VDOT Hi-Polymer Asphalt – Implementation of NCAT Test Track Research

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What is Hi-Polymer Asphalt?

Material
- Most binder is typically PG64-22
- Polymer modification to get PG76-22 (typically 2.5% - 3%)
- Hi-Polymers (SBS) are typically about 7.5%
- HP spec. requires PG76-28E with min. elastic recovery of 90%

Properties
- More flexible
- Stiff but not brittle

Performance
- Improved resistance to rutting
- Improved resistance to thermal (environmental) cracking
- Improved resistance to fatigue cracking
NCAT Experience

Test Section N7 (2009)
- Hi-Polymer mixes
- 5.75” Hi-Polymer section
- 7” control section
- Hi-Polymer section - less rutting

Test Section N8 (2010)
- OK heavy pavement
- Original section failed
- Hi-Polymer mix used
- Performed very well
Why Hi-Polymer Asphalt?

Potential Benefits – Low Volume Roadways
- Reduce the amount of patching
- Improve performance (less cracking)
- Longer life cycle

Potential Benefits – High Volume Roadways
- Delay the onset of reflective cracking (composite pavements)
- Improve fatigue resistance = improved performance
- Reduced pavement thickness for same performance

Potential Challenges
- Increased cost of polymer modified binder
- Hand work is very difficult with some mixes
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 in Prince William County
• Paving in Summer/Fall, 2015
• SM-12.5E HP, SM-9.0E HP, SMA-9.5 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
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

Current Projects

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

Current Projects

• Mine Road to Stafford County Line, SB and NB
• Mill 2”, patch at joints
• Resurface with 2” SM-12.5E (HP)
I-95 in Prince William County

Current Projects

• 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)
And now, the contractor’s perspective...