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Traditional Techniques and Methods used in Rubberized Asphalt

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EPA Scrap Tire Work Group Webinar
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Presentation Overview

• Asphalt Rubber Introduction
• Field Production of AR Binders
• Issues with Field Blending Processes
• Performance of AR Mixes
• Conclusions
Asphalt Rubber History

• Developed in 1960’s by City of Phoenix Engineer
• Also referred to as the “wet process”, “field blend” or “McDonald Process”
• Large amount of crumb rubber used as a Binder Modifier
• Needs constant agitation
Asphalt Rubber

• Terms are Important
• 80% Asphalt / 20% Ground Tire Rubber
• ASTM D8 definition
• ASTM D6114 Specification
Ground tire rubber is typically received in 2,000 pound “Supersacks”.
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Examples of Blending Equipment
Agitation Systems
Agitation Systems
Maintaining Heat and Agitation is Key
An aerial view of a portable Asphalt-Rubber Plant setup at a Hotplant.

- RUBBER STAGING AREA
- BLENDER
- VIRGIN AC TANK
- AR BLEND TANK
- Standard AC Heat Tank
- Hotplant
Meter / Pump is interlocked with Hotplant
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AR Paving is done with conventional paving techniques.
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PLACING AC WITH AR BINDERS

- Don’t pave in the cold but AR performs well in the cold
- No use of pneumatic rollers
  - “Rubber picks up Rubber”
- Elevated mix temperature is not solution
- Use of limewater in some areas
Some Days Are Better Than Others
Some Days Are Better Than Others
Warm Mix Benefits

- Reduced Energy Consumption
- Better Performance of Mixtures
- Reduced Green-House Emissions
- More Effective Compaction
- Improved Ride Quality
  - Less Swelling of Rubberized Crack Sealant
  - Less Bumps from Thermal Segregation
- Safer Working Conditions
Use of Warm Mix Admixtures with Rubberized Asphalt Mixtures

Better Workability of the HotMix Allows
- Compaction Aid for Stiffer Mixes
- Longer Haul Times due to wider paving window.
- Extension of the Paving Season/ Cold Weather Paving
- Reduction in Production Temperatures Reduces Emissions
  - Better Environment for Workers
  - Reduce Blue Smoke / Odor complaints
  - Reduce Recordable Emissions
- Reduction in Energy Consumption
  - Depending on mix it may be possible to save up to 30% on energy costs.
- Drain Down test may need modification with additives
“Rubber picks up Rubber”
Set the Stage for Success

• Experienced Binder Designer
• Experienced Mix Designer
• Blender / Hot Plant Compatibility
• On-site contractor quality control
• Knowledgeable Agency inspection
Common Sense Best Practices

• Tarp loads
• Shorten windrows when paving with belllys
• Keep rollers close
• Weather forecast
  – Wind
  – Long range outlook
• Nighttime temperatures
Constructability vs. Performance
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Constructability vs. Performance
Constructability vs. Performance
Performance in Indio, CA
Performance in Indio, CA
Photomicrographs of CMCRA
Transmitted and Fluorescent Light
AR “Gel”
Difference with and without Particulate Rubber
Why it works -
22,937,600 rubber particles per ton of mix help fight cracking

www.rubberpavements.org
Two ALF’s with 12 Pavement Lanes Constructed in the Summer and Fall of 2002
Percentage of Area Cracked vs. ALF Wheel Load Passes
Summary

• Asphalt Rubber are very cost effective in right application
• Constructability issues must be managed
• Potential to use large amounts of scrap tires to beneficial use
Questions?

“I know you believe you understand what you think I said, but I am not sure you realize that what you heard is not what I meant.”

---Alan Greenspan