Asphalt Rubber Applications in the Northeast

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NATIONAL PAVEMENT PRESERVATION CONFERENCE
npc23
IMPACTS AND BENEFITS FROM PAVEMENT PRESERVATION

ncpp
National Center for Pavement Preservation
MICHIGAN STATE UNIVERSITY

AASHTO TSP2 PAVEMENT PRESERVATION

ROCKY MOUNTAIN WEST PAVEMENT PRESERVATION PARTNERSHIP
SOUTHEAST PAVEMENT PRESERVATION PARTNERSHIP
MIDWESTERN PAVEMENT PRESERVATION PARTNERSHIP
NORTHEAST PAVEMENT PRESERVATION PARTNERSHIP

ASMG History with Asphalt Rubber

1957 — All States Asphalt, Inc. was founded

1979 — Acquired Adirondack Asphalt

1983 — Began producing high-quality emulsions

1995 — ***Began producing CRMA and asphalt-rubber SAM and SAMI***

2005 — ***Launched first portable asphalt-rubber blending plant***

2006 — Acquired Warner Bros.

2008 — ***First asphalt-rubber HMA project***

2013 — Acquired Rampart Bituminous & Auburn Asphalt

2014 — ***Constructed PMA Plant at Deerfield Terminal***

2017 — Entrance into asphalt additives market

2018 — Constructed HMA Plant & Maine Headquarters

2019 — Acquired F.R. Carroll & State Paving

2020 — Acquired Mitchell Sand & Gravel

2022 — Acquired Alton Gleason & Berkshire Asphalt

2023 & Beyond — Continued growth in modified asphalts & new applications






Liquid Asphalt Distribution Terminals

Total storage capacity of over 40 million gallons

Deerfield, MA

Oswego, NY

Albany, NY

Bangor, ME

New Haven, CT

Providence, RI

QA / QC Program and Capabilities

- Complete *in-house* liquid asphalt and bituminous concrete laboratories
- AASHTO re:source Certified PG Binder Laboratory
- NETTCP Certified Bituminous Concrete Laboratories
- Full staff of NETTCP Certified Production and Field Quality technicians
- Latest technology and testing equipment in the industry

Crumb Rubber Recycling Process

- Recycled tires are shredded into smaller pieces
- Metal and fabric are separated through mechanical, cryogenic and ambient processes
- Crumb rubber of varying sizes are created for a range of applications

Why Use Asphalt Rubber?

- Rubber contains polymers and anti-oxidants
- Raises softening point of binder to above 140° F
  - Resistance to rutting and shoving
  - Higher binder contents without having drain down or flushing
- Increases low temperature flexibility of residue
  - Better fatigue resistance to reflective and thermal cracking
- Longer service life of treatments
- Lower equivalent annual costs
- Recycles scrap tires in a sustainable and economic process

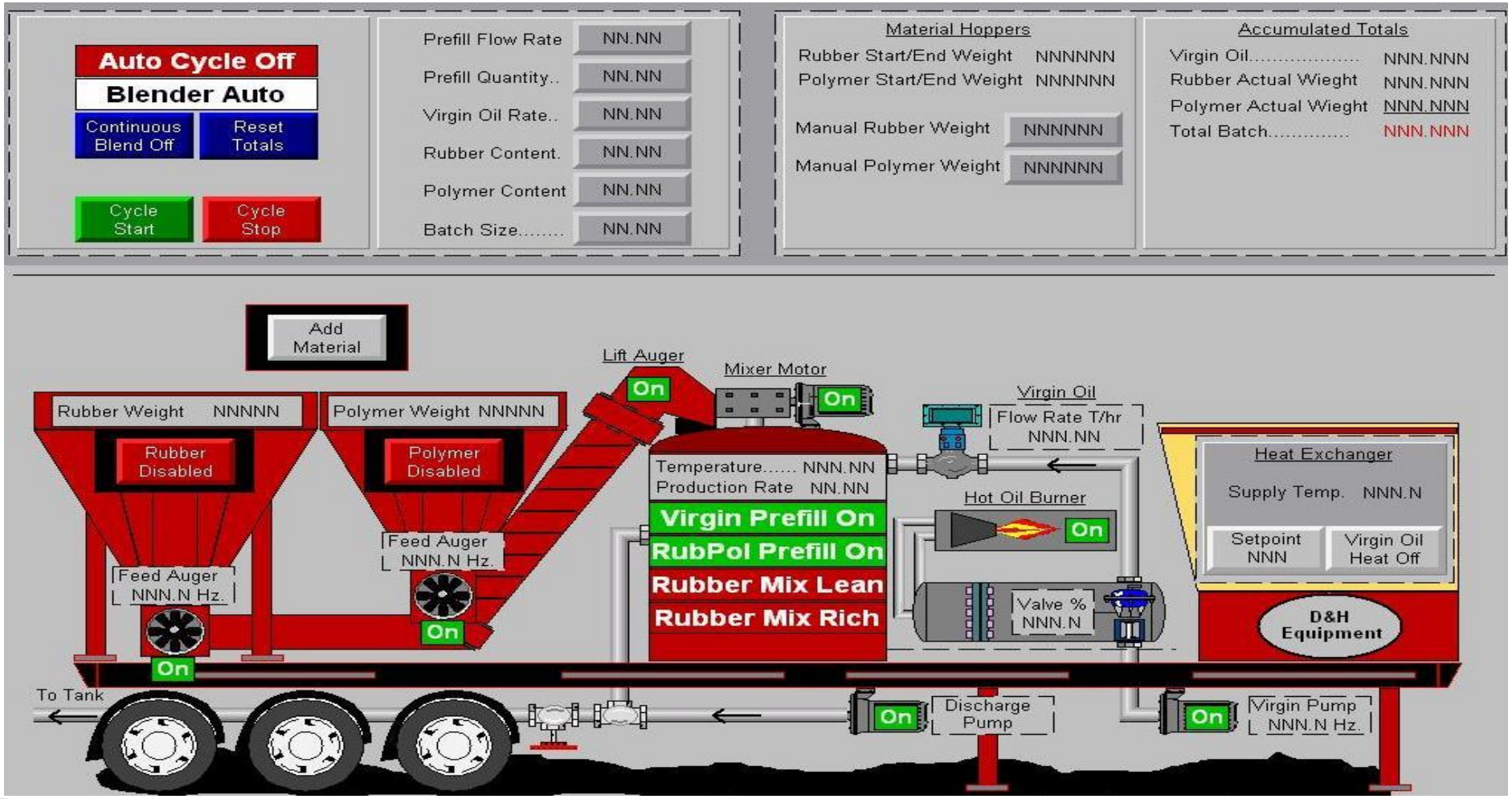
Asphalt Rubber Specification (Wet Process)

- PG58-28 (or PG64-28 if needed) base binder with minimum 15% crumb rubber
- Asphalt Rubber binder must conform to ASTM D6114 Type II
- Mixing and reaction requirements:
  - Asphalt heating tank or heat exchanger
  - Mechanical blender capable of measuring and recording total quantity of AC in tons and total weight in tons and percentage of ground rubber
  - Dedicated asphalt rubber reaction/storage tank with heating and agitation
  - Additional heating and agitation specifications after blending

Asphalt Rubber Blending Operations

- Manufactured at the terminal or on-site using a portable blending unit
- Strict quality control standards for consistency and performance

Asphalt Rubber Blending Schematic



Asphalt Rubber Binder Certification

- Sampling and testing per lot at point of manufacture
- All testing and certification completed by an AASHTO re:source accredited lab
- Must report test results confirming ASTM D6114 Type II compliance

ASPHALT RUBBER CERTIFICATE OF ANALYSIS

Terminal Location:	**Date:**
Grade: AR-20	**Lot:**
Tank:	**Notes:**

TEST	TEMP °F / (°C)	METHOD	TEST RESULT		SPECIFICATION
Apparent Viscosity	347 / (175)	ASTM D2196		cP	**1500-5000 cP**
Softening Point	-	ASTM D36		°F	**Min 130°F (54°C)**
Resilience	77 / (25)	ASTM D5329		%	**Min 20%**
Penetration	77 / (25)	ASTM D5		Dmm	**25-75 dmm**
2mm OB DSR	76°C	ASTM D7175		kPa	**G*/sinΔ >1.00 kPa**

This material conforms to ASTM D6114 Type II specifications

Authorized Signature: _____ Date: _____

Northeast Asphalt Rubber Usage

- Crack Seal
- Chip Seal Applications
  - Stress Absorbing Membrane (SAM)
  - Stress Absorbing Membrane Interlayer (SAMI)
- Hot Mix Asphalt Paving Applications
  - Open Graded Friction Courses
  - Gap Graded Mixtures including Ultra-thin Bonded Wearing Course

Crack Sealing

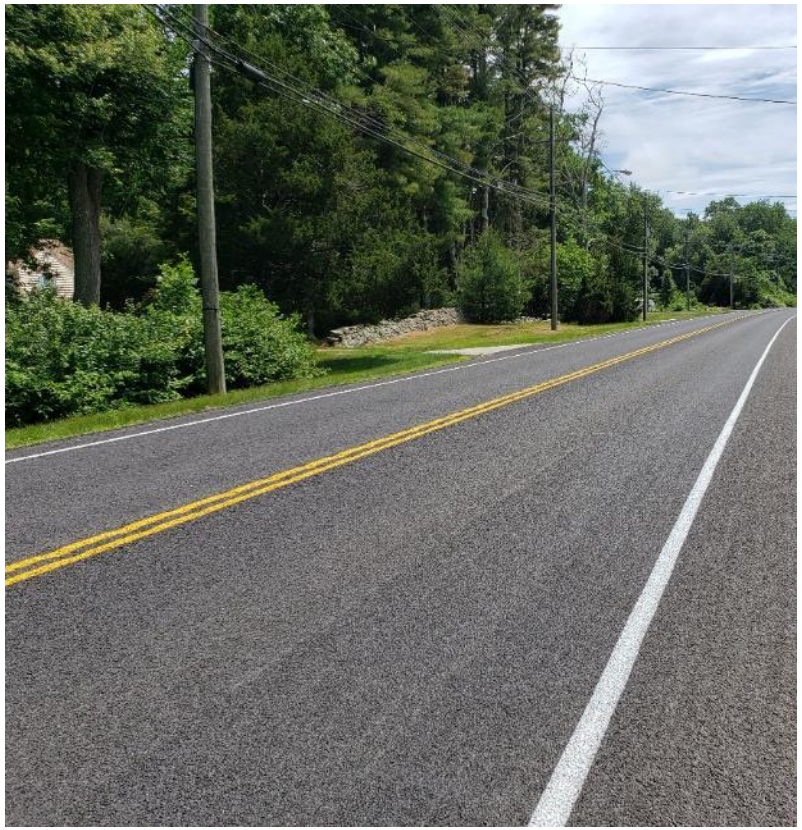
- Variety of types of asphalt materials
- Widely used in stand-alone applications and in preparation before other preservation treatments
- Quick and cost-effective application
- Significantly improves treatment performance

Asphalt Rubber Stress Absorbing Membrane

- Surface prep work and cleaning as needed
- Hot spray application (325°+ F) of crumb-rubber modified asphalt
- Placement of 3/8” – 7/16” heated, treated cover aggregate
- Immediate rolling and sweeping
- Return to normal traffic within 1 hour

Example Northeast DOT ARSAM Projects

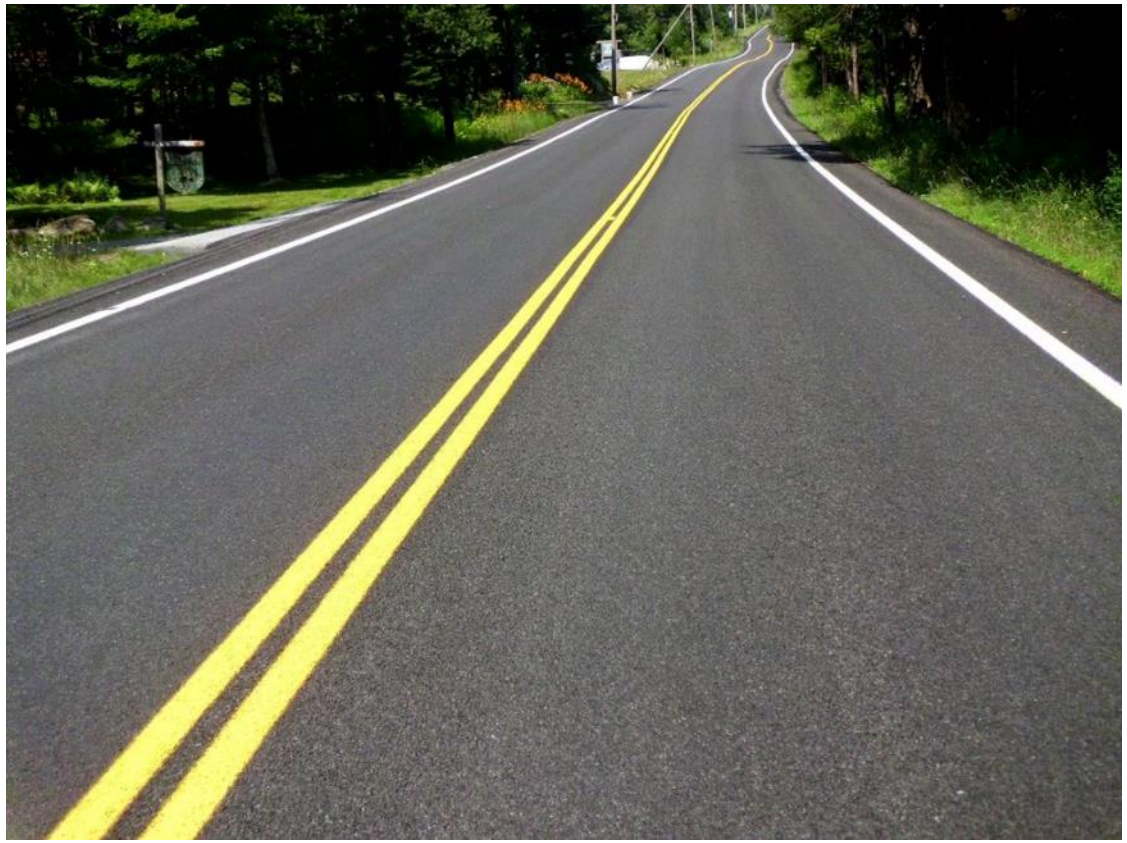
Massachusetts Rt. 32A



Connecticut Rt. 201

Vermont Rt. 12A

Case Study – VT Rt. 100 ARSAM

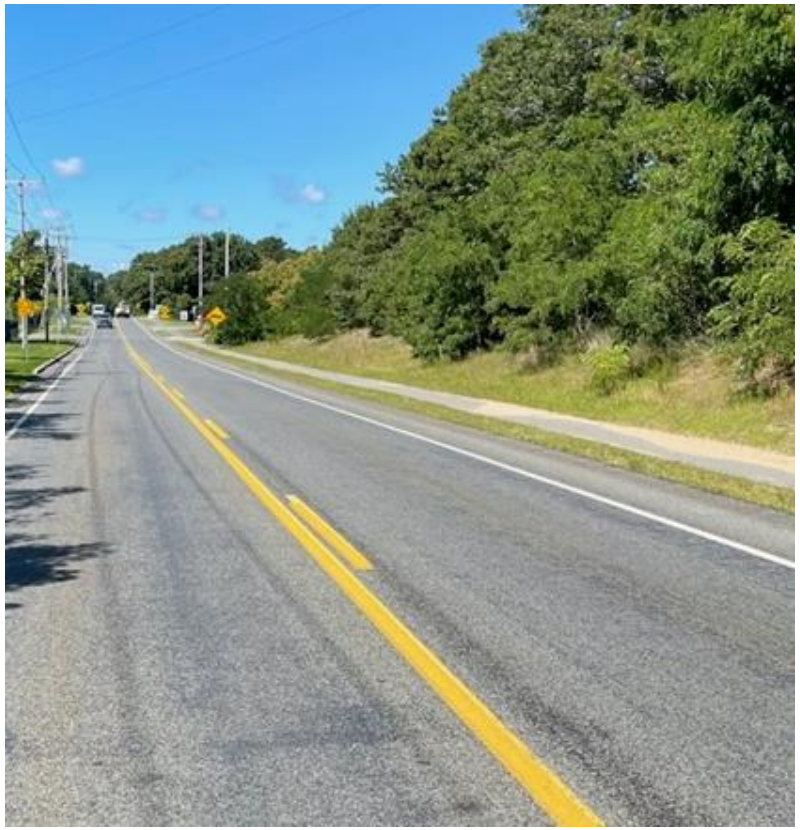


Placed 2013

3 Years Old (2016)

Case Study – Yarmouth, MA ARSAM Program

11 Years Old (Placed 2012)



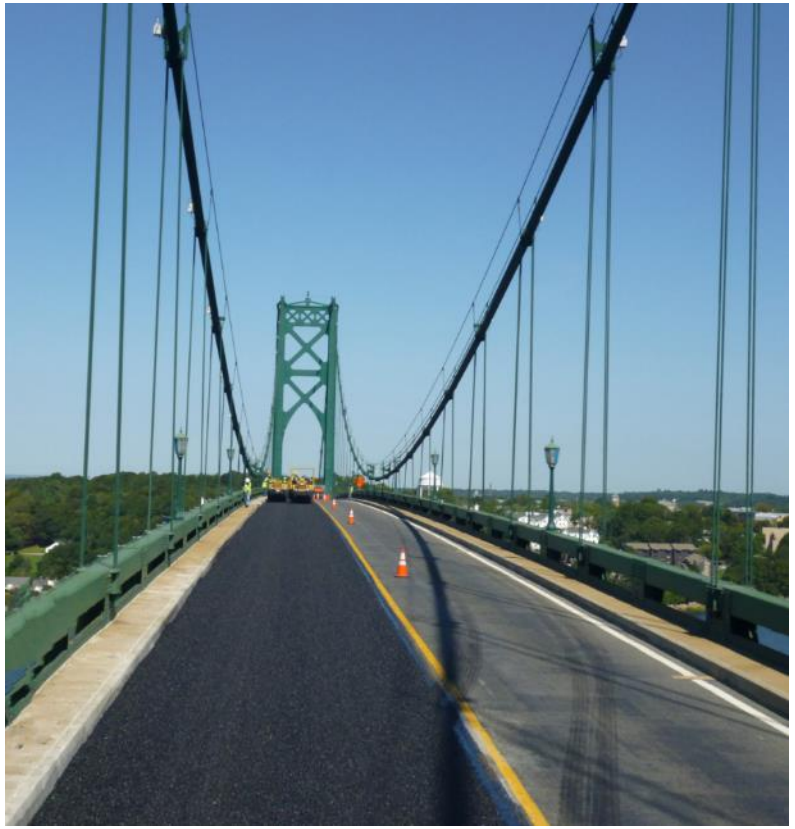
10 Years Old (Placed 2013)

4 Years Old (Placed 2019)

Unique Applications of ARSAM

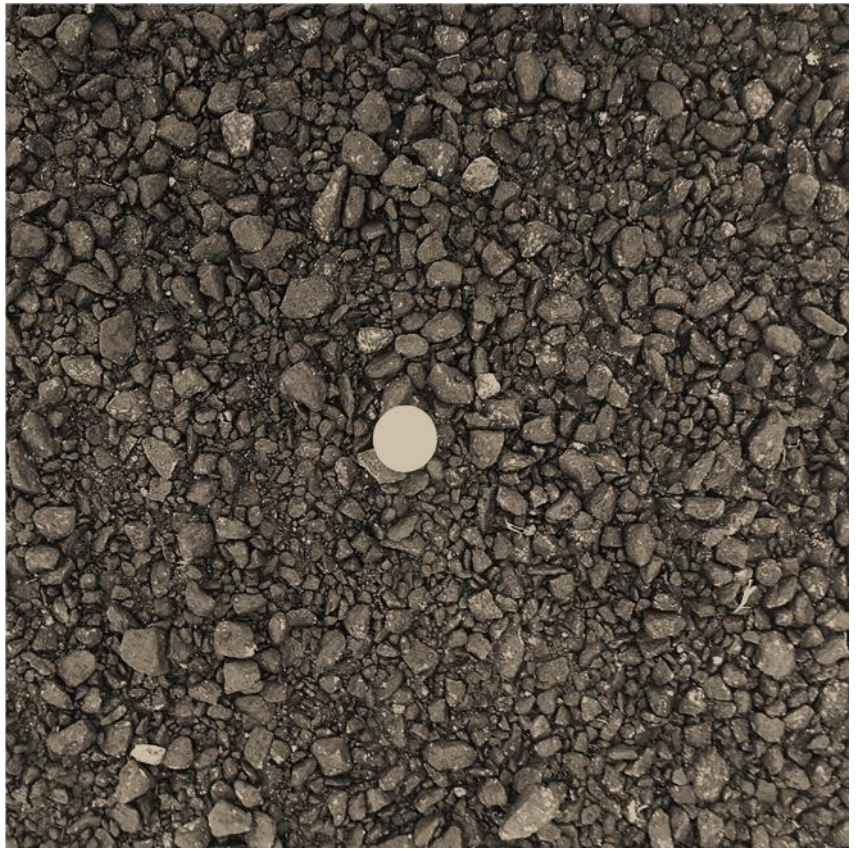
Wooden Draw Bridge, Beverly, MA

SAMI Over Concrete, Newton, MA
(Boston Marathon Route)



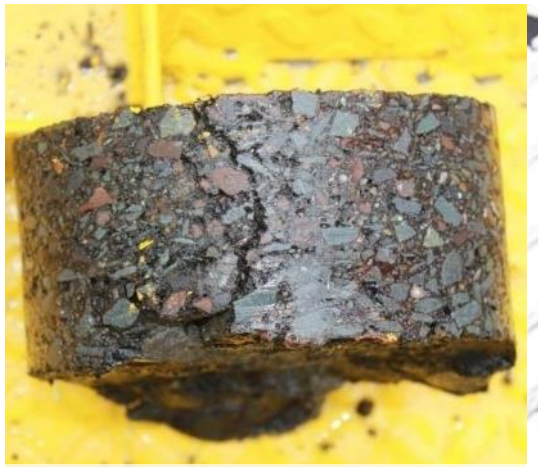
15,000+ AADT Suspension Bridge, RI

Asphalt Rubber SAM at NCAT



Asphalt Rubber Stress Absorbing Membrane Interlayer

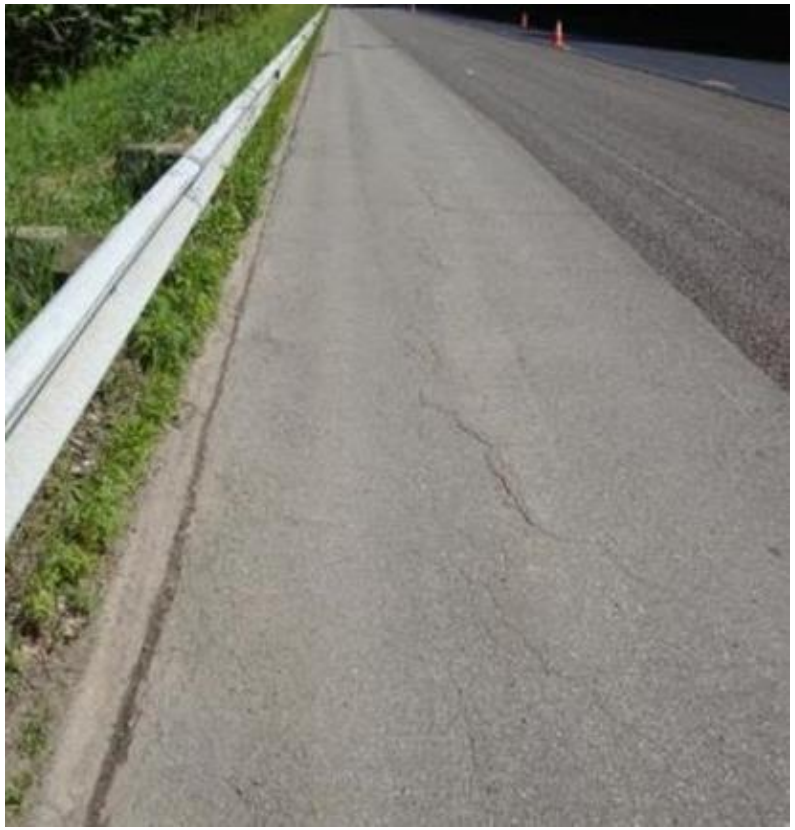
- Same process and materials as ARSAM but as interlayer
- Placement of HMA or other paved overlay
- Seals and waterproofs existing surface
- Provides flexibility and cracking resistance



Without SAMI

With SAMI

Case Study – MA Rt. 8 ARSAMI – 2008



ARSAMI Placement on Travel Lanes

1.5” HMA Overlay

5 Years Old (2013)

Asphalt Rubber HMA Paving

- Variety of applications using conventional paving equipment
- Extends pavement performance and life
- Significantly improved resistance to cracking and rutting
- Reduced traffic noise
- Higher resistance to oxidation

Example Northeast DOT AR HMA Projects

Massachusetts I-91 AR OGFC

New Hampshire Rt. 101 ARGG

Massachusetts Rt. 3 AR BWC 8 Years Old

Case Study – MA Rt. 295 AR BWC

Paving 2008

2 Years Old (2010)

11 Years Old (2019)

Case Study – NH Rt. 38 ARGG

Paving 2011

4 Years Old (2015)

12 Years Old (2023)

Case Study – CT Rt. 11 ARSAMI / ARGG

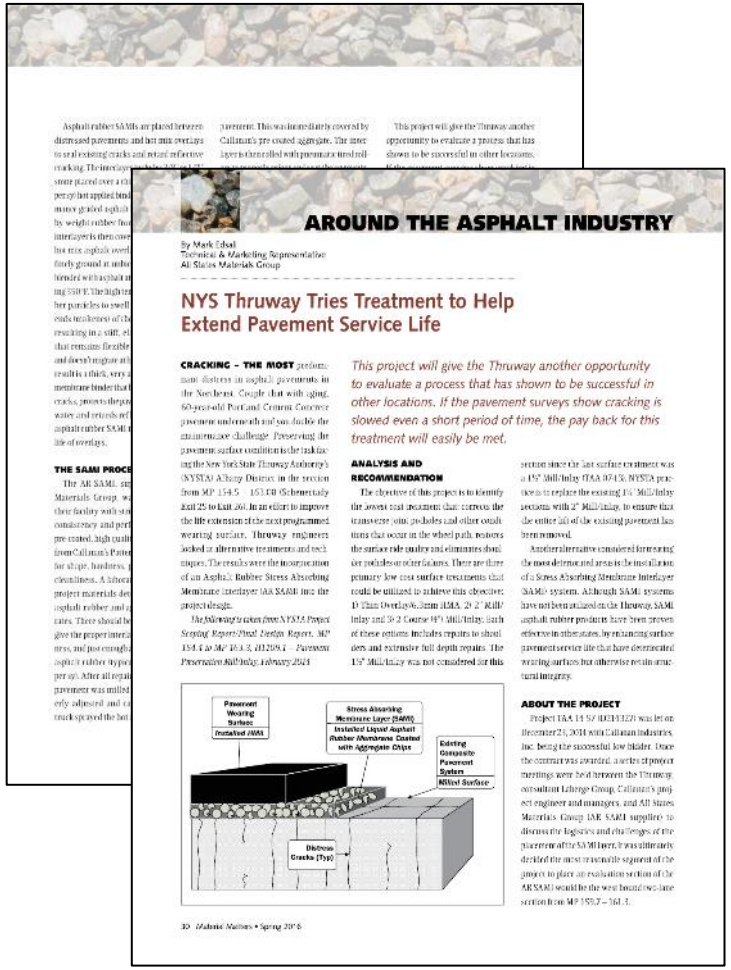
ARSAMI Mainline / ARSAM Shoulder

Finished Roadway

ARGG Surface

Asphalt Rubber SAM Projects in Publication

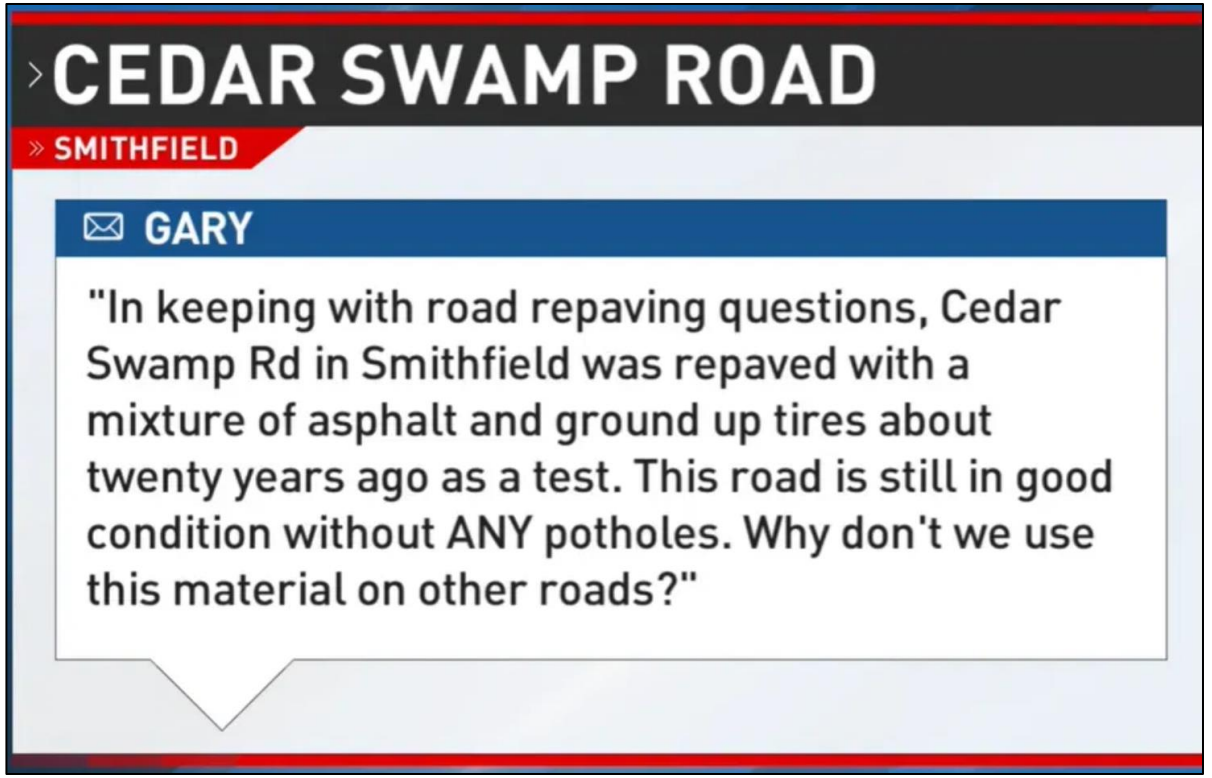
Arlington, MA



New York State Thruway

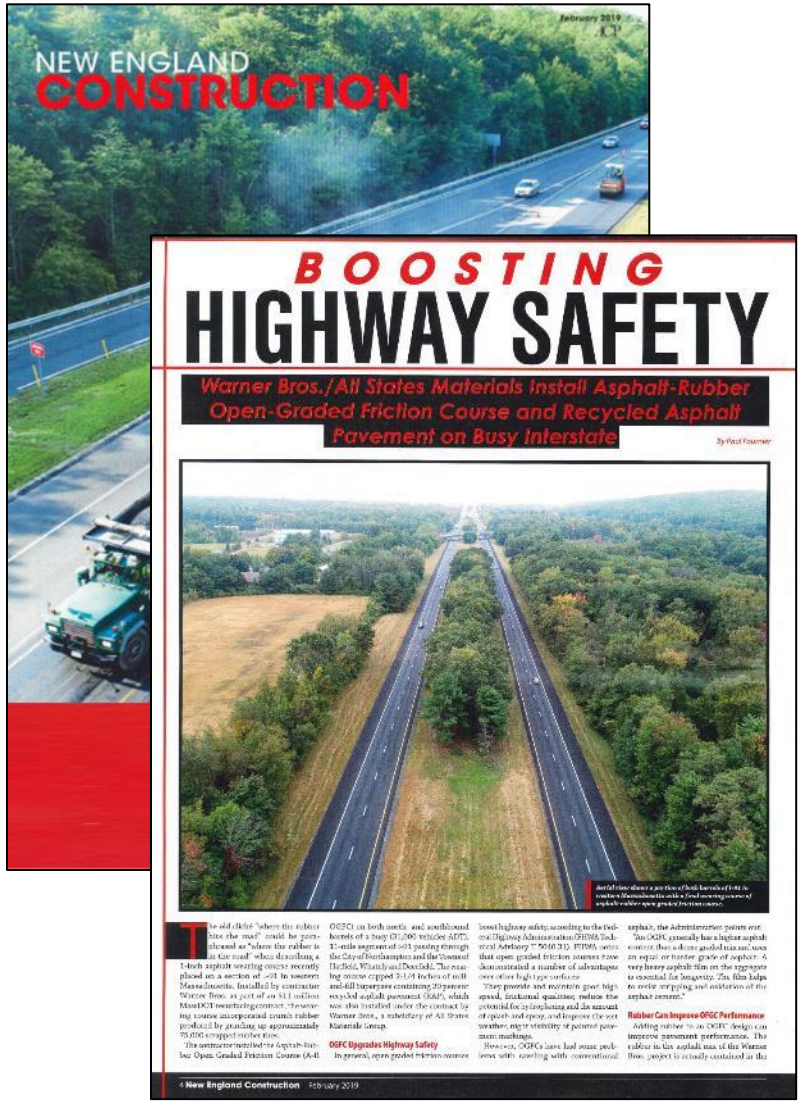
Newport, RI

Asphalt Rubber SAM in the News – RI DOT



Asphalt Rubber HMA Projects in Publication

Massachusetts Rt. 3 ARBWC



Massachusetts I-91 OGFC

Asphalt Rubber Applications Take-Aways

- Variety of applications and uses throughout the region
- Significantly improved performance compared to conventional treatments
- Quality control and material certification is critical to success
- Continued development and advancements to applications
- More opportunities with emphasis on recycling and sustainability

Thank You!

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