr>
<tr>
<td>SM-9.0E (HP)*</td>
<td>4,385</td>
<td>$135</td>
</tr>
<tr>
<td>SM-12.5E (HP)</td>
<td>31,622</td>
<td>$100</td>
</tr>
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<td>SM-12.5E</td>
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<td>$84 typ.</td>
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## Hi-Polymer Lessons Learned

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### 2016 Bid Prices (PM9I-029-F16, N501)

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<tr>
<td>SM-12.5E (HP)</td>
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<tr>
<td>SM-12.5E</td>
<td>29,419</td>
<td>$120.00</td>
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<tr>
<td>SM-9.5D</td>
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<td>$71 typ.</td>
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Moving Forward

Contracts/specifications
• SM-12.5E (HP) good for reflective cracks
• SM-9.0E (HP) excellent for shallow patching
• SMA-9.5 (HP) excellent but expensive; do not use on shoulders/ramps

Field Performance
• All mixes performing very well
• No signs of early reflective cracking
• SM-12.5E placed in 2015 has already started to crack
• Continue to review field performance on regular basis

Next Steps
• Review cost effectiveness versus performance
Future Applications
And now, the contractor’s perspective...