Stone Matrix Asphalt

Virginia’s 25-Year Journey

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Who Is VAA?

Technical Association for the Asphalt Industry, Not a Lobbying Association

Formed in 1952 to Serve Asphalt Producers in the State of Virginia

Who Is VTRC?

Research Division of the Virginia Department of Transportation

Partnership with the University of Virginia
Today’s Topics

**PRE-2002**
Initial Specs
Projects
Outcomes

**POST-2002**
Revised Specs
Lessons Learned
Experiments

**MOVING FORWARD**
Long-Term Performance
LCCA
Performance Mix Design
SMA in Virginia Prior to 2002

**INITIAL SPECIFICATIONS**
- AASHTO Scanning Tour
- AASHTO Specs
- Marshall Design

**INITIAL INSTALLATIONS**
- First Trial Sections in 1993
- First Major Projects in 1995

**EVOLUTION OF SPECS**
- Development of Intermediate SMA Mix
- Move from Marshall to SUPERPAVE
- Compaction
SMA in Virginia Prior to 2002 (cont.)

**BINDERS**
- AC-30 for Initial Sites
- PG 70-22 and 76-22
- SBS Polymers and Pellets

**OVER 700,000 TONS PLACED**
- Predominately Interstate Routes
- Maintenance Overlays

**GERMANY TRIPS**
- 1995 Trip Assisted in Learning Processes and Improving Specs
- 2002 Trip Lead to Introduction of SMA-9.5
What Changed in 2002?

**VDOT SMA INITIATIVE**
Renewed Emphasis on SMA (after SUPERPAVE “distraction”)
Excellent Performance

**TRIAL PROJECTS**
Goal of 2 per District
High-Volume Locations

**NEW SPECS**
SMA-9.5 Added
Minimum AC Contents
100 Gyrations

**GOALS**
Expand Experience with SMA
Improve Service Life
Reduce Life Cycle Costs
2003/2004 Construction Season

SEVEN DISTRICTS PARTICIPATED
- Multiple Contractors Across Virginia
- 180,000 Tons (2003)/210,000 Tons (2004)
- Primarily SMA-12.5 with PG 76-22 or PG 70-22
- Overall Very Successful
- Plant and Field Results Documented

LESSONS LEARNED
- Gradation Matters
- VCA as an Important Calculation
- Waste Initial Loads
- Mineral Filler is Crucial
- Cellulous Fibers are Necessary
Plant Issues

- Dry Mineral Filler
- Working Fiber Feeder
- Correct AC Content

(and working fiber feeder!)
Field Problems

- Roller Pick-Up
- Flushing
- Crushed Aggregate
Spec Issues

- Minimum AC Content
  - 6.8% for SMA-9.5
  - 6.5% for SMA-12.5
- No Adjustment for Agg. SP
- Gradation Bands to Open and Fine
PROJECT USES
- Maintenance Overlays
- Major Rehabilitation
- New Construction

BINDERS
- Almost Exclusively SBS Modified (PG 64E-22)

MIX DESIGN SPECIFICATIONS
- Reduced Design Gyrations
- Adjusted Minimum AC Content
- Revised Gradation Bands
- F and E on the Blend
- 15% to 20% RAP Allowance

PLACEMENT SPECIFICATIONS
- 4 or More Vibratory Passes
- Acceptance with 1 Core Per 1,000 ft
- Warm Mix Technologies

Change Is Inevitable: 15 Years Later
SMA Related Research

RAP AND SHINGLES

- RAP Allowed in Polymer and Non-Polymer Mixes (15% and 20% Max)
- Shingles Evaluated, But Not Allowed In Mixes
SMA Related Research

FIBERLESS
- Test Sections Placed in 2015
- Initial Lab Results Positive
- No Further Evaluation at This Time
SMA Related Research

AGGREGATE MORPHOLOGY

- Angular, Better-Crushed Coarse Aggregate with Less F&E (i.e., SMA Aggregate) \(\Rightarrow\) Better Rut-Resistance
- Breakpoint Sieve for VCA Key to Ensuring Good Stone-on-Stone
SMA Performance

DG = Dense-graded
SMA = Gap-graded

BIT – Full-depth Flexible
BOC – Asphalt over CRC
BOJ – Asphalt over Jtd. Conc.
Outlook for SMA Going Forward

- Steady Use of SMA Across the Commonwealth
- 175,000 To 200,000 Tons Per Year on Resurfacing Contracts
- Final Surface on Mega Construction, Reconstruction and Rehabilitation Contracts
- Inclusion in Performance Based Mix Design?
- Allowance of Other Mix Additives and Modifiers?
- Expanded Use on Lower-Volume Routes?
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Questions

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