The Rapid Implementation of WMA in Virginia

Trenton M. Clark, P.E.
Director of Engineering
Virginia Asphalt Association

Todd M. Rorrer
Assistant Asphalt Program Manager
Virginia Department of Transportation
Presentation Outline

• Background
• Risk Assessment of WMA
• Short History of WMA in Virginia
• Specification Development
• Lab Evaluation of WMA
• Lessons Learned
• What Lies Ahead
Background

• SUPERPAVE™ mixes and SMA
  – PG 64-22 and PG 76-22 w/SBS binders predominately
  – Up to 30% RAP in surface and intermediate mixes

• Approximately 10 million tons of AC laid each year

• Prior to economic downturn, 30% VDOT and 70% non-VDOT – now closer to 50/50

• Majority of mix placed is surface mix
Background

- 2010 – 1.9 million tons of surface mix for VDOT
- 2011 – over 2.8 million tons of surface mix for VDOT
Risk Assessment of WMA

- **Positive Attributes (VDOT Perspective)**
  - Increased paving season
  - Improved field compaction and density
  - Longer material life
  - Lower material costs
  - Increased competition
  - Reduced emissions

- **Positive Attributes (Contractor Perspective)**
  - Fuel Savings
  - Increased workability
  - Longer paving season
  - Larger market area
Risk Assessment of WMA

• Two Potential Negative Aspects
  – Striping of AC
  – Long-term performance of WMA
Short History of WMA in Virginia

• 2006
  – The trial sections
  – Placed on three primary routes
  – WMA additives: Sasobit and Evotherm ET
  – Varying plant temps, RAP contents, haul distances and seasons (Summer and Fall)
  – Two sites were successful
  – Primary concerns were:
    • TSR Values
    • Segregation due to haul distance
Short History of WMA in Virginia

• 2007
  – No VDOT Projects
  – Limited non-VDOT projects
• 2008
  – Initial special provisions available, but not included in VDOT projects
  – Increased use on private projects
  – One or two VDOT projects
Short History of WMA in Virginia

• 2009

  – Flood or foam gates opened up
  – Many contractor plants retrofitted with foaming systems
  – Permissive specification included in maintenance contracts
  – Used with DGAC and SMA, including polymer modified binders
  – By end of year, 3 additives and 4 foaming systems approved in Virginia
Short History of WMA in Virginia

- 2010
  - 50% of AC plants using WMA technology
  - 1.9 million tons of AC surface mix
  - Over 65% of AC used by VDOT produced with WMA technology
  - Predominant approach was foaming, Evotherm 3G used to much lesser extent
Specification Development

• Initial Specifications
  – Materials Specs
    • WMA properties equivalent to HMA
    • WMA must have same AC content
    • WMA produced using approved technology
    • WMA cooled and reheated for volumetrics testing
    • Minimum TSR = 60%
    • **Maximum plant temperature same as HMA**
    • **No minimum plant temperature**
• Initial Specifications
  – Field Specs
    • WMA must meet HMA density requirements
    • WMA must be smooth and uniform
    • No minimum placement temperature
    • Minimum base temperature of 40F
• Specifications Revisions
  – Materials Specs
    • WMA cooled and reheated requirement removed
    • Minimum TSR = 80%
  – Field Specs
    • No changes since 2008
Lab Evaluation of WMA

- Comparison of 2009 and 2010 data
- Randomly selected 500 points per year
- 2009 data for plants prior to foaming equipment
- 2010 data for plants after foaming equipment
- Evaluations of AC content and #200’s
- Two mixes
  - SM-9.5
  - BM-25.0
Lab Evaluation of WMA

LOE Comparison of 2010 to 2009 Dust and %AC for SM-9.5 Mixes
Lab Evaluation of WMA

LOE Comparison of 2010 to 2009 Dust and %AC for Base Mixes

2009 (%AC or -200)

2010 (%AC or -200)

AC loe
-200 loe
Linear (loe)
Lab Evaluation of WMA

• Conclusions
  – AC content for mixes did not change
  – #200’s increased from 2009 to 2010; RAP percentages increased during the same time period
  – Volumetrics passing or mixed would be denied
Lessons Learned

• **At the Plant**
  – Foaming systems should start hot (i.e., conventional plant temperatures) and then reduce temperature
  – Hot weather, typical temperatures of 250 - 275°F
  – Cool/Cold weather, typical temperature of 300°F
  – Must get aggregate dry
  – More handwork, higher mix temperatures
Lessons Learned

• In the Field
  – Cooler the AC, the harder the handwork
  – Temperature segregation overcome with MTV
  – Lower temperature allows traffic sooner
  – Lower temperature helps with tender mixes
  – Reduced fumes at paver and MTV
What Lies Ahead

- New plants have foaming capability
- More existing plants being retrofitted
- Combination of foaming and additive to meet certain project requirements
- Common place in 5 years
Questions?