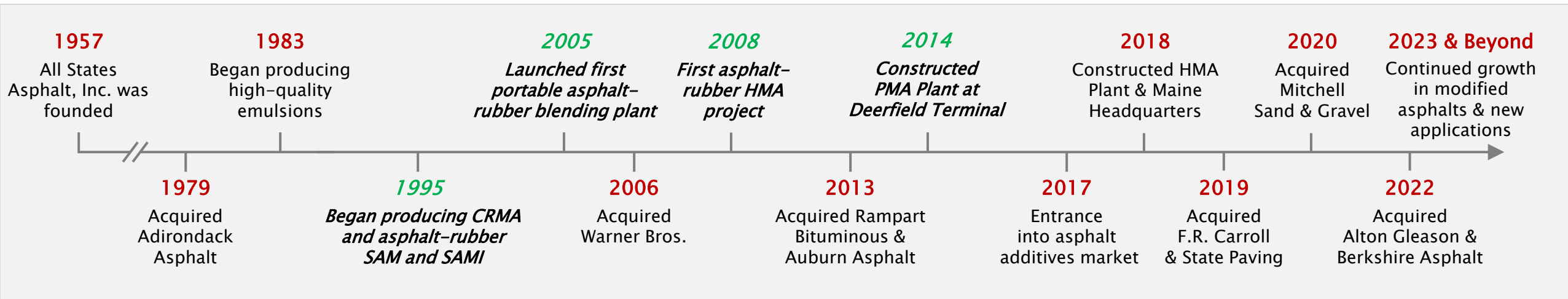


Asphalt Rubber Applications in the Northeast

Rod Birdsall
All States Materials Group



ASMG History with Asphalt Rubber



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

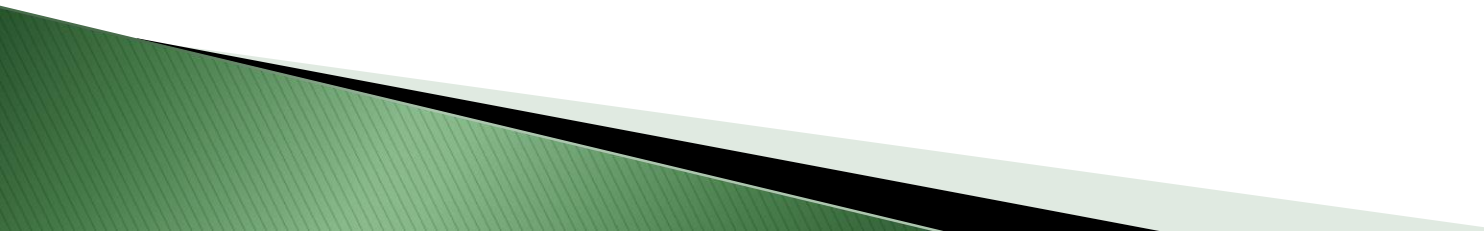


Crumb Rubber Recycling Process

- ▶ 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)

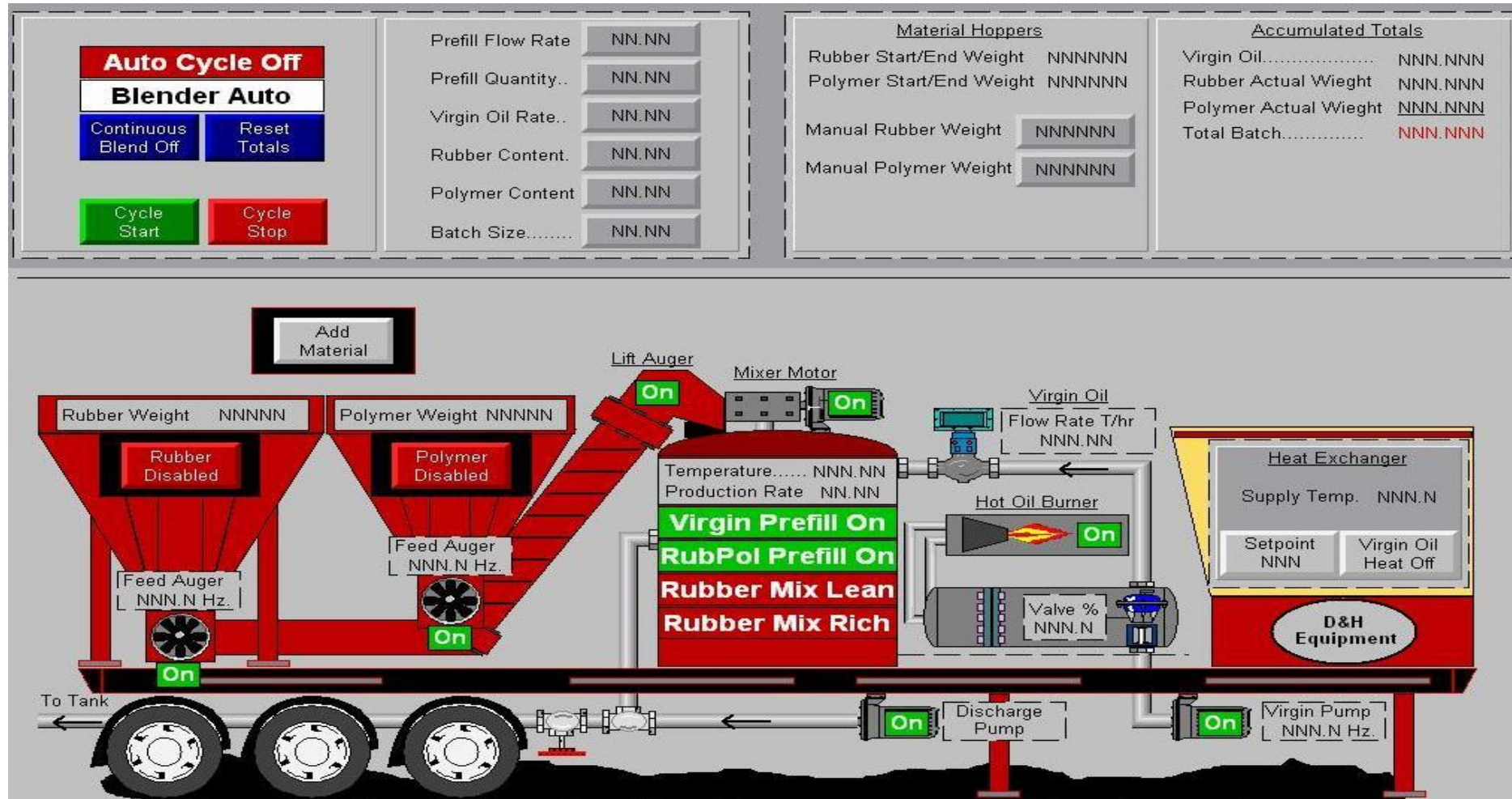
- ▶ PG58–28 (or PG64–28 if needed) base binder with minimum 15% crumb rubber
- ▶ Asphalt Rubber binder must conform to ASTM D6114 Type II
- ▶ Mixing and reaction requirements:
 - Asphalt heating tank or heat exchanger
 - Mechanical blender capable of measuring and recording total quantity of AC in tons 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

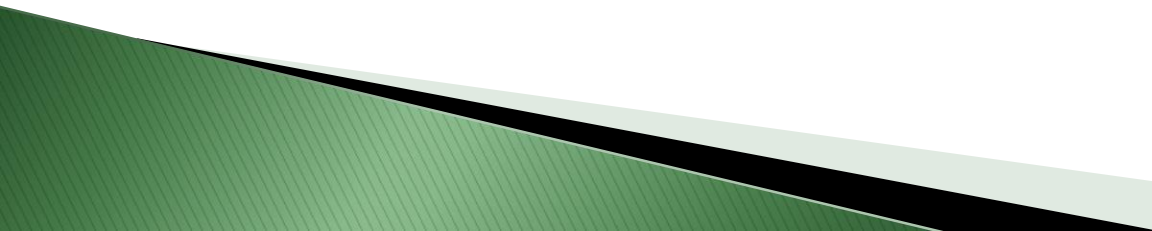


Asphalt Rubber Binder Certification

- ▶ 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

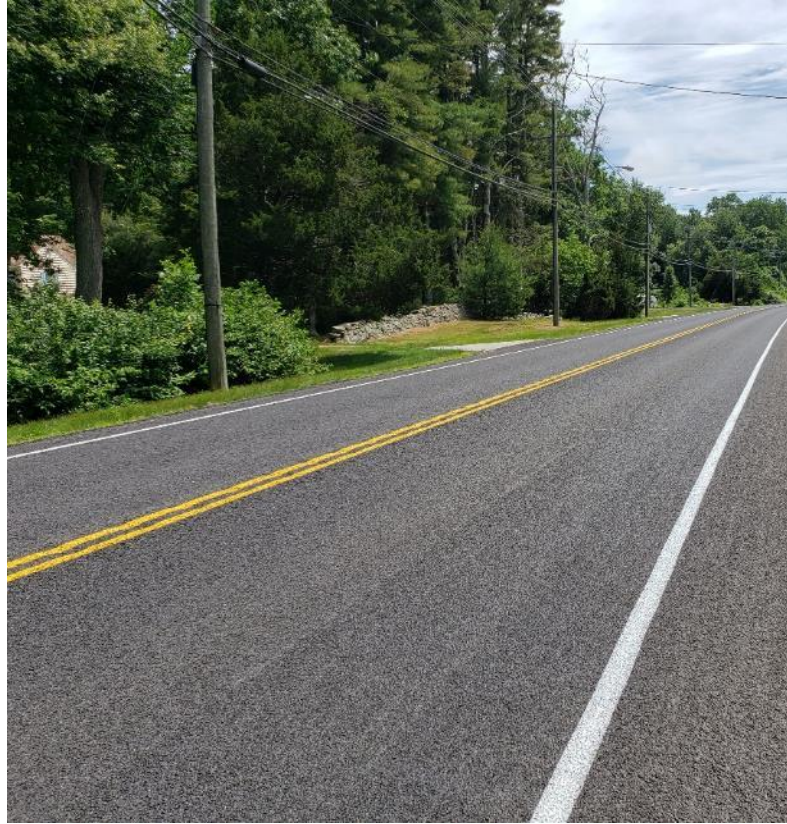
- ▶ Surface prep work and cleaning as needed
- ▶ Hot spray application (325°+ F) of crumb-rubber modified asphalt
- ▶ Placement of 3/8" - 7/16" heated, treated cover aggregate
- ▶ Immediate rolling and sweeping
- ▶ Return to normal traffic within 1 hour



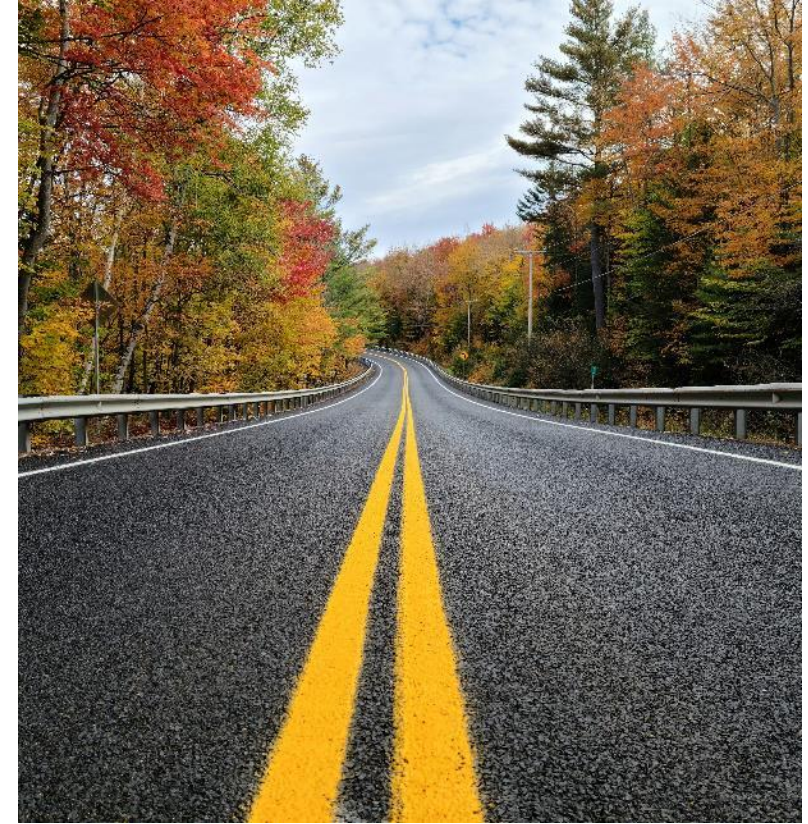
Example Northeast DOT ARSAM Projects



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)

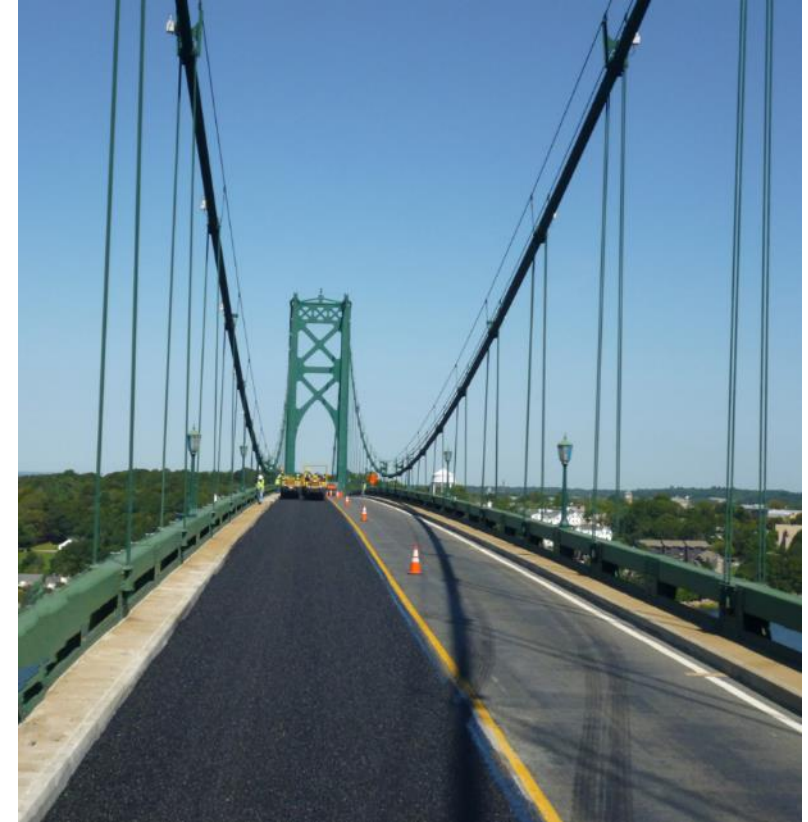
Unique Applications of ARSAM



Wooden Draw Bridge, Beverly, MA

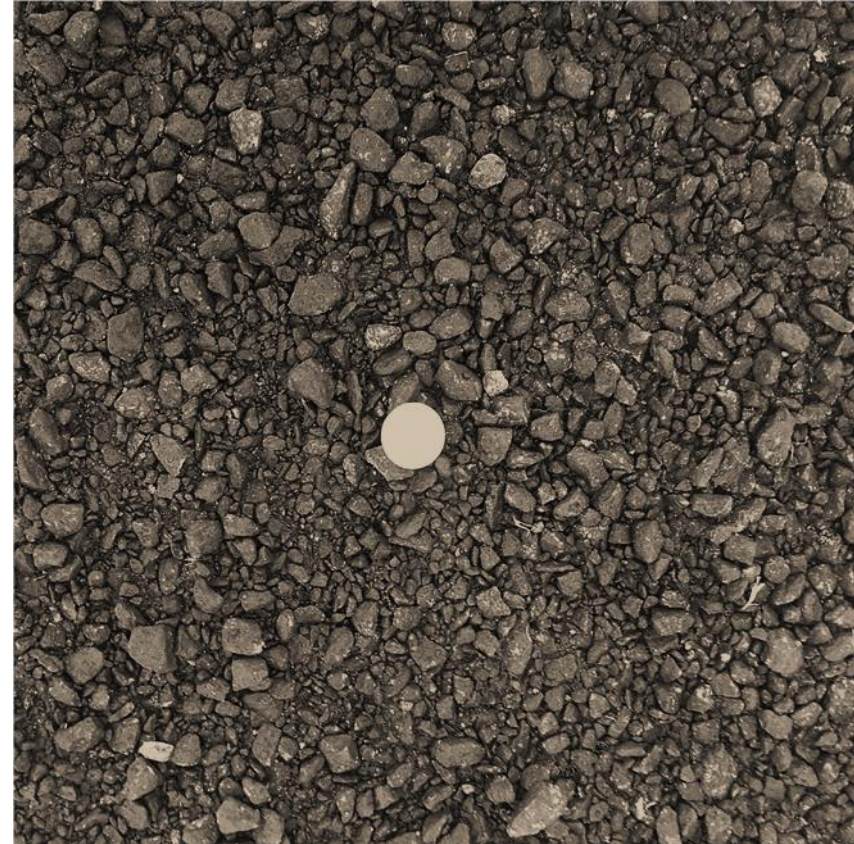
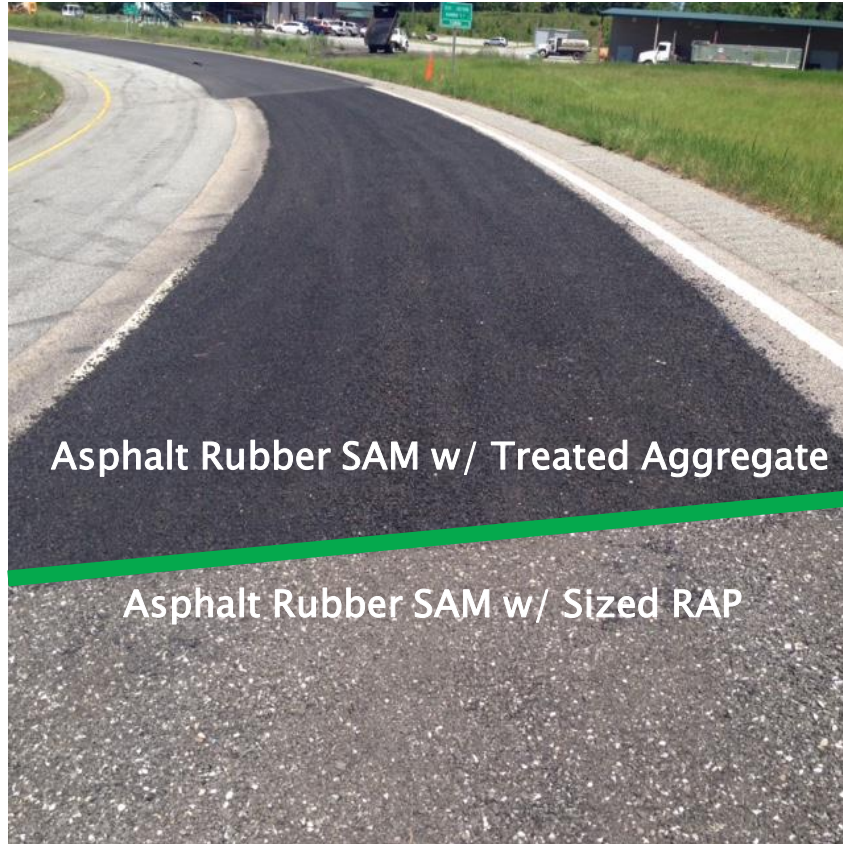


SAMI Over Concrete, Newton, MA
(Boston Marathon Route)



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

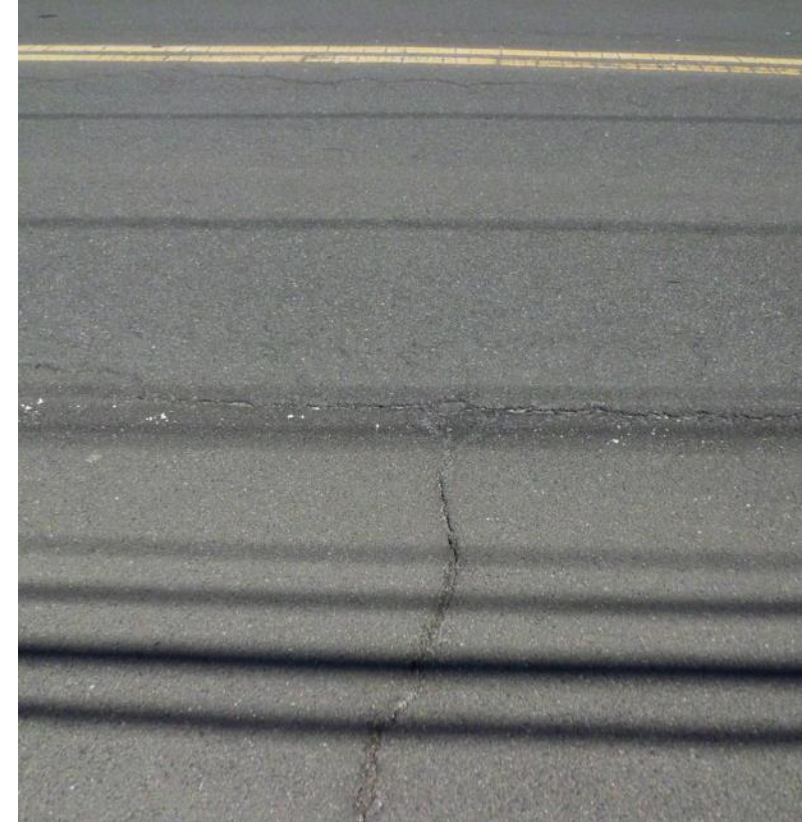
Case Study – MA Rt. 8 ARSAMI – 2008



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

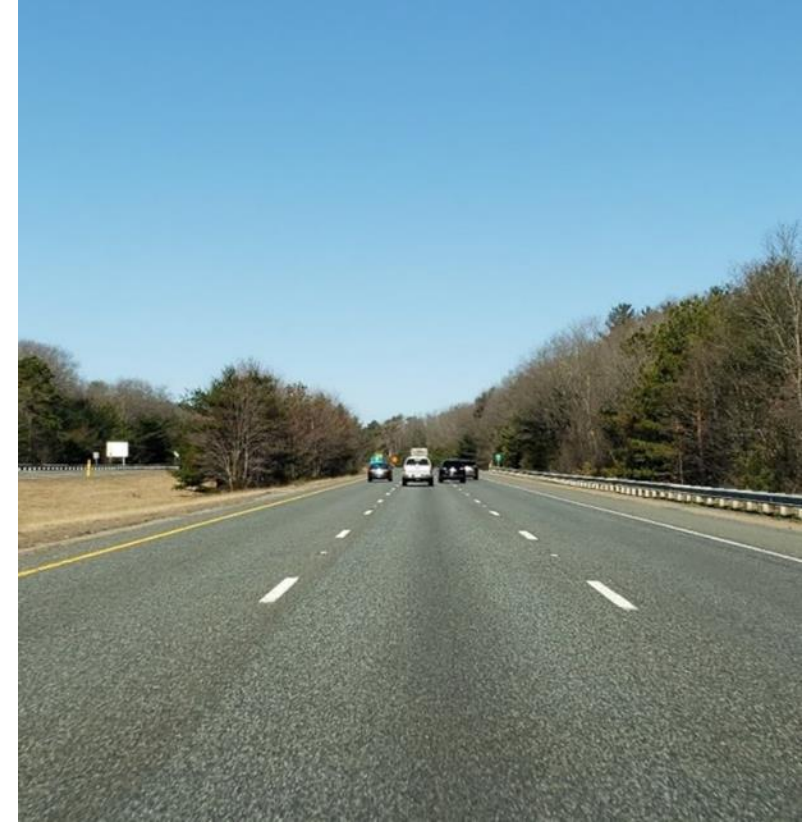
Case Study – MA Rt. 295 AR BWC



Paving 2008



2 Years Old (2010)



11 Years Old (2019)

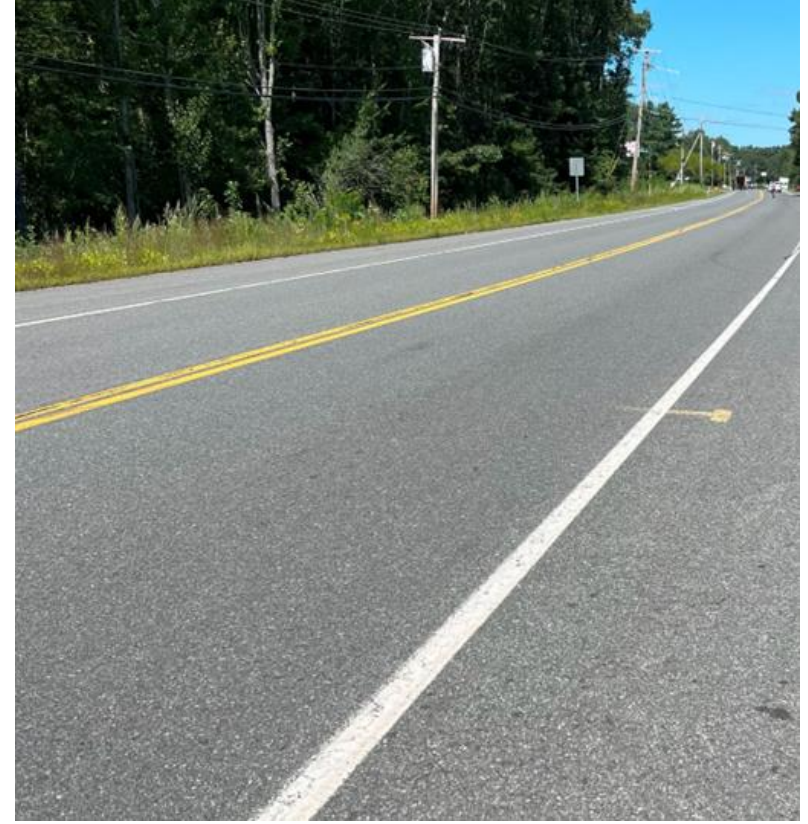
Case Study – NH Rt. 38 ARGG



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

10 WJAR NEWS WEATHER POLITICS I-TEAM GAME CENTER WATCH LIVE

Ask Alison: Can rubberized asphalt chip seal be used on all roads?

by ALISON BOLOGNA, NBC 10 NEWS | Tue, August 22nd 2023, 11:11 AM EDT



ASK ALISON
Turn To 10.com
6031 425-1122
ASKALISON@WJAR.COM

5
VIEW ALL PHOTOS

An NBC 10 viewer wrote to Ask Alison about using rubberized asphalt chip seal on all roads. (WJAR)

> CEDAR SWAMP ROAD

>> SMITHFIELD

GARY

"In keeping with road repaving questions, Cedar Swamp Rd in Smithfield was repaved with a mixture of asphalt and ground up tires about twenty years ago as a test. This road is still in good condition without ANY potholes. Why don't we use this material on other roads?"

Asphalt Rubber HMA Projects in Publication

A PUBLICATION OF FP² INC.

Pavement Preservation Journal

FALL


High-Volume U.S. 3 Gets R26 Showcase Preservation

By Ed Naras


The recently completed pavement preservation project on U.S. 3 in Massachusetts would be considered significant based on its size alone, with nearly 1 million sq. yds. of mainline paving, and over 400,000 sq. yds. of preservation on the shoulders and breakdown lanes.

Add to that a scope of work that included the use of over 10 new pavement treatment combinations, and the result is a showcase project by anyone's standards.

Completed in fall 2015, the project involved work along a section of U.S. 3 north and south from Burlington, Mass., to the New Hampshire state line at Lyngsborough, Mass. This 20.6-mile stretch of road is one of the main routes between Boston and New Hampshire, with average daily traffic counts of approximately 100,000 vpd. The route consists of six total travel lanes three northbound and three southbound, as well as high-speed shoulders and breakdown lanes in each direction.



U.S. 3 in Massachusetts prior to the start of the SHRP2-R26 pavement preservation project



Completed view of U.S. 3 following all pavement preservation applications

SHRP2-R26 AND U.S. 3
Authorized by Congress in 2005 as part of SAFETEA-LU and funded at \$272.5 million, SHRP2 was a follow-up to the 1987 authorization of SHRP. The program included four broad areas of emphasis: Highway Safety, Renewal, Reliability, and Capacity.

As part of the Renewal focus—the document, R26: Guidelines for the Preservation of High-Traffic-Volume Roads—was completed. This report, released in 2011, provided valuable research and information to help expand state usage of pavement preservation techniques on high-traffic-volume roadways.

34 View past issues of the Pavement Preservation Journal online at www.naij.com/network.com/top.naij

Massachusetts Rt. 3 ARBWC

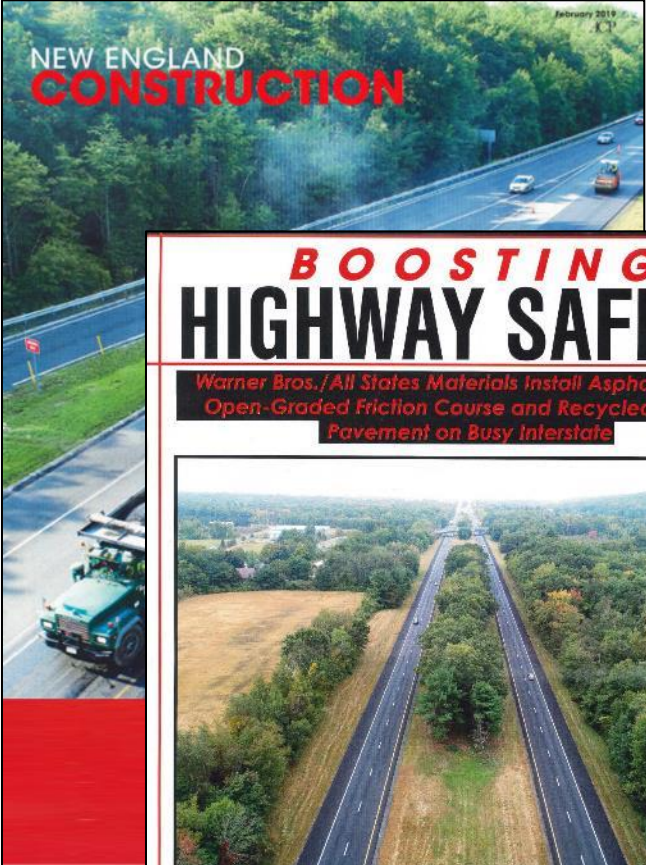
February 2019
CP

NEW ENGLAND CONSTRUCTION

BOOSTING HIGHWAY SAFETY

Warner Bros./All States Materials Install Asphalt-Rubber Open-Graded Friction Course and Recycled Asphalt Pavement on Busy Interstate

By Fred Fosmer



Worldwide shows a positive trend for use of asphalt rubber in open-graded friction courses.

The old cliché "where the rubber hits the road" could be rephrased as "where the rubber is in the road" when describing a fresh asphalt paving crew's recent placement on a section of road in western Massachusetts. Installed by contractor Warner Bros. as part of an \$11-million MoutOC investment contract, the paving system incorporated warm rubber produced by grinding up approximately 75,000 cu yd of old tires. The mixture resulted in an asphalt-laden Open Graded Friction Course (OGFC) on both north and southbound lanes of a busy 67,000 vehicles daily, 2.5-mile segment of toll-paying stretch the City of Northampton and the Town of The Shels, Plymouth and Devens. The resulting course topped 2.5 in. of well and all layers containing 20 percent recycled asphalt pavement (RAP), which also included under the contract by Warner Bros., a subsidiary of All States Materials Group.

OGFC upgrades highway safety. In general, open-graded friction courses boost highway safety, according to the Federal Highway Administration (FHWA). Federal Highway "2016-2017 RFPs" notes that open-graded friction courses have demonstrated a number of advantages over other high-use surfaces.

"They provide and maintain good high-speed, frictional qualities, reduce the potential for rutting and are less susceptible to potholes and raveling, and improve the wet weather grip, thereby, it provides greater traction," says FHWA.

Warner Bros. says it had some problems with curing, with conventional asphalt, the Administration points out. "An OGFC generally has a higher asphalt content than a dense graded mix and uses an equal or higher grade of asphalt. A very heavy asphalt film on the aggregate is essential for longevity. The film helps to seal, wrap and protect the surface of the asphalt mixture."

Rubber Can Improve OGFC Performance
Adding rubber to an OGFC design can improve pavement performance. The rubber in this asphalt mix of the Warner Bros. project is actually contained in the

4 New England Construction February 2019

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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