EPA Disclaimer

Notice: This document has been provided as part of the U.S. Environmental Protection Agency Sustainable Materials Management Web Academy (formally RCC) Recycling and Solid Waste Management Educational Series. This document does not constitute EPA policy or guidance and should not be interpreted as providing regulatory interpretations. Inclusion within this document of trade names, company names, products, technologies and approaches does not constitute or imply endorsement or recommendation by EPA. Information contained within this document from non-EPA presenters has not been screened or verified. Therefore, EPA has not confirmed the accuracy or legal adequacy of any information provided by the non-EPA presenters and used by EPA on this web site. Finally, links to non-EPA websites are provided for the convenience of the user; reference to these sites does not imply any official EPA endorsement of the opinions, ideas, data or products presented at those locations nor does it guarantee the accuracy of the information provided.

RUBBER manufacturers association

The Use of Scrap Tires in Rubber Modified Asphalt: A Sustainable Technology

Michael Blumenthal
Vice President
Rubber Manufacturers Association

EPA Scrap Tire Work Group Webinar
February 21, 2013

RUBBER manufacturers association

RMA Scrap Tire Activities

- Began in 1990
- Scrap Tire Management Council = RMA
- Sponsored by all RMA tire manufacturers
- Work with governments, scrap tire users, NGO's, general public to accomplish mission

RUBBER manufacturers association

Sustainable Materials Management

- How our society uses materials is fundamental to of our economic and environmental future. Sustainable Materials Management: The Road Ahead suggests a roadmap based on materials management—which includes using less materials, reducing toxics and recovering more of the materials used
- Taken as a whole, this strategy would be an important shift of emphasis from waste management to materials management. Materials management is focused on:
- Knowing and reducing the lifecycle impacts across the supply chain;
- Using less material inputs (reduce, reuse, recycle, “rethink”);
- Using less toxic and more renewable materials;
- End of life - recycling materials into new highways

RUBBER manufacturers association

What is a Sustainable Highway?

For the Federal Highway Administration (FHWA), a sustainable approach to highways means helping decision makers make balanced choices among environmental, economic, and social values—the triple bottom line of sustainability—that will benefit current and future road users

Sustainability encapsulates a diversity of concepts as well, including efficient use of funding, incentives for construction quality, regional air quality, climate change considerations, livability, and environmental management systems

RUBBER manufacturers association

Scrap Tire & Sustainability

- The use of tire rubber to modify asphalt can extend the life of a road, use less materials to achieve the same or better results and provides a high-value use for a secondary material
- These features are all consistent with all the definitions of sustainable material management

RUBBER manufacturers association

Life Cycle Implications of Rubber Modified Asphalt

- When used in road surfaces, recycled tire rubber had between three and seven times lower carbon footprint than asphalt on a materials basis

- This reuse of tire rubber in roads is highly favorable from a climate change perspective, creating almost 7 times less carbon emissions than asphalt.
  - The upstream carbon footprint for the production of asphalt is 840 kgCO2 per metric ton.
  - The weighted average carbon footprint for recycling tires is 124 kgCO2 per metric ton.

Carbon Footprint of USA Rubber Tire Recycling 2007, ISRI

RUBBER manufacturers association

Life Cycle Implications of Rubber Modified Asphalt

- Road surfaces made from rubber modified asphalt can be a lesser thickness than conventional asphalt roads, providing additional improvement in the carbon footprint (less material is used)

- Using rubber modified asphalt in roads has the potential to reduce the rolling resistance of tires, thus reducing the energy consumption of all vehicles using the road

Carbon Footprint of USA Rubber Tire Recycling 2007, ISRI

Why Are Asphalts Modified?

- Unmodified asphalt is sensitive to temperature variations
  - Brittle in cold temperatures
    - Thermal Cracks
  - Softens in high temperatures
    - Rutting and surface deformations
- Modification makes asphalt more temperature stable

What is Rubber Modified Asphalt?

- Rubber modified asphalt is a generic term used to describe all technologies that incorporate tire rubber into any portion of asphalt pavements
- There are 3 basic classifications:
  - Wet process
  - Dry process
  - Terminal blending

RUBBER manufacturers association

States where tire rubber is routinely used in asphalt (DOT, Transportation Authority, County or City)

RUBBER manufacturers association

Ground Tire Rubber

RUBBER manufacturers association

Advantages of Rubber Modified Asphalt

- Reduces impact of aging
  - Antioxidants & antiozidants in tire rubber
- Reduces cracking
- Use as an overlay on distressed roads delays need for reconstruction
- Used for patching potholes
- Reduces “spray” effect when raining

RUBBER manufacturers association

Advantages of Rubber Modified Asphalt

- Reduces braking distances
- Reduces road noise
- Allows usage of very high binder contents which greatly improve ageing properties
- Very good in resisting reflective cracking

RUBBER manufacturers association

Future Considerations

- FHWA, ASCE & states developing "LEEDS" type program for highway & road construction: focus will be on 'greening of the highways'
- Use of rubber modified asphalts can result in achieving highest level of recycled content while using a proven technology

RUBBER manufacturers association

Future Considerations

- Highway & road construction now being viewed as a “quality of life’ issue
- Focus will be on reducing road noise
- Reduction of road noise can be obtained by building sound walls or use of rubber modified asphalt, or both

RUBBER manufacturers association

Future Considerations

- Cost of asphalt is likely to continue to increase (price of petroleum & processing of other petroleum products before asphalt)
- Use of rubber modified asphalt could actually decrease cost of construction; substituting tire rubber for asphalt binder
- DOT budgets likely to be further impacted by state deficits: more focus on repair

RUBBER manufacturers association

Conclusions

- Rubber modified asphalts have specific applications where they have competitive advantages
- Rubber modified asphalt roads have been shown to have lower lifecycle impacts than conventional asphalt roads
- Understanding the technology is a key to a successful application

Conclusions

- Likely, continued increases in asphalt costs will change construction practices
- Federal & state agencies will place greater emphasis on “green” roads
- The use of tire rubber as a modifier of asphalt pavements has many applications and now has cost advantages

RUBBER manufacturers association

RMA Contact Information

Michael Blumenthal
Vice President
Rubber Manufacturers Association
1400 K Street, N.W., Suite 900
Washington, DC 20005
(202) 682-4882
michael@rma.org