The Importance of Quality and Availability of Supply in Rubber Asphalt Paving
Agenda

• Company background
• Asphalt rubber
  – Background
  – Materials
  – QC/QA influence on mix quality
• Recyclability of asphaltic pavements
• Recycled materials in new pavements
• How quality of recycled material effects mix performance
ASMG Family of Companies

All States Materials Group®

All States Asphalt, Inc.
Killingly Asphalt, LLC
New England Emulsions Corp.
Down East Emulsions, LLC
Warner Bros., LLC
Johnston Asphalt, LLC
Trew Stone, LLC
Tri-State Materials

WWW.ASMG.COM
Industry Affiliations and Memberships

National Center for Pavement Preservation
www.pavementpreservation.org

NAPA National Asphalt Pavement Association
www.hotmix.org

AEMA – Asphalt Emulsion Manufacturers Association
www.asphaltinstitute.org

ARRA – Asphalt Recycling and Reclaiming Association
www.arra.org

NSSGA – National Stone Sand and Gravel Association
www.nssga.org

FP2, Inc. – Foundation for Pavement Preservation
www.fp2.org
Industry Affiliations and Memberships (Continued)

ASTM – American Society for Testing and Materials
www.astm.org

Transportation Research Board
www.trb.org

Asphalt Institute
www.asphaltinstitute.org

Various states we do business in

Various state and local industry associations

Other National Organizations
ASMG Asphalt Rubber History

1957
All States Asphalt, Inc. was founded...

1995
Manufacturing of CRMA for AR Surface Treatments

2005
Portable Blending of CRMA for Asphalt Rubber HMA
Asphalt Rubber - Crumb Rubber Modified Asphalt (CRMA)

- Tire rubber is finely ground at ambient temperatures
- Rubber is then blended and reacted with asphalt at temperatures exceeding 350°F for over 1 hour
- Results in a high viscosity elastic asphalt binder that remains flexible at low temperatures and stiff at high temperatures
Asphalt Rubber - Crumb Rubber Modified Asphalt (CRMA)

• Tire rubber contributes polymers, carbon black, and anti-oxidants

Result:
– Very adhesive and cohesive, high viscosity binder that yields high film thickness on the aggregates, superior durability and resistance to oxidative aging, rutting, raveling, delamination, shoving, and thermal and reflective cracking
How Asphalt Rubber Works

The field blend system fully saturates the rubber in the asphalt so that they are stabilized or reach equilibrium.
Asphalt-Rubber Blending
What does Rubber do to Asphalt?

Softening Points

<table>
<thead>
<tr>
<th>Material</th>
<th>Softening Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG 58-28</td>
<td>106°</td>
</tr>
<tr>
<td>PG 64-22</td>
<td>114°</td>
</tr>
<tr>
<td>CRMB (Type II)</td>
<td>144°</td>
</tr>
</tbody>
</table>
Asphalt-Rubber SAM/I

SAM and SAMI Full Production
Asphalt-Rubber Stress Absorbing Membrane (SAM)

• Asphalt-Rubber SAM is a stress absorbing membrane surface treatment that creates a highly durable wearing surface

• Designed for demanding, high-traffic roadways

• Ideal for cracked and raveled surfaces

• Excellent solution when curb reveal, clearance under bridges, and traffic delays are concerns
Asphalt-Rubber Stress Absorbing Membrane Interlayer (SAMI)

- Asphalt-Rubber SAMI is a stress absorbing membrane interlayer placed between distressed pavements and hot mix overlays to seal existing cracks and retard reflexive cracking.

- Used on distressed asphalt, concrete, and composite pavements.
Asphalt-Rubber SAM & SAMI is:

- A blend of 15-20% crumb rubber (20 mesh) and asphalt ASTM D-6114, Type II (PG58-28 or PG64-22 or blend)

- Hot spray-applied (approx. 375°F – 400°F) at the rate of 0.50-0.60 gallons per square yard

- Then covered with heated and pre-coated 3/8” to 1/2” stone, followed by rolling and sweeping
Asphalt-Rubber SAM & SAMI

- Asphalt-Rubber SAM and SAMI
  - Environmentally Sound
Asphalt-Rubber Blending
Asphalt-Rubber Blending

Super Sack of Crumb Rubber

Weigh Scale on Rubber Hopper
Asphalt-Rubber Blending

Auger Crumb Rubber into Mixer

Heat Exchanger For PG Binder
Asphalt-Rubber Blending

Computerized Inter-Lock

Computerized Control Station
NE States Using Asphalt Rubber

- **MA**
  - MassDOT (>600,000 tons since 2008)
- **NH**
- **NJ**
  - NJDOT
  - NJTA/Garden State Parkway
- **PA**
  - 4 pilot projects since 2012
Recyclability of Asphalt Pavements

- Asphalt pavements are one of the most highly recycled materials
- Current percentage limit of recycle content added back in new mixes
- NYSDOT
  - 30% base/binder
  - 20% surface
    - RAP – Recycled Asphalt Pavement
    - RAS – Recycled Asphalt Shingles
      - Currently evaluating
      - < 5% manufacturers waste
      - Post consumer w/ additive
Current Specifications

• Volumetrics
• Production tolerances
• In place densities
• Smoothness
• QC/QA
  – FHWA Oversight and Stewardship Reviews
  – Statistical analysis of production QC/QA data
  – Bonus for mix consistency
  – Penalty for mix variability
Secrets to Mix Consistency

• Quality of Materials
• Consistency of Materials
  – Gradation
  – Material content
    • No foreign material
      – Metal
      – Fiber
  – Moisture content
• Age of material – rotation of inventory
Material Quality - Unacceptable
Material Quality - Unacceptable
Material Quality - Unacceptable
GTR Availability / Quality

• Currently 4 active suppliers
  – NY (2)
  – PA
  – Michigan

• Consistent quality – 1
Obstacles To Increasing Recycle Content in Asphalt Mixes

• Resistance to Change
• Current Specifications
• Mix Quality
  – Oxidized asphalt in RAP & RAS
    • Black rock
    • (or) Effective asphalt
• Mix performance
  – Resistance to cracking
Future of Recycled Materials in Asphaltic Pavements

• Must be value added use of recyclables
  – Asphalt Rubber
  – Processing RAP & RAS
  – Performance Based Specification
    • FHWA – Every day counts
    • NJDOT / Rutgers U. models
    • Establish performance measures
  – Use of rejuvenators
    • Mobilize effective asphalt in RAP & RAS
    • Control amount of rejuvenation
THANK YOU

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Products & Services
- Asphalt Rubber SAM & SAMI
- CRMB for HMA
- FiberMat® SAM & SAMI
- Bonded Wearing Course
- Chip Seals
- Liquid Calcium/Magnesium Chloride
- Full Depth Reclamation
- Hot & Cold Mix Asphalt