

Road Map to Sustainable Pavements

AMAP ADVISORY COMMITTEE QUARTERLY TECH BRIEF

Contributions: National Asphalt Pavement Association, Asphalt Institute, National Center for Asphalt Technologies, and Pavement Preservation & Recycling Alliance



Association of Modified Asphalt Producers

AMAP Advisory Committee

AMAP has an Advisory Committee comprised of members from several aspects of the industry. The Committee consists of a Roofing, Paving, Agency Subcommittee (SC). The Committee's primary goal is to maintain open communication between AMAP and the rest of the industry, offering education and insights on modified asphalt, from its definition to its usage and performance.

PAVING & AGENCY SC

The Paving SC consists of representatives from AI, NAPA, PPRA, & NCAT. The Agency SC consists of representatives from DOTs in each region, the Asphalt Pavement Alliance (APA), and the American Public Works Association (APWA).

GET INVOLVED

Find out how to get involved! Contact us at info@modifiedasphalt.org.

this issue

Whether you are new to Sustainability or a veteran, this issue will give you an overview of the State-of-the-State for Sustainability in the asphalt paving industry.

EPDs and Carbon Reduction: The Next Big Shift in Asphalt

One of the most significant collective movements in the asphalt paving industry since the transition from Marshall to Superpave and Balanced Mix Design (BMD) as well as from Viscosity grading to Performance Grading the asphalt binders, is currently underway. This movement is the introduction of Environmental Product Declarations (EPDs) and consideration of embodied carbon in pavement design, procurement, project delivery, and maintenance decisions.

Similar to nutrition labels for food products, EPDs provide details about the environmental impacts of construction products and materials.

The ultimate long-term goal is to reduce the carbon emissions involved with the materials and processes necessary for achieving cost effective, viable and sustainable pavements, thus reducing the Global Warming Potential (GWP).

The Road Forward is the National Asphalt Pavement Association's (NAPA) vision for achieving net zero carbon emissions for the asphalt pavement industry.

On this industry wide journey, we have not yet ventured beyond the front gates of our asphalt mix plants. The reason for this is that the current EPD analysis process (called a Life Cycle Assessment or LCA) is only being applied to the materials and "Materials Production" process used for paving. This is known as "cradle to gate," meaning before the asphalt mixtures leave the mix producer's front gate.

Multiple efforts are currently underway, including the FHWA Climate Challenge and the NAPA-led initiative funded by the EPA Construction Materials and Product Grant Program, to refine datasets on construction impacts, define maintenance and rehabilitation scenarios, conduct LCAs to inform flexible pavement PCRs, and account for end-of-life structural capacity.

Meanwhile, AEMA, AMAP, and ARRA are developing LCAs and PCRs for emulsions, asphalt additives, and asphalt recycling processes, respectively.

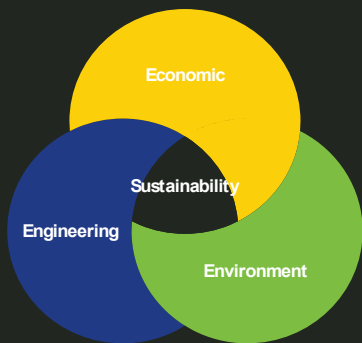
While the EPD analysis process for pavement mixtures has made significant progress over the past 5-6 years, we still have a long way to go to achieve full "Cradle-to-Grave" Life Cycle Analysis,



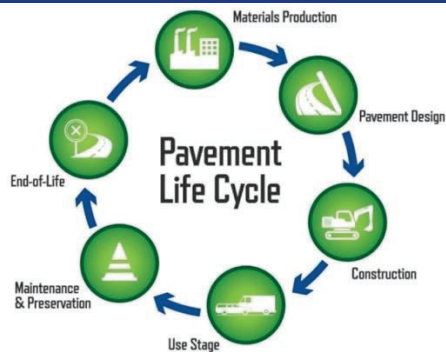
Don't Miss Our Next Issue

In this issue we begin the journey of describing each of the Phases in the Pavement Life Cycle.

Further we will start to tie the important balance of Sustainability, Performance, and Economics.



Graphic credit: Randy West, "Asphalt Mix Design of the Future", Distinguished Lecture Series for Arizona Pavement & Materials Conference. September 17, 2024.



Present Statuses for Challenges:

- The path forward had been identified
- Ongoing efforts are in progress to address and find solutions

which is essential for creating sustainable pavements with Net Zero Carbon Emissions. This will require strong coordination and teamwork among the working groups developing the building blocks for a comprehensive Global Warming Potential (GWP) assessment of asphalt pavements. However, significant advances are expected in the next 12-24 months.

AI (Asphalt Institute)

AI formed an EPD Task Force in 2022 to develop more representative EPDs for the liquid asphalt component of asphalt mixtures. This task force selected an independent program operator and life cycle assessment consultant. The objective was to update the existing cradle to gate LCA for asphalt binder that would be in accordance with the first-ever Product Category Rule and eventually support an Environmental Product Declaration (EPD) tool. Within the next 12 months, AI should have critically reviewed updated LCA, PCR and an EPD tool for asphalt binder manufacturers to develop context-specific EPDs.

AMAP (Association of Modified Asphalt Producers)

AMAP formed an EPD Task Force in 2023 to develop representative EPDs for any additives that might be added to the liquid asphalt binder (i.e. polymers, recycled rubber or recycled plastic, recycling agents, rejuvenators, etc.). Initial EPD results from this effort expected during 2025.

NAPA (National Asphalt Pavement Association)

NAPA's Eco-Label EPD program, launched in 2017, will improve in accuracy as more representative EPD data for asphalt mixture constituents (e.g., aggregate, binder,

additives, and recycled materials) become available. Ongoing benchmarking will ensure fair GWP thresholds for "Buy-Clean" procurement. Collaboration with State DOTs will help create benchmarks tailored to their specifications, while future benchmarks will balance GWP with performance, encouraging the use of high-performance materials with lower overall life cycle emissions.

NCAT (National Center for Asphalt Technology)

NCAT advocates using BMD to better assess the resistance of asphalt paving mixtures to common distresses and other technologies such as perpetual pavement design to extend pavement performance and achieve greater sustainability of asphalt pavements.

AEMA (Asphalt Emulsion Manufacturers Association)

A 2023 cradle-to-gate LCA study, commissioned by AEMA, analyzed average asphalt emulsion products used in paving applications to identify key contributors to environmental impacts. These findings are now guiding a working group in developing product category rules (PCR), which will enable the publication of EPDs. The project is expected to be completed by 2025.

Summary

While achieving cost effective yet sustainable pavements is the asphalt pavement industry's goal, the path to understanding how we will get there will involve improving pavement performance through the implementation and use of Balanced Mix Design (BMD).

There will be several hurdles along this path, but strategies toward achieving this goal are constantly being made and evaluated. Stay tuned as we continue to discuss these options.

