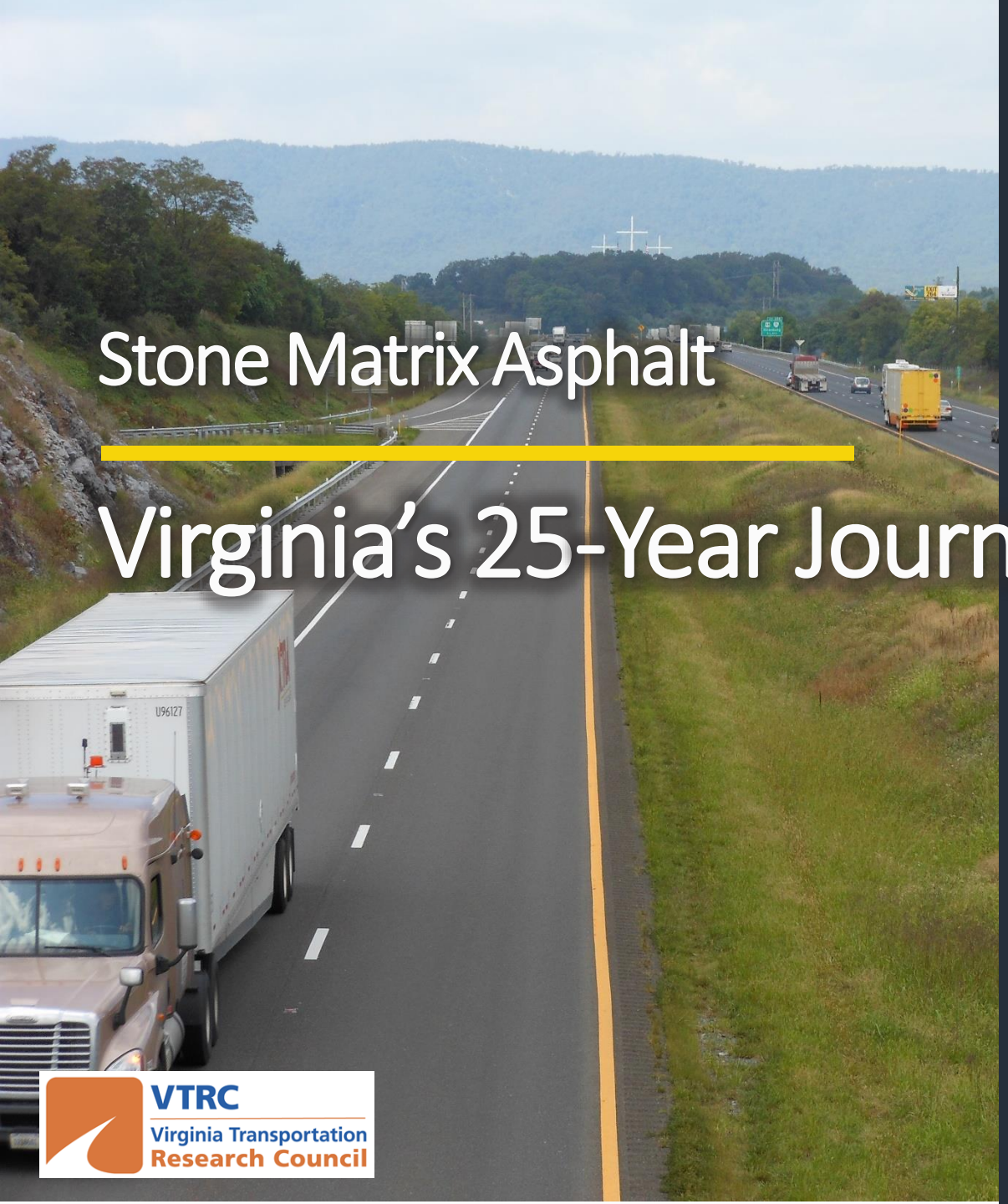
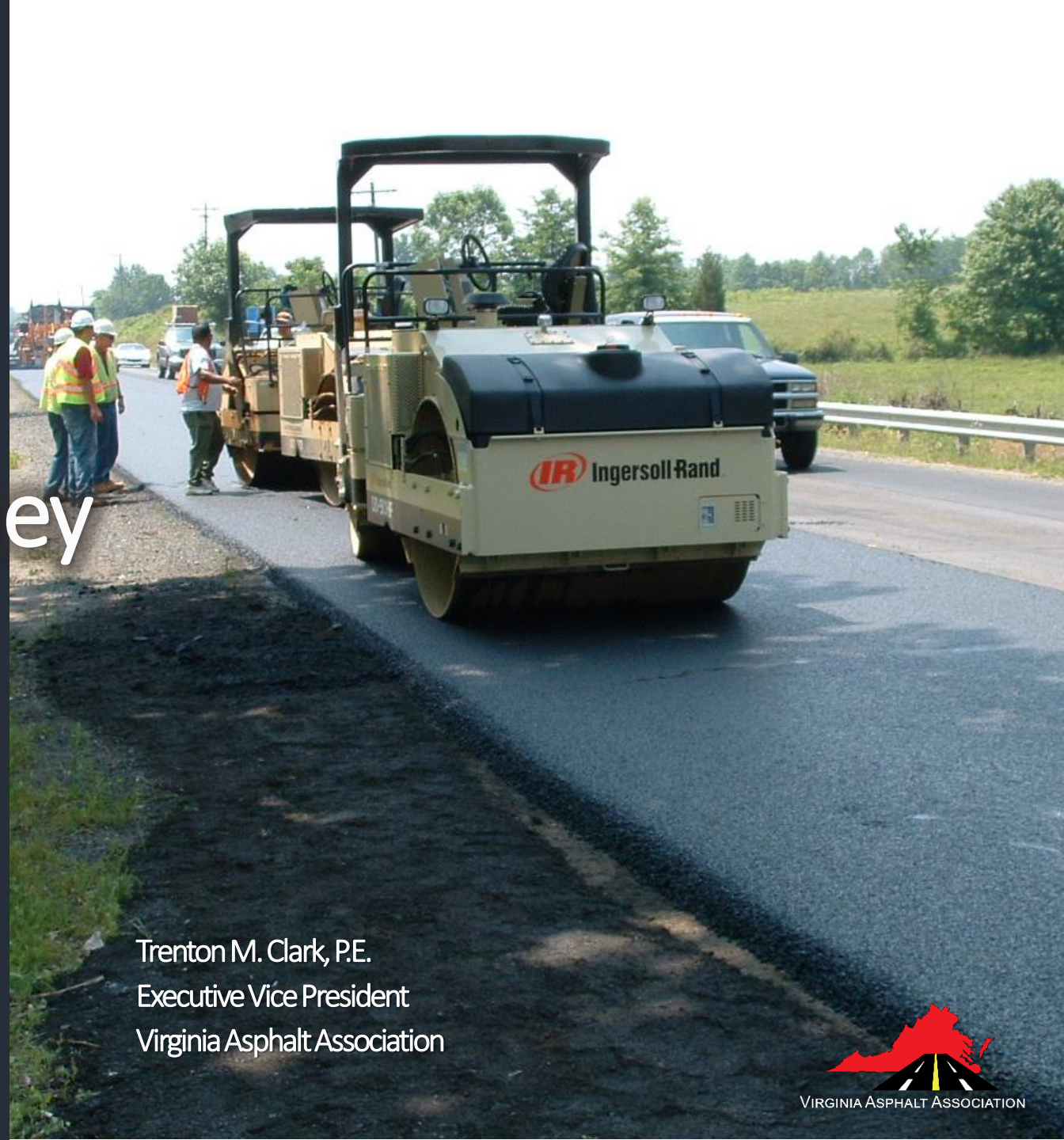
Stone Matrix Asphalt

Virginia's 25-Year Journey





Trenton M. Clark, P.E.
Executive Vice President
Virginia Asphalt Association

VTRC
Virginia Transportation
Research Council

Virginia Asphalt Association

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 700,00 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

NEW SPECS

SMA-9.5 Added

Minimum AC Contents

100 Gyrations

TRIAL PROJECTS

Goal of 2 per District

High-Volume Locations

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

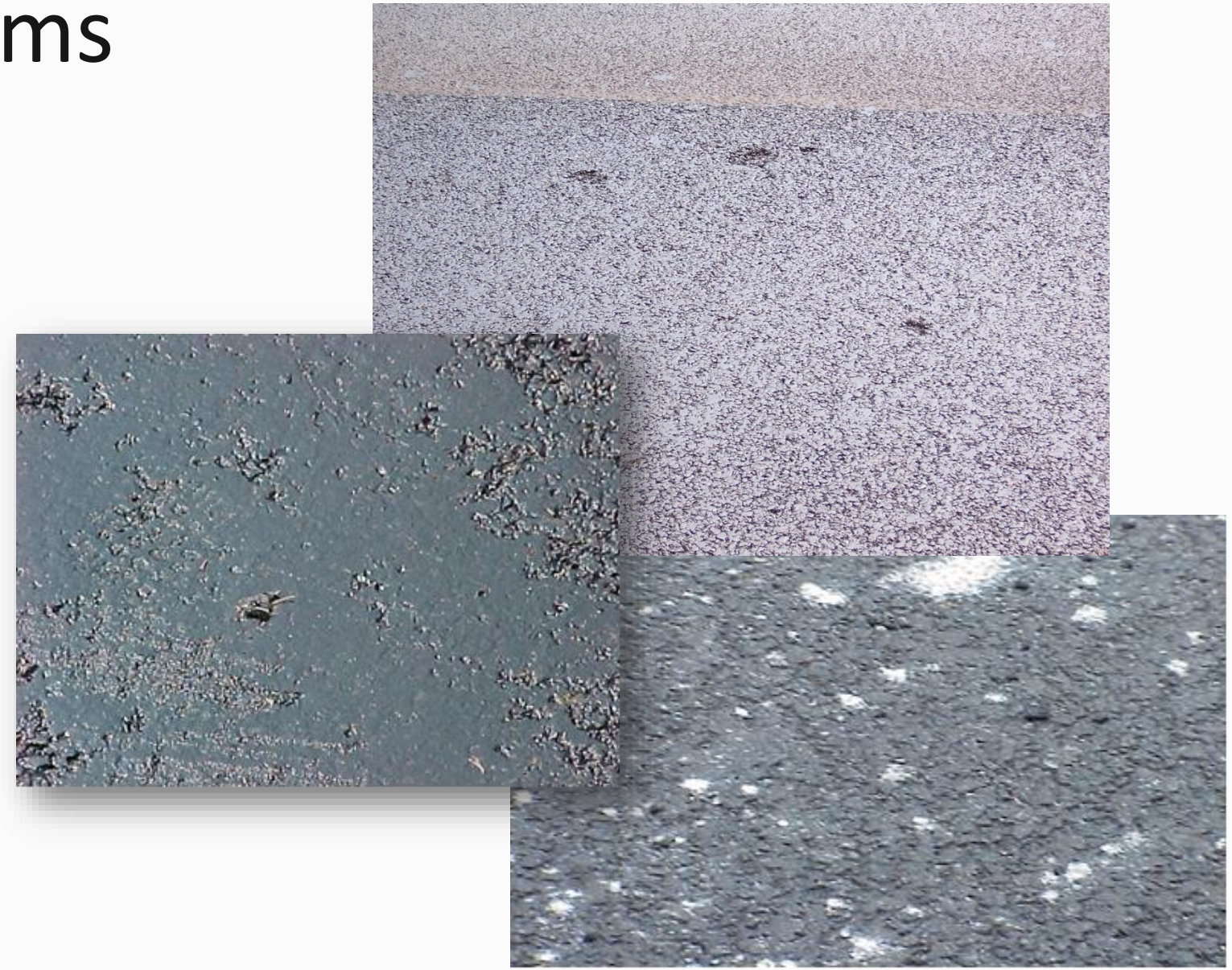
Plant Issues

- 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

Change Is Inevitable: 15 Years Later

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

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

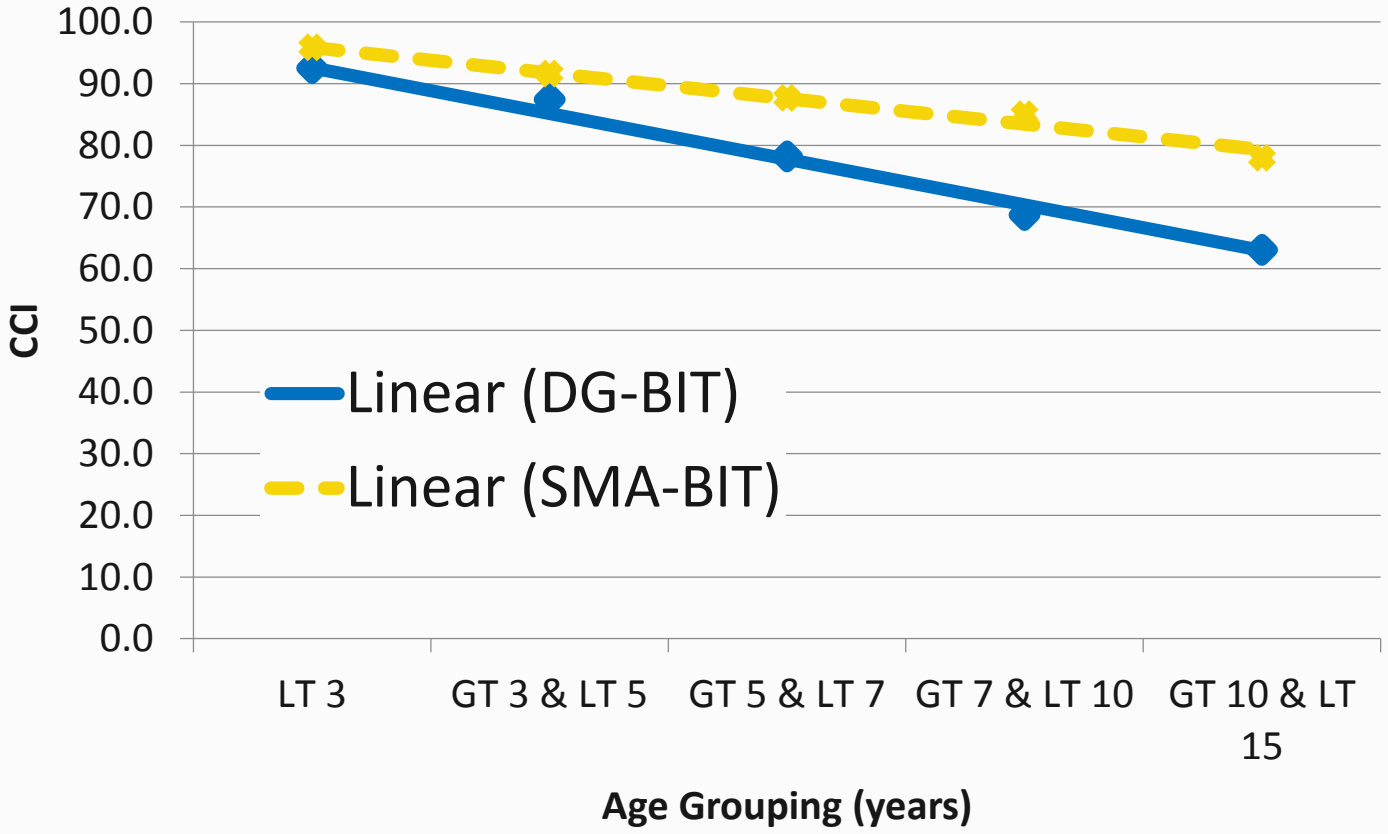
SMA Related Research

AGGREGATE MORPHOLOGY

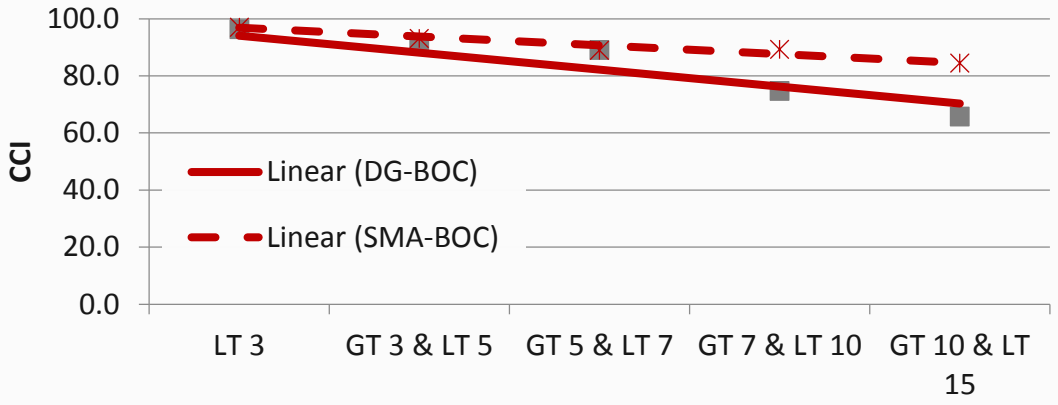
- Angular, Better-Crushed Coarse Aggregate with Less F&E (i.e., SMA Aggregate) → Better Rut-Resistance
- Breakpoint Sieve for VCA Key to Ensuring Good Stone-on-Stone

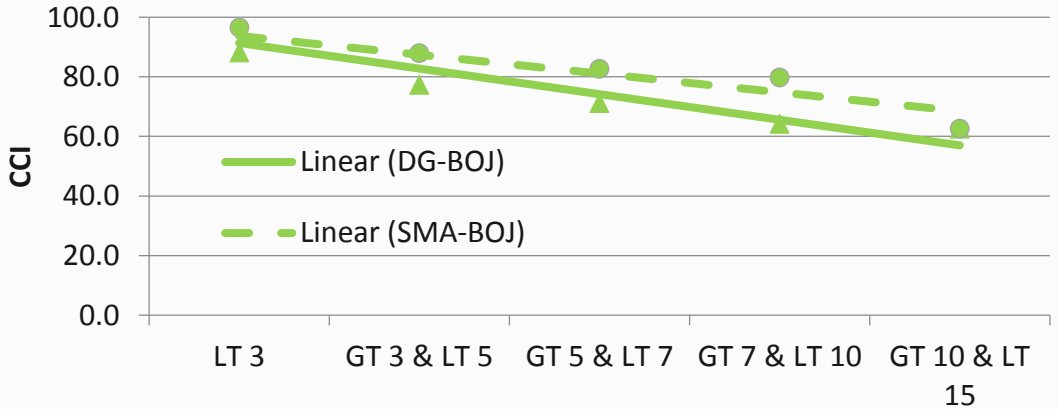
SMA Performance

DG = Dense-graded SMA = Gap-graded

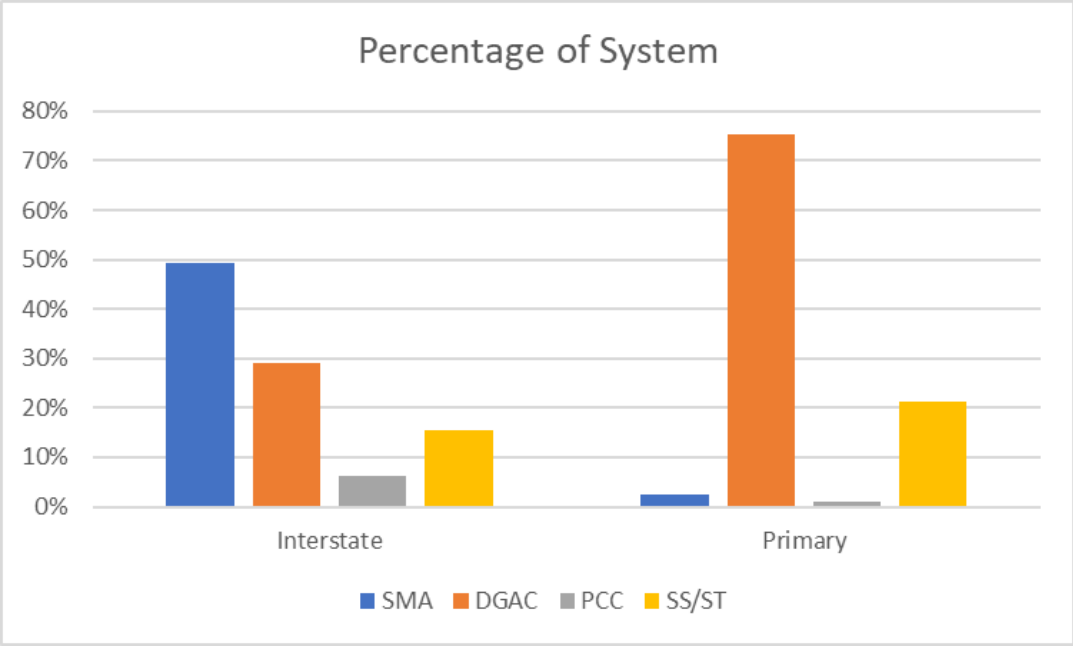


BIT – Full-depth Flexible
BOC – Asphalt over CRC
BOJ – Asphalt over Jtd. Conc.



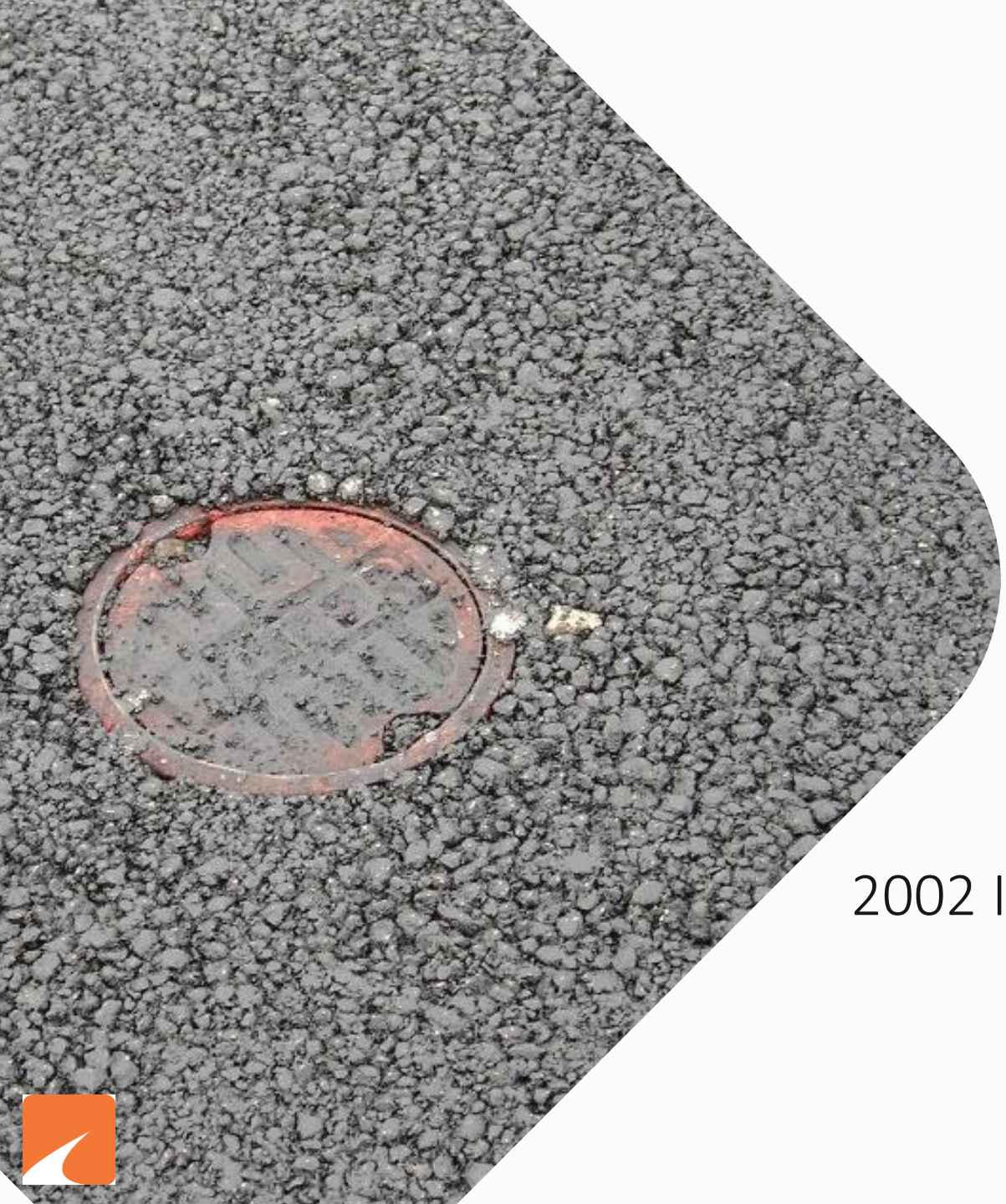


Outlook for SMA Going Forward



- Steady Use of SMA Across the Commonwealth
- 175,000 To 200,00 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?



Acknowledgements

Co-Author: Kevin McGhee

SMA Godfather: Richard Schreck

2002 Initiative Champion: Andy Mergenmeier

Questions

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