Hornberger_SponsorAmendment_HB_781
Uploaded by: Delegate Kevin Hornberger
Position: FAV

AMENDMENT TO HOUSE BILL 781

Page 2, Lines 9 through 16: Delete text and replace with the following:

(2) THE ADMINISTRATION SHALL PERFORM A STUDY IN PARTNERSHIP WITH THE MARYLAND ASPHALT ASSOCIATION TO EVALUATE THE ENVIRONMENTAL AND PAVEMENT PERFORMANCE BENEFITS OF USING RUBBER MODIFIED ASPHALT IN ACTUAL FIELD CONDITIONS FOR THE CONSTRUCTION, RECONSTRUCTION, AND REPAIR OF STATE HIGHWAYS.

(3) A REPORT DETAILING THE RESULTS OF THE STUDY SHALL BE PROVIDED BY THE ADMINISTRATION TO THE GENERAL ASSEMBLY BY JULY 1, 2027 THAT INCLUDES THE FOLLOWING:

(I) ENVIRONMENTAL BENEFITS AND DIFFERENCES IN TERMS OF GLOBAL WARMING POTENTIAL BETWEEN RUBBER MODIFIED ASPHALT AND STANDARD ASPHALT MIXES PLACED IN 2024.

(II) MATERIAL PRODUCTION, PLACEMENT, AND PERFORMANCE BENEFITS AND DIFFERENCES IN TERMS OF COSTS AND LONG-TERM SERVICE LIFE.

(II) THE USE OF VARIOUS TYPES OF RUBBER MODIFIED ASPHALT, INCLUDING THOSE PRODUCED BY THE WET PROCESS AND THE DRY PROCESS, AS WELL AS OTHER RECYCLING MATERIAL STREAMS THAT MAY BENEFIT THE STATE.

(IV) SPECIFICATIONS AND STANDARDS THAT ALLOW THE USE OF CRUMB RUBBER AND OTHER RECOMMENDED FINDINGS FROM THE STUDY FOR THE CONSTRUCTION, RECONSTRUCTION, AND REPAIR OF STATE HIGHWAYS.

<u>Costs:</u>
$250k for the study and research time of the Administration not including the asphalt industry's Capital costs or those construction and oversight costs of the field projects.

TIA HB781 FAV D.pdf
Uploaded by: Dick Gust
Position: FAV

TIRE INDUSTRY ASSOCIATION
1532 Pointer Ridge Place Suite G, Bowie, MD 20716

www.tireindustry.org

February 22, 2024

STATEMENT OF
THE TIRE INDUSTRY ASSOCIATION
IN SUPPORT OF H.B. 781
BEFORE THE
MARYLAND HOUSE ENVIONMENT AND TRANSPORTION COMMITTEE
ROOM 231
ANNAPOLIS, MD 21401

Dear Chair Korman and members of the Environment and Transportation Committee,

I submit this statement on behalf of more than 300 Maryland businesses affiliated with the Tire Industry Association (TIA). TIA, as an international non-profit, represents all facets of the tire industry, aiming to advance tire safety through education, serve as a primary advocate in government affairs, and enhance the industry's overall professionalism.

Headquartered in Bowie, Maryland, TIA boasts a global membership exceeding 13,000 and is recognized as a leader in tire service technician training, having educated over 180,000 individuals since 1997.

We wholeheartedly endorse House Bill 781, which supports the integration of Rubber Modified Asphalt (RMA) in road construction. Our testimony underscores the manifold advantages of this innovative approach, focusing on environmental sustainability, potential state cost savings, elevated road quality, seamless integration with existing construction equipment, and significant carbon footprint reduction.

1. **Environmental Stewardship:**
Rubber Modified Asphalt makes substantial contributions to waste reduction by incorporating recycled rubber from tires into the asphalt mix, alleviating landfill pressure and addressing environmental concerns related to tire disposal.

2. **Financial Benefits for the State:**
House Bill 781's endorsement of RMA aligns with a financially prudent approach to infrastructure development. The use of recycled rubber in asphalt holds the potential for considerable cost savings

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for the state, with the durability of RMA-infused roads leading to reduced maintenance and repair expenses.

3. **Enhanced Road Durability:**
Rubber Modified Asphalt showcases superior performance, offering enhanced road quality and durability. Its flexibility and resilience allow roads to withstand heavy traffic, temperature fluctuations, and environmental factors, ensuring safer and more reliable infrastructure.

4. **Seamless Integration with Construction Equipment:**
RMA's versatility allows for a smooth integration into standard construction practices, requiring minimal modifications to existing equipment. This facilitates a practical and feasible transition for construction companies.

5. **Carbon Footprint Reduction and Climate Responsibility:**
Adopting Rubber Modified Asphalt plays a pivotal role in reducing carbon footprints and mitigating climate change. By incorporating recycled rubber, it diverts tire waste from landfills and diminishes the need for virgin materials, resulting in a lower carbon footprint compared to traditional asphalt production.

In conclusion, the Tire Industry Association strongly advocates for the favorable consideration of House Bill 781. Embracing Rubber Modified Asphalt aligns with sustainable practices, offering economic benefits to the state while actively contributing to environmental conservation and resilient infrastructure development.

Thank you for your attentive consideration.

Sincerely,

Dick Gust
CEO
Tire Industry Association

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Liberty Tire Recycling Testimony MD HB781 02.22.20
Uploaded by: Kenneth Kirton
Position: FAV

February 22, 2024

House Environment and Transportation Committee
Maryland House of Delegates

Chairman Korman and Vice Chair Boyce,

My name is Stratton Kirton, I am the vice president of government affairs for Liberty Tire Recycling, the leading tire collector, processor, and recycler in North America. I am also a proud resident of Montgomery County.

I'm here to talk about HB781 and, more broadly, ways that Maryland can look at rubber modified asphalt as a way to make our roads more sustainable.

I am happy to try and answer any and all of your questions related to rubber modified asphalt, but I want to focus my testimony today on two points: innovation in rubber modified asphalt mixes and performance in all climates.

On innovation in mixes: traditional mixes for rubber modified asphalt typically require blending equipment, extra heating, agitation, and storage tanks. However, there is another way. We produce a mix that uses a dry process called SmartMix, which is produced in a way so that rubber can be simply incorporated into an asphalt mixture at the mix plant. It does not require an additional binder, higher mixing temperatures, long mixing times, or long storage times.

Put simply—it simplifies the process of rubber modified asphalt and lowers the barriers to entry while keeping all the positives of adding rubber to roads. And while I am obviously preferential to our product, the dry mix process is not exclusive to us.

On performance in all climates: rubber modified asphalt performs well in cold, hot, and temperate climates. In fact, rubber as an additive actually improves the performance of asphalt at extreme temperatures. Asphalt has a range of about 90 degrees Celsius before it begins to fail under extreme temperatures; but rubber has a range of 148 degrees Celsius. When you put rubber into the pavement, it shares part of that temperature resiliency with the asphalt mixture.

One of my colleagues made this illustrative point: if you drive from here to Pittsburgh, the binder grade on the road probably changes four times due to the difference in climate, but you don't stop to change your tires four times because of the temperature resiliency of the rubber.

Thank you for your time today; I am happy to try and answer any questions, and any I cannot, I will follow up with you after the hearing.

Stratton Kirton
Vice President, Government Affairs
Liberty Tire Recycling
skirton@libertytire.com

TIA HB781 FAV.pdf
Uploaded by: Roy Littlefield
Position: FAV

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February 22, 2024

STATEMENT OF
THE TIRE INDUSTRY ASSOCIATION
IN SUPPORT OF H.B. 781
BEFORE THE
MARYLAND HOUSE ENVIONMENT AND TRANSPORTION COMMITTEE
ROOM 231
ANNAPOLIS, MD 21401

Dear Chair Korman and members of the Environment and Transportation Committee,

I respectfully submit this statement on behalf of over 300 Maryland businesses that are members of the Tire Industry Association (TIA).

The Tire Industry Association is an international non-profit association representing all segments of the tire industry, including those that manufacture, repair, recycle, sell, service or use new or retreaded tires, and also those suppliers or individuals who furnish equipment, material or services to the industry.

The mission of TIA is to promote tire safety through training and education, to act as the principal advocate in government affairs and to enhance the image and professionalism of the industry so that our member businesses may be more successful.

TIA has more than 13,000 members from all 50 states and around the globe. As the industry leader in tire service technician training, TIA has educated more than 180,000 people since 1997.

The Tire Industry Association is headquartered in Bowie, Maryland.

TIA strongly supports House Bill 781, which advocates for the implementation of Rubber Modified Asphalt (RMA) in road construction projects.

Our written testimony aims to shed light on the myriad benefits associated with this innovative approach, emphasizing its environmental sustainability, potential cost savings for the state, improved road infrastructure, the feasibility of integration with existing construction equipment, and carbon footprint reduction and climate mitigation.

1. **Environmental Benefits:**

Rubber Modified Asphalt is renowned for its positive environmental impact. By incorporating recycled rubber from tires into the asphalt mix, this approach significantly contributes to waste reduction and promotes the circular economy. The reuse of discarded tires in road construction not only reduces landfill pressure but also addresses the environmental concerns associated with tire disposal.

2. **Cost Savings for the State:**

House Bill 781's endorsement of RMA aligns with a fiscally responsible approach to infrastructure development. The use of recycled rubber in asphalt has the potential to result in

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considerable cost savings for the state. The durability and longevity of RMA-infused roads could lead to reduced maintenance and repair costs, ultimately benefiting the state's budget.

3. **Improved Road Quality:**

Rubber Modified Asphalt has demonstrated enhanced performance in terms of road quality and durability. The flexibility and resilience of RMA contribute to roads that can better withstand the impact of heavy traffic, fluctuations in temperature, and other environmental factors. This, in turn, leads to safer and more reliable road infrastructure for the benefit of the community.

4. **Minimal Modifications for Existing Construction Equipment:**

An essential consideration in the adoption of any new construction material is its compatibility with existing equipment. RMA's versatility allows for a seamless integration into standard construction practices, requiring minimal modifications to the existing equipment. This ensures a smooth transition for construction companies, making the implementation of RMA a practical and feasible choice.

5. **Carbon Footprint Reduction and Climate Mitigation:**

An additional pivotal advantage of adopting Rubber Modified Asphalt (RMA) is its role in carbon footprint reduction and climate mitigation. The incorporation of recycled rubber in asphalt not only diverts tire waste from landfills but also diminishes the need for virgin materials in road construction. This results in a lower carbon footprint compared to traditional asphalt production processes. Moreover, RMA's reflective properties contribute to cooler road surfaces, reducing the urban heat island effect. By embracing RMA, we align with sustainable practices that actively combat climate change, making it a crucial element in the broader strategy for environmentally conscious and resilient infrastructure development.

In conclusion, the Tire Industry Association strongly encourages the favorable consideration of House Bill 781, recognizing the numerous advantages associated with Rubber Modified Asphalt.

As an industry committed to sustainable practices and innovation, we believe that the adoption of RMA will not only benefit the state economically but also contribute significantly to environmental conservation and the development of robust and resilient road infrastructure. **Rubber modified asphalt Performs better, Cost less and is good for the Environment!**

Thank you for your consideration.

Sincerely,

Roy Littlefield IV
Vice President of Government Affairs
Tire Industry Association

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USTMA Testimony on MD HB 781.pdf
Uploaded by: Sean Moore
Position: FAV

Testimony of the

U.S. TIRE MANUFACTURERS ASSOCIATION

In Support of

HOUSE BILL 781

presented to the

HOUSE ENVIRONMENT AND TRANSPORTATION COMMITTEE

STATE OF MARYLAND

FEBRUARY 22, 2024

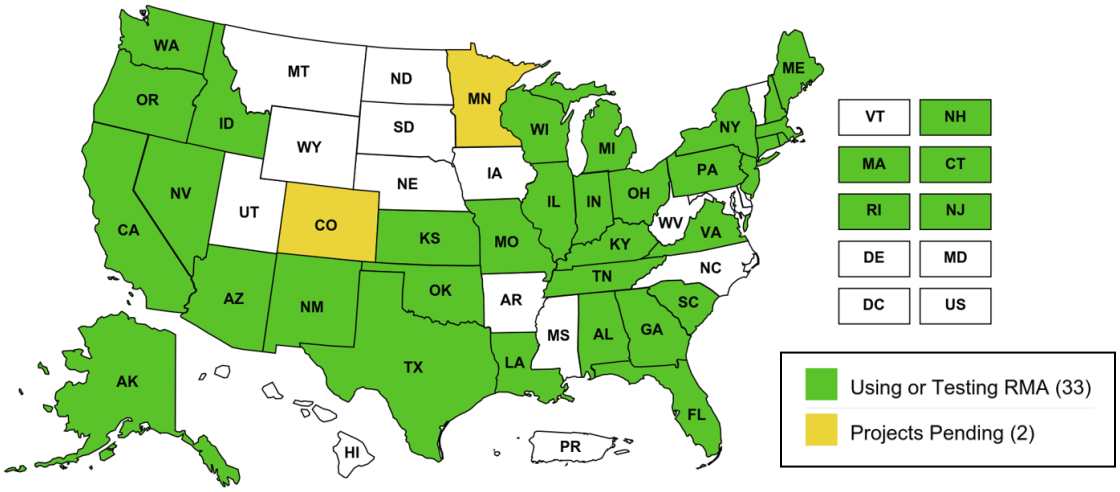
Submitted by: Sean Moore, Senior Director, Head of Government Relations
Email: smoore@ustires.org

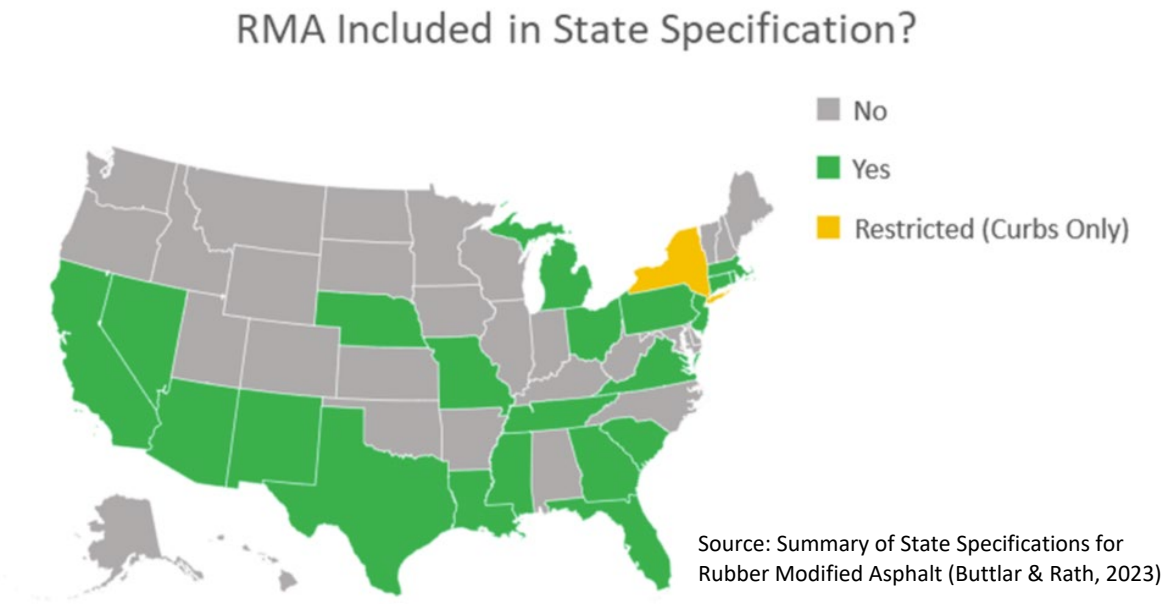
Good afternoon, Chair Korman, Vice Chair Boyce, and distinguished members of the House Environment and Transportation Committee, my name is Sean Moore, and I am testifying today on behalf of the U.S. Tire Manufacturers Association (USTMA) **in support of House Bill 781,** which would direct the Maryland Department of Transportation (MDOT) to utilize rubber modified asphalt (RMA).

USTMA is the national trade association for tire manufacturers that produce tires in the United States. Our 12 member companies operate 57 tire-related manufacturing facilities across 17 states. The U.S. tire manufacturing industry directly supports nearly 2,900 Maryland jobs and indirectly supports nearly 4,500 additional jobs across the state. In Maryland, tire manufacturing produces an annual direct economic impact of more than $529 million and generates more than $94 million in state and local tax revenue. USTMA advances a sustainable tire manufacturing industry through thought leadership and a commitment to science-based public policy advocacy.

Overview

Maryland has long been an outlier among states when it comes to rubber modified asphalt. Today, 35 states are using or testing RMA, and 21 states now include RMA in the material specifications published by their respective State Highway Agencies[i].





Source: Summary of State Specifications for Rubber Modified Asphalt (Buttlar & Rath, 2023)

While USTMA is supportive of the general underlying policy in HB 781, we understand some intermediate steps may be necessary to advance this issue to a point where RMA is a preferred roadway material in Maryland.

USTMA respectfully encourages the committee to:

1. Adopt legislation directing MDOT to:
    a. Conduct a series of pilot projects using RMA, and
    b. Develop material specifications for the use of RMA in Maryland roads.
2. Explore policies that would incentivize the state's road builders and engineers to familiarize themselves with RMA and scale up its use. This might include tax credits for:
    a. Attending educational seminars to learn best practices for using RMA (these are offered at industry conferences; the state of California has also developed an online college-level course[ii]), and/or
    b. The purchase of any new machinery needed to use RMA (needs vary dependent on which RMA process is used).

Background on rubber modified asphalt[iii]:

Nascency - first wave

The first experiments incorporating rubber bitumen into roads were conducted in 1840, though the concept remained largely experimental for the next century. In the 1960s, the commercial usage of scrap tire rubber in asphalt mixtures was developed in Europe and the U.S. at approximately the same time. It was 1968 when the Arizona Department of Transportation placed its first Stress Absorbing Membrane (SAM), a hot asphalt-rubber chip seal applied to a deteriorated pavement surface.

While the durability of RMA was readily apparent in these early applications, there was little widespread knowledge regarding best practices, and standards were not yet developed. By 1991, use of rubber modified asphalt was growing, when the federal government enacted the Intermodal Surface Transportation Efficiency Act (ISTEA), which contained provisions requiring states to use RMA. However, the program was repealed in 1995 and is largely remembered as a failure. According to Drs. Bill Buttlar and Punyaslok Rath, this was due to[iv]:

a) a lack of technology prevented contractors from producing high-quality mixtures on a consistent basis,

b) a lack of proper training of personnel compounded by a lack of understanding of the function of rubber in asphalt led to poor or inconsistent quality (for instance, it was not understood at the time that interaction time and temperature are crucial in the production of quality RMA), and

c) many technologies that were used in the pilot projects were still patented at that time, leading to high initial costs for RMA.

Second wave

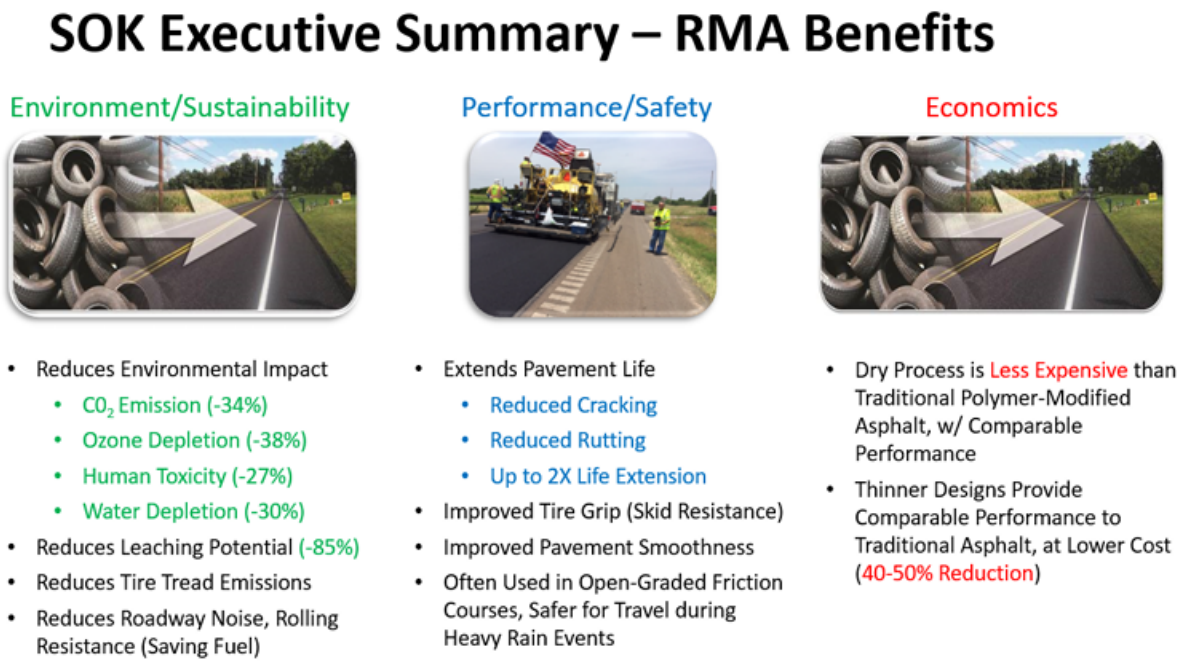
The market for rubber modified asphalt experienced significant expansion in the latter half of the 2010s, "partly due to new technologies available for modification and partly due to a better understanding of the mechanics behind rubber modification of asphalt mixtures" (Buttlar & Rath, 2021).

As states have increasingly focused on improving the sustainability of their transportation infrastructure, they've begun to take another look at rubber modified asphalt. The development of standards (e.g., ASTM International D6114/D6114M-19[v]) and best practices has now made RMA an attractive investment.

As a reflection of the renewed interest in RMA, the Federal Highway Administration, has published several guidance documents related to RMA:

- A **2021 overview of asphalt rubber gap-graded** as part of FHWA's Targeted Overlay Pavement Solutions (TOPS) program, which promotes pavement solutions with benefits including enhanced safety, longevity and performance, and cost savings through reduced maintenance needs[vi].
- "**Resource Responsible Use of Recycled Tire Rubber in Asphalt Pavements**"[vii] was issued in 2020 under FHWA's Accelerated Implementation and Deployment of Pavement Technologies Program to update the agency's earlier review of RMA, with a stated objective "to provide knowledge for resource responsible use of RTR to promote sustainable use in asphalt pavements."
- A **2014 Technical Brief** provided an overview of the various processes for using recycled tire rubber as a modifier for asphalt binders and as an additive for asphalt mixtures.

Benefits of rubber modified asphalt:



The above graphic is borrowed from a 2021 state-of-knowledge report conducted by the University of Missouri with funding from USTMA and The Ray (a nonprofit proving ground dedicated to developing safer, smarter, and more sustainable highways). The report is available online and hyperlinked in endnote iii.

The potential to address several persistent problems

As mentioned above, more states began to reexamine rubber modified asphalt as they started to focus more on the sustainability of their transportation infrastructure.

Problem: Need to increase the sustainability of the transportation sector and design roads and highways to be safer and more sustainable.

Solution: Rubber modified asphalt has lower emissions, enables vehicles to travel more efficiently and can reduce pollutants in stormwater; it also produces less road-spray in wet conditions and has improved skid resistance.

Problem: Disadvantaged communities are often disproportionately affected by road noise due to their closer proximity to high-traffic roads.

Solution: Rubber modified asphalt reduces road noise by up to 10 decibels; a lawsuit over Utah's Legacy Parkway was settled in part with an agreement that RMA be used to reduce road noise.[viii]

Problem: States are spending more to maintain roads.

Solution: RMA significantly extends pavement life (up to 2X), reducing maintenance costs and construction-related delays.

Problem: According to the Maryland Department of the Environment, more than 6 million scrap tires were produced in Maryland, and Maryland facilities processed more than 6.8 million scrap tires in FY23[ix].

Solution: Each lane mile paved with a 2-inch overlay of rubber modified asphalt consumes between 1,500 and 2,000 scrap tires.

Notable RMA usage in other states:

As noted above, RMA is currently being used in some form in two-thirds of the U.S. Some notable examples are provided below. California's experience is specifically cited, given the state is among the most experienced with a mandate like the one proposed in HB 781. The experiences of Illinois and Michigan are discussed below since both states specifically studied the performance of RMA in cold climates. Pennsylvania and Virginia are included, given they border Maryland, and each has material specifications for both wet and dry process RMA; Pennsylvania also considered RMA's performance in cold climates. Additional case studies are provided in the *Summary of State Specifications for Rubber Modified Asphalt* hyperlinked in endnote i.

California

According to California's Department of Resources Recycling and Recovery (CalRecycle), the state has used RMA for more than 30 years;[x] today it is a preferred road surface material. For close to two decades, the state has mandated a percentage of roads be paved with RMA (*see*: CA Pub Res Code § 42703 (2021)) with use rates increasing by year. Additionally, the state supports RMA usage through:

- **CalRecycle RAC grant programs** that provide financial assistance to local governments, specifically to fund RMA projects.
- **Engineering and technical assistance and training** to local jurisdictions in the state.
- **A state-maintained list of product and vendor information** in the California Tire-Derived Product Catalog.
- **A Green Roads Fact Sheet** used to educate local decision makers about the benefits, uses, and cost comparisons for RAC as a paving alternative.

Illinois

Illinois Tollway began using RMA in 2009. In 2016, the Tollway placed nine test sections on high traffic sections of I-88. Field testing in 2019 showed excellent performance for fracture energy tests ("project exceeded the 690 J/m2 threshold required for high traffic applications") as well as excellent crack and rutting resistance. The field evaluators noted, "These sections went through a 50-year cooling event due to the polar vortex experienced in late January, 2019, where air temperatures in the vicinity of Chicago dropped below -32F (-34C)."[xi] All mixtures were shown to perform well under the heavy traffic and cold weather of northern Illinois.[xii]

Michigan

In 2019, Michigan's Department of Environment, Great Lakes, and Energy (EGLE) performed a joint project with Michigan Technological University (MTU) and Dickinson County Road Commission, to evaluate the performance of rubber modified asphalt in the cold climate of Michigan's Upper Peninsula. The initial results have shown, "more resistance both to rutting during hot temperatures and cracking during cold weather."[xiii]

Michigan has been increasing its RMA usage since 2005. In 2022, EGLE issued a grant that paved five and a half miles of roadway in two counties and utilized approximately 59,500 scrap tires. According to EGLE, "The growing consensus is that rubber-modified paving is a winner for local roads."[xiv]

Pennsylvania

Between 2012 and 2015, the Pennsylvania Department of Transportation (PENNDOT) performed a series of four pilot projects to evaluate the performance of RMA on various Average Daily Traffic (ADT) roadways and on roads subject to Pennsylvania's climate. Despite the formal evaluation period for the project spanning a period of 10 years from the placement of the asphalt mix, the initial results were so promising that in 2018 – three years after the completion of these projects – PennDOT formally approved the use of rubber modified asphalt and included the studied technology in PENNDOT's construction specification.[xv]

Virginia

In August 2022, the Virginia Transportation Research Council (a partnership of the Virginia Department of Transportation and the University of Virginia) published a report with initial findings from a project using RMA on US-60. According to the authors, "The study found that dry process SM 12.5 (GTR) mixture can be produced and placed with no significant field-related concerns and that the special provision developed for its use was effective… Laboratory performance testing showed the [RMA] mixture to be more crack resistant than conventionally modified polymer (SM 12.5E) mixtures."[xvi]

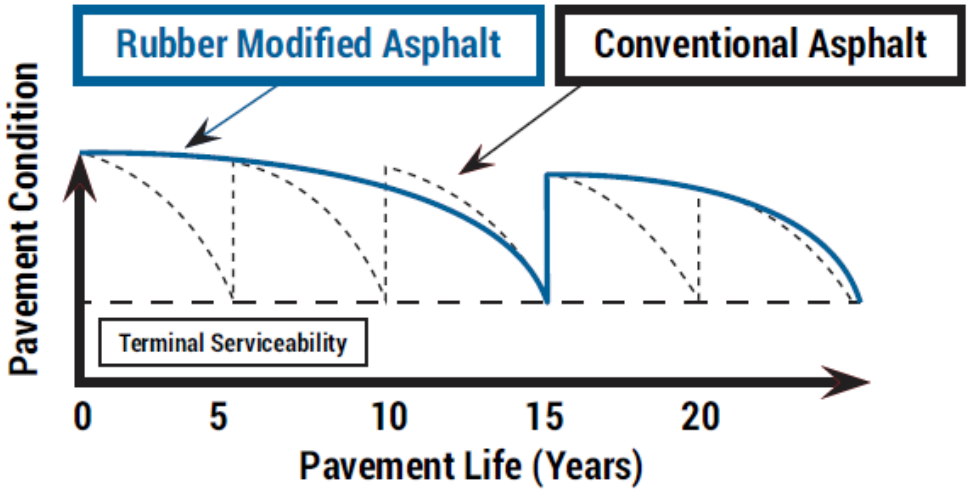
According to the Virginia Asphalt Association (VAA)[xvii]:

> *Today, VAA, VDOT and Virginia asphalt contractors are conducting joint efforts to utilize [ground tire rubber] in other mixes used on VDOT projects as an alternative to polymer modification. The ultimate goal is to produce a mixture that provides superior performance at a lower cost. Research conducted by other agencies has shown the value of these mixes…This not only will reduce the initial and long-term cost of the pavement, but has significant environmental impacts through the reduced demand on new asphalt binders and reduction in landfilled materials.*

<u>Opportunity in Maryland</u>:

As noted in the Fiscal and Policy Note for HB 781, the State Highway Administration (SHA) replaced an average of 720 miles of asphalt road each year over the last five years.[xviii] **If those lane miles were replaced using rubber modified asphalt, it would consume nearly 1.5 million tires annually**. While SHA's preliminary projections anticipate higher initial costs to install RMA, it does not account for cost savings

realized through delayed maintenance, repair, and/or rehabilitation activities, given RMA can provide up to double the service life of pavement compared to conventional asphalt. In other words, the use of a life-cycle cost analysis often shows reduced costs to the agency in the long run, as shown in the figure below.[xix]



Schematic on maintenance phase for rubber-modified pavement compared to conventional pavement. (adapted from (R. Hicks, Lundy, & Epps, 1999))[xx]

Federal grants to make RMA cost-neutral on the front end.

The Inflation Reduction Act (Public Law No: 117-169) created federal grant opportunities that can be accessed to eliminate any added front-end costs of using rubber modified asphalt. Specifically, Sec. 60501, §177, (a)(2) – Competitive Infrastructure Technology Grants authorizes the Federal Highway Administration to distribute competitive grants that address greenhouse gas emissions, permeable/porous pavement, and road safety. RMA is proven to reduce carbon emissions through increased fuel economy, to act as a permeable pavement, and to increase driving safety by improving wet grip and reducing road spray.

MDOT should be directed to revise its material specifications to allow for the use of rubber modified asphalt. As noted in the case studies above, RMA has applications beyond the purview of SHA. By including RMA in the material specifications, the benefits associated with RMA could be realized by counties and local governments through their own road maintenance projects.

Scale of potential benefits to including RMA in material specifications.

According to MDOT's 2022 Annual Mileage Report, there are more than 26,000 miles of county and municipal owned roads in Maryland.[xxi] The analysis SHA provided for the Fiscal and Policy Note for HB 781 notes SHA typically replaces 720 miles of asphalt road annually out of the approximately 5,200 miles it owns (14%). If county and municipal roads are resurfaced at the same rate, approximately 3,600 miles of county and municipal roads would be resurfaced each year. Using RMA on just the county and municipal roads could consume between 5.6 million and 7.2 million tires. Put another way, **the expected annual paving of Maryland roadways could consume all the scrap tires produced in Maryland in a given year**, which would yield all of the economic, environmental and safety benefits discussed above.

USTMA's interest:

USTMA members share a common goal that 100% of scrap tires enter sustainable and circular end-use markets. Successful scrap tire management depends on the availability of sustainable and circular end-use markets. USTMA seeks to grow these types of markets to ensure scrap tires are properly managed to prevent stockpiles and illegal dumping.

USTMA is a leader in advocating strong scrap tire laws, which have reduced stockpiled tires by 95% nationwide – from over 1 billion in 1990 to 50 million in 2021.[xxii] Scrap tires are now one of the most recycled consumer products, with 71% of tires consumed in beneficial end-use markets. While this number is impressive, additional policies are needed to increase that percentage to 100.

USTMA works with stakeholders, including the federal and state governments to incentivize market development and advance federal and state regulations that foster sustainable scrap tire markets. Rubber modified asphalt not only provides a circular and sustainable end-use for scrap tires, but it also produces more sustainable infrastructure.

Conclusion

Successful scrap tire management depends on the availability of sustainable and circular end-use markets. Maryland has an opportunity to become a leader in sustainable scrap tire management while enhancing the sustainability of its state and local roads.

The economic, environmental, and safety benefits associated with rubber modified asphalt make it an ideal material for producing more sustainable transportation infrastructure in Maryland.

Legislative direction is needed to ensure MDOT's Standard Specifications for Construction and Materials allow for the use of rubber modified asphalt. USTMA respectfully urges the committee to direct MDOT to begin this important work and to explore policies to incentivize the state's road builders and engineers to familiarize themselves with RMA and scale up its use.

We sincerely appreciate your consideration of our position on this important issue. I am happy to answer any questions you might have.

Bibliography

[i] Buttlar, William G. and Rath, Punyaslok. *Summary of State Specifications for Rubber Modified Asphalt*. 2023. https://www.ustires.org/sites/default/files/2023-11/Summary%20of%20State%20Specifications%20for%20Rubber%20Modified%20Asphalt%20Final_0.pdf.

[ii] California Department of Resources Recycling and Recovery. *Continuing Education and University Curricula of Rubberized Asphalt Concrete and Civil Engineering Application of Waste Tires* (DRRR-2011-0018). 2011. https://www2.calrecycle.ca.gov/Publications/Details/1382.

[iii] Buttlar, William G. and Rath, Punyaslok. *State of Knowledge Report on Rubber Modified Asphalt*. 2021. https://www.ustires.org/sites/default/files/2021-06/Rubber-Modified-Asphalt_5-27-2021-FINAL.pdf.

[iv] Ibid.

[v] ASTM International, *Standard Specification for Asphalt-Rubber Binder*. 2023. https://www.astm.org/d6114_d6114m-19.html.

[vi] Federal Highway Administration Center for Accelerating Innovation. *Targeted Overlay Pavement Solutions (TOPS)*. https://www.fhwa.dot.gov/innovation/everydaycounts/edc_6/targeted_overlay_pavement.cfm. Accessed February 19, 2024.

[vii] Baumgardner, Gaylon, Hand, Adam J. T., and Aschenbrener, Timothy B. *Resource Responsible Use of Recycled Tire Rubber in Asphalt Pavements* (Publication No. FHWA-HIF-20-043). Federal Highway Administration. 2020. https://www.fhwa.dot.gov/pavement/asphalt/hif20043.pdf.

[viii] Davidson, Lee. "Legacy Parkway will allow big rigs, higher speed limit after neighbors again fail to halt Jan. 1 changes." *The Salt Lake Tribune,* December 13, 2019. https://www.sltrib.com/news/politics/2019/12/13/neighbors-again-fail-halt/.

[ix] Maryland Department of the Environment. *Maryland Scrap Tire Annual Report: FY23 Data*. 2023. https://mde.maryland.gov/programs/land/RecyclingandOperationsprogram/Documents/Environment%20Article%2c%20Section%209-275%28c%29%20FY%2023%20MARYLAND%20SCRAP%20TIRE.%20ANNUAL%20REPORT.pdf

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Bill 781 Testimony.224(2).pdf
Uploaded by: Redmond Clark
Position: FWA

REDMOND CLARK, PhD
PRESIDENT, ASPHALT PLUS, LLC, BARRINGTON, IL
TESTIMONY REGARDING HOUSE BILL 781

My name is Redmond Clark. I am president of Asphalt Plus, a leading developer of markets for scrap tire rubber use in asphalt pavements. I have invested a 52-year career in developing functioning markets that change industrial and consumer waste products into valuable commodities while reducing the environmental footprint of global manufacturing processes.

Over the past 20 years, we have worked to develop the science, engineering and operational knowledge required to allow the use of modified ground scrap tires/chemically Engineered Crumb Rubber (ECR) in asphalt pavements. Those efforts have been successful. Since 2006, various state and federal agencies have successfully used scrap tires in their roads. More than half the US states now use ground tire rubber in their pavements, and many report a series of benefits on heavy traffic and lighter traffic roads:

- Heavy-duty traffic roads:
    - Meaningful reductions in cost
    - Higher levels of recyclables in pavement
    - Better traction for vehicles/safer, quieter roads
    - Significantly more sustainable road surfaces
- Lighter Duty Roads
    - Extension of road life
    - Potential reduction in pavement thickness
    - Higher levels of recyclables in pavement
    - Better traction for vehicles/safer, quieter roads
    - Significantly more sustainable road surfaces

Tire rubber represents an untapped engineering and environmental opportunity for public and private road owners. Advances in pavement technology make rubberized pavements an opportunity for Maryland.

At present, about half of US scrap tires are either burned for fuel or they are disposed in landfills. Maryland generates about 6.2 million scrap tires annually, and the state consumes about 6 million tons of asphalt mix annually. If the region's scrap tires currently going to incineration and disposal were used in asphalt mix designs, several benefits could accrue:

- A reduction in the life cycle cost of all pavements through lower up-front costs and/or extended pavement life.
- Safer, quieter roads and a reduction in vehicular accidents
- Environmental benefits, including:
    - Elimination of GHG emissions from burning 2 million tires/year and less disposal
    - Increased use of other recycled materials in pavements (like RAP)
    - Continued reuse of rubber when pavements are recycled.
    - Reduced repaving frequency (lower processing/use of materials)

We strongly support the goals of this legislation.

REDMOND CLARK, PhD
PRESIDENT, ASPHALT PLUS, LLC, BARRINGTON, IL
ENVIRONMENT AND TRANSPORTATION COMMITTEE WRITTEN TESTIMONY
REGARDING HOUSE BILL 781

THE STATE PAVEMENT SYSTEM

The road construction industry is a vital portion of the US economy. Roads are central to economic function, but they also create a number of environmental impacts, both locally and globally. Road maintenance/construction agencies have a shared mission: construction of safe, efficient and durable roads while minimizing the environmental impacts of construction and maintenance activities. The traffic volumes on each road are important drivers of the construction and maintenance needs of each roadway. The vehicles that use these roads operate on vulcanized rubber tires, and the wear rate of those tires is directly impacted by the condition of the road surface. Roads and scrap tires are connected elements in our transportation system.

In order to make roads last longer, road agencies design roads based on the amount and type of traffic expected on each pavement. Heavy traffic roads with lots of truck traffic typically include concrete and asphalt surfaces that have been modified to withstand the extra stress. These heavy traffic roads include interstate highways and major arterials throughout the state. Modified asphalt pavements (heavy traffic roads) represent about 10-20% of the state's asphalt production.

When asphalt roads are designed for heavy traffic, they are typically modified with various kinds of rubber. Two kinds of rubber are most commonly used as strengthening agents: synthetic rubber polymers added to the liquid asphalt cement (un-vulcanized, manufactured synthetic rubber) and modified ground scrap tire rubber (vulcanized ground tire rubber or GTR) added to the binder ("wet process") or the asphalt mix ("dry process"). Although they adds cost to those roads, rubber additions to the pavement extend pavement life and promote smoother, quieter rides. At this time, heavy traffic modified asphalt roads in Maryland utilize rubber polymers, not scrap tire rubber.

Maryland has a second, larger population of asphalt roads that carry low to moderate traffic volumes. These would include state, county and city/town non-arterial roads. These pavements are typically not designed with modified asphalt. Although modification can increase road life, it is not commonly used in medium and light traffic roads because modification adds cost, and most road paving and maintenance budgets are limited.

BENEFITS OF SCRAP TIRE RUBBER USE IN MARYLAND PAVEMENTS

Heavy Traffic Roads

Decades of research and field testing indicates that the addition of scrap tire rubber in what is called "dry process" mix modification of asphalt pavements produces roads that behave like polymer pavements, but at a discount of approximately $3-5 per mix ton. That number will vary somewhat based on oil and polymer market prices. Maryland consumes about 6 million tons of

asphalt mix annually, although amounts will vary based on economic and Trust Fund conditions. Approximately 10-20% of those pavements are modified with polymers each year. At a savings of $3 per mix ton, changing from polymers to rubber in Maryland would save the state, counties, cities and towns an estimated $2-$4 million annually. Annual savings will vary somewhat based on market conditions for oil and petrochemicals.

Lighter Traffic Roads

Rubber asphalt research also indicates that the use of crumb rubber modification in medium and light-traffic roads can extend the life of the roads. Published data comparing rubber, polymer and unmodified pavements indicates that the addition of dry process Engineered Crumb Rubber (ECR) to the asphalt mix or polymers added to the asphalt binder can extend the mean life of those pavements from 35-50% and beyond. Net of the cost of modification, the net present value of extended pavement life savings can exceed $10 per mix ton. In addition, modification of hot mix can also allow for the reduction of pavement thickness. Although caution should be used in projecting performance improvements in all pavements, a conservative estimate of the savings from the use of scrap tire rubber in medium and light-duty roads could approach $50 Million annually if fully deployed in the state.

All Roads

The addition of GTR products to asphalt roads offers some important ancillary benefits:

- The addition of GTR to roadways improves wet weather skid resistance by up to 10-15%. Better skid resistance means fewer accidents.
- The addition of GTR in an asphalt pavement impedes crack formation. Since the addition of materials like recycled asphalt pavement (RAP) and recycled asphalt shingles (RAS) tends to encourage cracking, GTR additions can permit elevated additions of recyclables without an increase in pavement cracking risk.
- GTR/asphalt roads are quiet pavements, usually much quieter than concrete pavements or old, worn pavements of any design.
- When GTR is used in asphalt pavements, each grain is coated with asphalt binder, thus all but eliminating any chemical or particulate releases from the tire rubber grains.
- Extension of road life is one of the key goals in the design of sustainable, low carbon roads. If the repair or reconstruction of a road can be delayed for years, it means less mining (quarried aggregate and oil), less material movement over time and less processing over time. All of those factors contribute to a greener economy.

MARYLAND SCRAP TIRE MANAGEMENT

Maryland generates over 6 million scrap tires per year that are collected by a number of in and out-of-state scrap tire recycling companies (MDE Annual Scrap Tire Report, 2023). Maryland reports a high recycling rate for tires managed inside Maryland, but a sizable fraction of Maryland tires get exported. In order to understand the environmental impacts of tire management in the region, it may be more enlightening to consider regional recycling numbers, especially since the environment does not recognize political borders.

Using national figures assembled by the US Tire Manufacturing Association (USTMA, Scrap Tire Report: 2021), about 34% of the US scrap tires are burned for energy recovery and at least 17% are disposed in landfills. Burning tires create roughly 2 lbs. of CO_2 per pound of rubber burned. If those metrics are applied to the MD scrap tire stream, approximately 1 million MD tires will end up in landfills annually and approximately 2.1 million MD tires will be burned for energy recovery (directly as fuel or indirectly in pyrolysis). Burning 2.1 million scrap tires each year would produce approximately 38,000 tons of CO_2 annually.

To the best of my knowledge, none of the scrap tires generated in Maryland are used directly in paving processes. If such a market could be created, it could divert tires that might otherwise be burned or discarded in landfills.

SPECIFICATION AND IMPLEMENTATION

If the proposed legislation is enacted, immediate adoption of rubber as an asphalt modifier is not workable unless attention is paid to the necessary phases of technology implementation. Those phases include:

1. Preparation of a specification with MDOT.
   MDOT is best equipped to provide a timeline for that process, which can occur during the evaluation of demonstration projects. It is my understanding that MDOT is already in the process of preparing a provisional specification for demonstration projects. In other states, specification preparation and approval is in the range of a six month process. Because the use of rubber in asphalt is a process that has been vetted by other states, much of the critical engineering information necessary for specification preparation is already assembled.
2. Demonstration pavements
   Since MDOT has not placed a material number of tire rubber-modified pavements in the last 25 years, MDOT will want to evaluate a few test/demonstration pavements before releasing a full specification. Through the use of a provisional specification and a value engineering process, MDOT can phase in the rate of early technology deployment while the agency accumulates the last information necessary for a full, state-wide specification.
3. Construction of a supply chain
   Individual asphalt plants will either have to obtain or repurpose equipment to feed ECR into their mix production process. Asphalt producers will be more likely to invest in repurposed or new equipment when they see evidence of opportunity (market demand and margin) and bid pricing advantages. There are creative financial and funding tools that can be applied to accelerate this process. These tools might include support from the State Used Tire Cleanup and Recycling Fund, but it will require time to move the producer market forward. As a stopgap measure, feeder machines are available for rent from various companies. This allows the producer an opportunity to work with ECR modification before making a commitment to purchase capital equipment.
4. Training of the engineering community

Training on new technology application and operation will be required for a number of different groups:

- Specifying and regulatory communities: on-line and in-person training is available to support this effort.
- Plant operations personnel: training is helpful during the first use of the technology, and ECR providers typically offer those services.
- Plant quality engineers: training is helpful during the first use of the technology, and ECR providers typically offer those services.
- Field regulatory personnel: on-line and in-person training is available to support this effort.

Once a full specification is put in place at the state level, most road owners in the state will adopt it by default, as most road owners rely on MDOT specifications for their road construction and maintenance needs.

SUMMARY ECONOMIC AND ENVIRONMENTAL BENEFITS WITH TIRE RUBBER IN MARYLAND ASPHALT PAVEMENTS

The use of rubber in asphalt pavements has become more common throughout the US, and as a result, earlier engineering uncertainties have been successfully addressed. Although (much) earlier additions of tire rubber to asphalt binders did not work well and were not economically competitive (Pre 1995), dry process rubber mix modification now offers both the performance and economics that permit the use of recycled tire rubber in asphalt a viable tool for the paving industry. If that technology is adopted in Maryland, the potential benefits should include:

- Economic Benefits
    - Heavy traffic roads: annual savings in several million dollars in modification costs when fully deployed.
    - Lighter traffic roads: multimillion dollar savings due to extended road life and/or reduced pavement thickness when fully deployed.
    - Increased recyclable materials in mix designs (lower cost mixes)
    - A 5-15% improvement in pavement skid resistance (fewer accidents)
- Environmental Benefits
    - Pavement life extension: less road reconstruction and mining/processing/transport of construction materials.
    - Increased use of other recycled materials (RAP)
    - Future use of recycled tire rubber/beneficiation from the recycling of asphalt rubber in recycled asphalt pavements.
    - Reduced road noise
    - Reduction of GHG emissions and a host of related environmental and impact reductions (See Table 1).

Impact category	Impact of Rubberized road with respect to Conventional road
Climate change (kg CO_2 eq)	-34%
Ozone depletion (kg CFC-11 eq)	-38%
Human toxicity (kg 1,4-DB eq)	-27%
Photochemical oxidant form. (kg NMVOC eq)	-34%
Terrestrial acidification (kg SO_2 eq)	-35%
Freshwater eutrophication (kg P eq)	-20%
Terrestrial ecotoxicity (kg 1,4-DB eq)	-37%
Freshwater ecotoxicity (kg 1,4-DB eq)	-26%
Water depletion (m^3)	-30%
Fossil depletion (kg oil eq)	-37%

Table 1: Ancillary Environmental Benefits Caused by Rubber Modification of Standard Asphalt Pavements

SUMMARY COMMENTS

The contract held between MDOT and the public is and has been straightforward, and it includes the construction and maintenance of safe and cost-effective state-owned roads throughout the state. By extension, the MDOT specifications passed down to the county, city and town level influence the same safe and cost-effective roads to every level of government. With the growing pressures on the regional and global environment, that contract is evolving. US FHWA, The US EPA and national paving organizations all recognize that the paving industry has to include sustainable, low-carbon roads as a key goal in future pavement designs and construction projects.

For asphalt production and asphalt roads, there will be a number of process adjustments that can have an important impact on environmental impacts:

- Keeping aggregate stockpiles dry,
- Reduced haul distances between the quarries and the plant,
- Use of more recyclable materials in mix designs,
- Reduced asphalt binder use, and
- Extension of pavement life

Taken together, these improvements can reduce the environmental footprint of asphalt by more than 60%. The single greatest environmental impact reduction will come from extensions in road life.

Inclusion of rubber modifiers in asphalt will materially extend pavement life. The use of recycled scrap tire crumb rubber as a modifier is more cost-effective than traditional methods of rubber polymer modification. As such, the addition of scrap tire rubber as an asphalt mix modifier should be an important tool available to contractors through MDOT specifications.

HB 781_MTBMA_UNF.pdf
Uploaded by: Michael Sakata
Position: UNF

February 22, 2024

Delegate Marc Korman, Chair
House Environment and Transportation Committee
251 House Office Building
Annapolis, MD 21401

RE: HB 781 – UNFAVORABLE – Transportation – State Highways – Rubber Modified Asphalt

Dear Chair Korman and Members of the Committee:

The Maryland Transportation Builders and Materials Association ("MTBMA") has been and continues to serve as the voice for Maryland's construction transportation industry since 1932. Our association is comprised of 200 members. MTBMA encourages, develops, and protects the prestige of the transportation construction and materials industry in Maryland by establishing and maintaining respected relationships with federal, state, and local public officials. We proactively work with regulatory agencies and governing bodies to represent the interests of the transportation industry and advocate for adequate state and federal funding for Maryland's multimodal transportation system.

House Bill 781 requires the State Highway Administration (SHA) to use rubber modified asphalt in the construction, reconstruction and repair of all state highways. SHA shall consider the use of various types of rubber modified asphalt while planning, including those produced by the wet process and the dry process.

Respectfully, MTBMA must oppose this legislation. Our Association has always and continues to maintain a position that legislatively mandated engineering and material selection decisions are improper and those decisions must be left up to the experts to decide. Instead, we recommend allowing SHA, the asphalt industry, and material suppliers to partner together to arrive at a solution that helps the environment without sacrificing performance. This bill limits future opportunities to introduce other environmentally beneficial materials as well as gain improved efficiency with our plant energy consumption.

We appreciate you taking the time to consider our request for an **UNFAVORABLE** report on House Bill 781.

Thank you,

Michael Sakata
President and CEO
Maryland Transportation Builders and Materials Association

HB 781_MAA_UNF.pdf
Uploaded by: Tim Smith
Position: UNF

MARYLAND ASPHALT ASSOCIATION
SINCE 1954

February 22, 2024

Delegate Marc Korman, Chair
House Environment and Transportation Committee
251 House Office Building
Annapolis, MD 21401

RE: HB 781 – UNFAVORABLE – Transportation – State Highways – Rubber Modified Asphalt

Dear Chair Korman and Members of the Committee:

The Maryland Asphalt Association (MAA) is comprised of 19 producer members representing more than 48 production facilities, 25 contractor members, 25 consulting engineer firms and 41 other associate members. MAA works proactively with regulatory agencies to represent the interests of the asphalt industry both in the writing and interpretation of state and federal regulations that may affect our members. We also advocate for adequate state and federal funding for Maryland's multimodal transportation system.

House Bill 781 requires the State Highway Administration (SHA) to use rubber modified asphalt in the construction, reconstruction and repair of all state highways. SHA shall consider the use of various types of rubber modified asphalt while planning, including those produced by the wet process and the dry process.

Respectfully, MAA must oppose this legislation. Our Association has always and continues to maintain a position that legislatively mandated engineering and material selection decisions are improper and those decisions must be left up to the experts to decide. Instead, we recommend allowing SHA, the asphalt industry, and material suppliers to partner together to arrive at a solution that helps the environment without sacrificing performance. This bill limits future opportunities to introduce other environmentally beneficial materials as well as gain improved efficiency with our plant energy consumption.

We appreciate you taking the time to consider our request for an **UNFAVORABLE** report on House Bill 781.

Sincerely,

Tim E. Smith. P.E.
President
Maryland Asphalt Association

Written Testimony in Opposition to HB0781 – State

Uploaded by: Tom Taylor

Position: UNF

Written Testimony in Opposition to HB0781 – State Highways – Rubber Modified Asphalt

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February 22, 2024

My name is Tom Taylor. I am submitting testimony as an individual, and I am writing in opposition to HB 0781.

About this bill: Requiring the State Highway Administration to use rubber modified asphalt in the construction, reconstruction, and repair of State highways; and requiring the Administration to consider different types of rubber modified asphalt, including those produced by the wet process and the dry process, when planning for the construction, reconstruction, and repair of State highways.

I am opposing this legislation because the rubber added to the asphalt contains chemical and heavy metals that are toxic to people and to wildlife. These particles are the No. 1 microplastic contaminant of water, and recent research has found that they kill 99 per cent of migrating coho salmon. Their use in asphalt adds to water and air pollution that is already caused by particles of tire wear on our roadways. Also, the addition of these particles makes asphalt less recyclable, or even non-recyclable.

While trying to repurpose materials is often a good thing, it is important to fully investigate each material, be attentive to other possible negative impacts, and be selective in our use of repurposing to make sure that it indeed offers a positive effect.

I urge an unfavorable report on HB0781. Thank you for considering my views.

Sincerely,

Tom Taylor
11-G Laurel Hill Road
Greenbelt, MD 20770
301-513-9524

HB0781 - SHA - Rubber Modified Asphalt_LOC_FINAL.p
Uploaded by: Patricia Westervelt
Position: INFO

February 22, 2024

The Honorable Marc Korman
Chair, House Environment and Transportation Committee
251 House Office Building
Annapolis MD 21401

RE: Letter of Concern – House Bill 781 – Transportation – State Highways – Rubber Modified Asphalt

Dear Chair Korman and Committee Members:

The Maryland Department of Transportation (MDOT) offers the following letter of concern for the Committee's consideration on House Bill 781.

House Bill 781 establishes a mandate that the State Highway Administration (SHA) use rubber modified asphalt (RMA) in the construction, reconstruction, and repair of State highways. As defined, RMA means an alternative road pavement material produced by mixing crumb rubber[1] with conventional asphalt. The bill further requires SHA to (1) consider the use of various types of RMA when planning the construction, reconstruction, and repair of State highways, and (2) adopt regulations to carry out these requirements.

The SHA notes that higher energy use and environmental impacts tied to production have been mentioned as other disadvantages of RMA. However, some research suggests there are methodologies to reduce these impacts based on the production methods. Finally, assessing how RMA wears down over time and the service needs of RMA is critical to assessing the cost and environmental impacts of this product; this factor may depend on the conditions where the product is applied.

Additionally, research indicates that use of RMA is more expensive than conventional asphalt by an estimated 10 to 30 percent. As such, SHA will be required to reduce its paving projects to reflect increased costs or redirect funds from other capital projects to meet the higher paving costs. However, SHA notes that some studies suggest these initial costs may be offset by lower maintenance costs, and that application plays a role in the total cost of a project.

Finally, research studies indicate certain technical constructability challenges with the use of RMA. Developing RMA requires a higher mixing temperature and a longer mixing time; RMA cannot, in some cases, be stored in a stable manner; and vulcanizing the crumb rubber requires advanced techniques to break down into devulcanized rubber for it to be properly incorporated.

[1] As defined in the bill, "crumb rubber" means the granules that result from grinding up whole scrap tires from automobiles, trucks, and buses.

While advanced supplier techniques may be feasible to mitigate these challenges, SHA is concerned that not all Maryland asphalt suppliers and installers will have these capabilities, exposing SHA to a less competitive asphalt market and potential quality risks.

SHA notes that the Federal Highway Administration *encourages*[2] the use of waste tire rubber in engineering applications, including asphalt paving, where it is both cost effective and can be properly engineered. Generally, SHA is authorized to use any material for paving, so long as it meets required specifications for use. However, as drafted, SHA would be required to utilize RMA and precluded from utilizing competing sustainability products (e.g., fly ash byproducts, recycled pavement millings, warm mix technologies, etc.) along with new and potentially innovative technologies moving forward.

Given the unsettled nature of the benefits and detriments to RMA use in paving applications, SHA believes that further research on applications is needed before establishing requirements as to RMA use. SHA is committed to staying current on the latest pavement research and will consider future opportunities for RMA use.

The Maryland Department of Transportation respectfully requests the Committee consider this information when deliberating House Bill 781.

Sincerely,

Matthew Mickler
Deputy Director (Acting)
Office of Policy and Research
Maryland State Highway Administration
410-545-5629

Pilar Helm
Director
Office of Government Affairs
Maryland Department of Transportation
410-865-1090

[2] Notably, the Intermodal Surface Transportation Efficiency Act (ISTEA) originally required that states use quantities of asphalt pavement containing recycled rubber; however, this was subsequently repealed by the NHS Designation Act of 1995, including the associated penalties, in favor of a standard requiring research and development of tests on the use of RMA.