



ASPHALT | INNOVATE | ENLIGHTEN | IMPLEMENT



AIEI NEWSLETTER | NOVEMBER 2024

QUARTER THREE

MESSAGE FROM THE PROGRAM MANAGER

Advancing Innovations for Low-Carbon Asphalt Technologies

The increased focus on environmental sustainability, particularly from a cradle-to-gate perspective, has generated significant interest among both users and producers in exploring alternative and innovative asphalt technologies. This shift reflects a broader commitment to reducing the environmental impact of transportation materials and aligns with global efforts to create more sustainable infrastructure.

On March 12, 2024, the Federal Highway Administration (FHWA) announced \$2 billion in funding to support low carbon transportation materials aimed at reducing embodied greenhouse gas emissions. As part of this initiative, the FHWA's Low Carbon Transportation Materials (LCTM) Program provides funding to incentivize the use of asphalt mixtures (among others) that demonstrate significantly reduced embodied carbon emissions in transportation projects. It should be noted that the LCTM program only considers qualified materials that meet specific, established thresholds for low carbon emissions for funding eligibility. In contrast, simply using "lower" carbon transportation materials—which refer to materials that produce less greenhouse gas emissions compared to their conventional counterparts—may not qualify for funding under this program.

One of the key areas of focus is the integration of recycled materials into asphalt mixtures. By incorporating reclaimed asphalt pavement (RAP), recycled tire rubber, and other recycled components, the reliance on virgin materials is reduced. This not only conserves natural resources but also aims at reducing greenhouse gas emissions associated with material extraction, processing, and transportation.

The exploration of alternative binders, including bio-based and other innovative materials, represents another step towards sustainability. These binders have the potential to reduce the carbon footprint of asphalt production without jeopardizing the quality and performance of the asphalt mixture.

Accordingly, the adoption of Balanced Mix Design (BMD) method has gained traction as a critical framework to ensure that the implementation of alternative materials and practices does not compromise performance. BMD allows for the evaluation and optimization of asphalt mixtures by considering key performance criteria such as resistance to rutting, cracking, and overall durability. This approach ensures that asphalt mixtures are not only environmentally friendly but also durable and long-lasting, ultimately contributing to reduced maintenance needs and extended pavement service life. Stakeholders are increasingly recognizing the value of BMD in helping to achieve both environmental and performance goals.

The AIEI team is actively involved in several Statements of Work (SOWs) that focus on advancing the deployment of asphalt technologies in support of low carbon transportation materials. These efforts include the advancement of innovative binders for asphalt pavement systems, the dissemination of positive practices from state departments of transportation (DOTs) for using recycled materials, and the deployment of BMD through targeted workshops, peer exchanges, and technical assistance support. Collectively, these efforts are instrumental in advancing the AIEI's mission to promote sustainability and low-carbon solutions within the asphalt pavement area.



ELIE Y. HAJJ, PH.D.

WHAT'S NEW WITH BMD IMPLEMENTATION WORKING GROUP

The Balanced Mix Design Implementation Working Group (BMD IWG), established in April 2024, held its first in-person meeting at the National Asphalt Pavement Association (NAPA) offices in Greenbelt, Maryland, on August 21-22. The group consists of 23 subject matter experts from across the asphalt pavement industry, including federal, state, and local highway agencies, academia, and equipment suppliers, all dedicated to facilitating the exchange of knowledge, experience, and best practices regarding BMD implementation.

During the meeting, the group reviewed the national status of BMD implementation and discussed opportunities, knowledge gaps, and challenges in six focus areas: BMD framework, mix design guidance, RAP integration, aging protocols, sample preparation, and quality assurance. From these discussions, the group identified three top-priority work items to accelerate BMD adoption:

- Recommend revisions to AASHTO PP 105 to consolidate BMD approaches and provide guidance on mix design specification, approval, and production acceptance.
- Create an educational document on the significance and influence of asphalt aging for mixture cracking evaluation in BMD.
- Develop a one-page infographic explaining how common mix design strategies impact the engineering, economic, and environmental aspects of asphalt mixtures.

The group plans to publish these work items after receiving approval at its next meeting, scheduled for April 1-2, 2025, at the Heritage Research Group.



If you are interested in becoming a friend of the BMD IWG, we invite you to learn more and get involved. By joining, you will have access to valuable resources, expert discussions, and collaborative opportunities aimed at advancing the implementation of BMD. For more information and to become a friend, visit the BMD IWG resource page at this link: <https://www.asphaltpavement.org/expertise/engineering/resources/bmd-resource-guide/bmd-iwg>

YEAR 2 SCOPES OF WORK (SOW)

A.2.1 Jhony Habbounce | Documenting Practices for the Use of Recycling Agents in Asphalt Mixtures

Objective: *This project aims to support DOTs in the effective use of recycling agents (RAs) in asphalt mixtures containing recycled materials. It will synthesize lessons learned, best practices, and limitations related to RAs, building on previous studies, to guide DOTs in enhancing binder performance and longevity. Tasks include reviewing relevant literature, conducting virtual visits with DOTs using RAs, documenting implementation practices and challenges, and identifying strategies for improved RA integration. The work will include a Tech Brief, presentation, and webinar to share findings, with progress tracked through material engagement and training participation.*

B.1.2 Adam Hand | Tech Snapshot on Strategies for Using High RAP Mixtures

Objective: *This project aims to develop a Tech Snapshot to guide DOTs on implementing high RAP asphalt mixtures in a staged approach, focusing on sustainability and performance. It will distill key techniques from the FHWA-HIF-22-003 report, introduce the concept of Reclaimed Binder Availability (RBA), and outline methods like grade bumping and corrective optimum asphalt content (COAC) to enhance durability. The work includes condensing the FHWA report, adding RBA considerations, and developing a marketing 1-Pager. At its conclusion, a concise, accessible Tech Snapshot and marketing document to support DOTs in adopting high RAP mixtures.*

B.3.2 Jason Wielinski | CIR/CCPR Quality Assurance Workshop

Objective: *This project focuses on developing a workshop to improve Quality Assurance (QA) practices for Cold In-place Recycling (CIR) and Cold Central Plant Recycling (CCPR) asphalt pavement techniques. The workshop will cover key QA procedures, construction methods, and acceptance criteria, using real-world examples from multiple projects across multiple states. Initial tasks include reviewing current QA standards, gathering field demonstrations, and creating a pilot workshop for feedback. The final workshop will educate DOT and industry stakeholders, promoting standardized QA practices for CIR and CCPR pavements.*

C.1.5 Elie Hajj | Documenting Benefits of Balanced Mix Design of Asphalt Mixtures

Objective: *This project will develop a Tech Brief summarizing the benefits of implementing Balanced Mix Design (BMD) for asphalt mixtures, using case studies from state DOTs to showcase its advantages in pavement performance and cost savings. Key tasks include reviewing existing studies, identifying relevant case studies, gathering quantitative performance data, and preparing a Tech Brief. The work from this project will support wider BMD adoption by illustrating its effectiveness and helping standardize best practices across the industry.*

YEAR 2 SCOPES OF WORK (SOW)

C.1.6 Tom Harman | Asphalt Mixtures Balanced Mix Design Technical Refinement and Deployment Support with Peer Exchanges, Workshops, Technical Assistance to State DOTs, etc.

Objective: *This project will provide technical assistance to AASHTO COMP TS 2d in revising and maintaining BMD-related standards. The goal is to accelerate the review of research findings and propose standard revisions to support the balloting process. This ensures that relevant research and positive practices are promptly incorporated into BMD for timely implementation.*

C.4.1 Nam Tran | Quality Assurance Practices for Validation and Incentives

Objective: *This project will focus on two quality assurance (QA) efforts by supporting state DOTs and contractors in validating quality control (QC) data and implementing incentive programs effectively. It will compile information on validation processes and incentive programs from various states, analyzing advantages and drawbacks, particularly of the F-test and t-test methods for QC data. This work includes two Tech Briefs summarizing best practices for data validation and incentive programs, with supporting training materials, webinar, and one-pagers. These resources will assist DOTs in adopting practices that improve construction quality while balancing costs.*

C.5.2 Travis Walbeck | Thick Lift Paving

Objective: *This project will support DOTs and contractors in understanding and implementing thick lift paving, a method offering durability and cost efficiency, particularly valuable in rapid road repairs after natural disasters or where traffic interruptions have greater impacts. It will compile case studies, project data, and existing specifications, and develop training materials and technical resources to share best practices and benefits. The work will produce presentations, a video overview, Tech Briefs, and specification language examples for adoption by interested agencies.*

C.5.3 Amma Agbedor | Examples of State Practices for Improving Joint Performance

Objective: *This project aims to enhance the performance of asphalt pavement longitudinal joints (LJs), which are prone to early deterioration. Through literature review and virtual consultations with selected State DOTs, the study will document effective practices in specification, construction, and quality control to improve LJ durability. The project will provide a Tech Brief, training material, and a webinar to share findings and promote adoption of best practices. These resources will provide practical examples from DOTs that have successfully implemented innovations in LJ construction, contributing to longer-lasting pavements.*

UPCOMING PRESENTATIONS BY TEAM MEMBERS

a. Elie Hajj, Adam Hand (C.1)

2024 Nevada Asphalt Conference

October 30, 2024 | Las Vegas, NV

Recent Development of BMD

For conference details: <https://nvltap.com/2024-nevada-asphalt-conference/>

b. Elie Hajj, Randy West, Fan Yin, Tom Harman, Tim Aschenbrener, Derek Nener-Plante (C.1.3)

Mid-Atlantic Balanced Mix Design (BMD) Regional Peer Exchange

November 13 – 15, 2024 | Washington, DC

Participants are by invitation only

c. Mike Anderson (A.1.1)

SEAUPG

November 19 – 21, 2024 | Mobile, AL

Evolution of Binder Specifications

For conference details: <https://www.seaupg.net/>

d. Nam Tran (A.3.1)

SEAUPG

November 19 – 21, 2024 | Mobile, AL

Florida DOT 9.5mm OGFC with HiMA

For conference details: <https://www.seaupg.net/>

e. Tim Aschenbrener (C.3.1 / C.5.1)

Arizona Pavements and Materials Conference

November 19 – 21, 2024 | Tempe, AZ

Improving Density: Demonstration Projects and Related Specifications

For conference details: <https://pavement.engineering.asu.edu/>

f. Derek Nener-Plante (C.1)

Arizona Pavements and Materials Conference

November 19 – 21, 2024 | Tempe, AZ

Balanced Mixture Design

For conference details: <https://pavement.engineering.asu.edu/>

UPCOMING PRESENTATIONS BY TEAM MEMBERS

g. Elie Hajj, Tim Aschenbrener, Derek Nener-Plante (C.1.1)

FHWA Balanced Mix Design Workshop: Moving Forward with Implementation

December 5 – 6, 2024 | Harrisburg, PA

h. Elie Hajj, Tim Aschenbrener, Derek Nener-Plante (C.1.1)

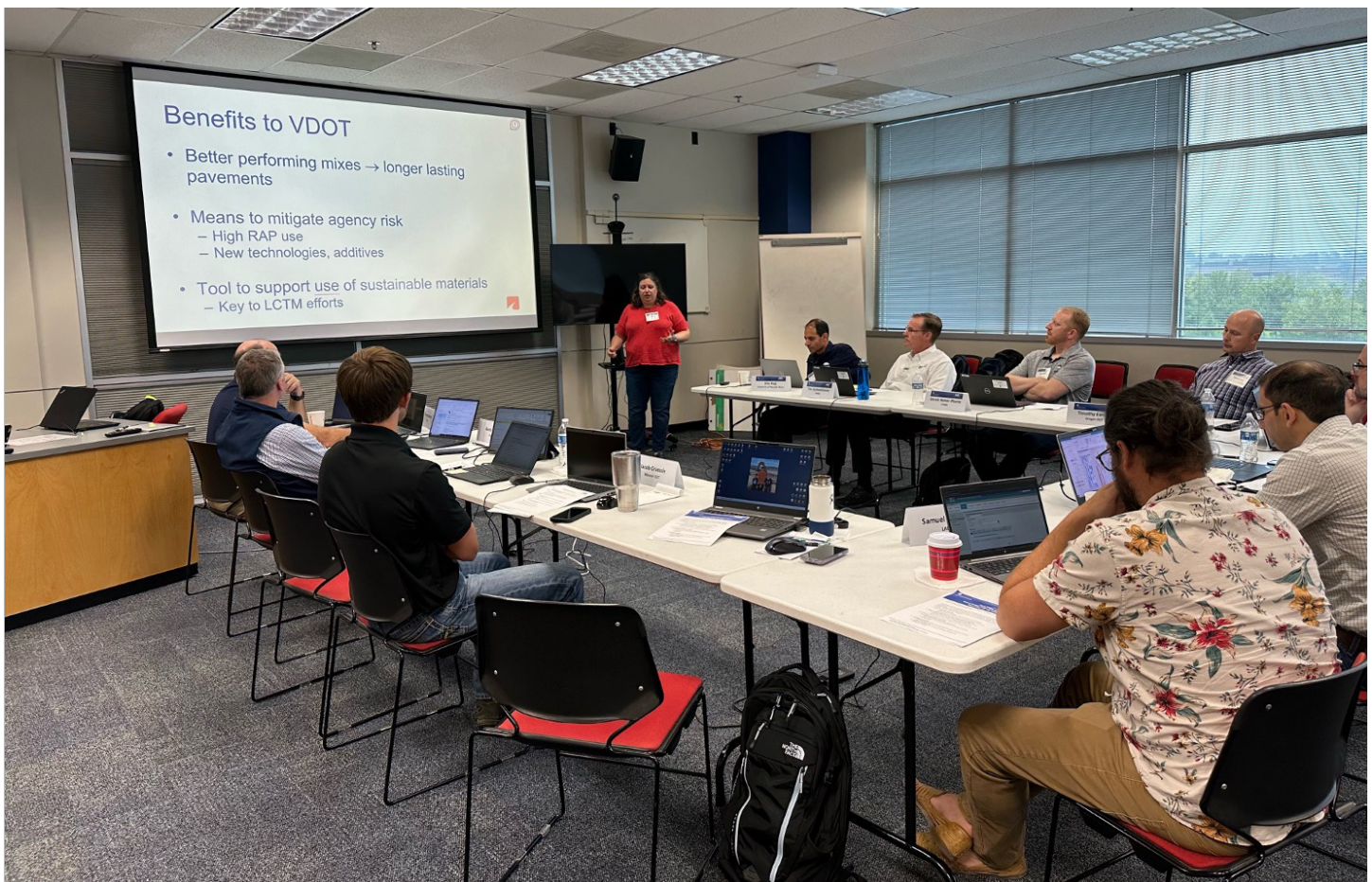
FHWA Balanced Mix Design Workshop: Moving Forward with Implementation

February 11 – 12, 2025 | Phoenix, AZ

i. Elie Hajj, Tim Aschenbrener, Derek Nener-Plante (C.1.1)

FHWA Balanced Mix Design Workshop: Moving Forward with Implementation

Week of February 24, 2025 | Billings, MT



FHWA Lead State Peer Exchange on Asphalt Balanced Mix Design in St. Louis, MO (from September 2024)

GET HYPED FOR TRB!

TRB is quickly approaching! Many of our AIEI team members will be at this annual event, and we have resources to get you ready!

- a. **Follow this link to review the E-Circular Day-to-Day Practices to Reduce the Carbon Footprint of Asphalt:** <https://onlinepubs.trb.org/onlinepubs/circulars/ec295.pdf>

Want to digest even more on this topic? Learn how to access the webinar by following this link:
https://www.nationalacademies.org/event/921_08-2024_trb-webinar-day-to-day-practices-to-reduce-the-carbon-footprint-of-asphalt

- b. **Follow this link to review the E-Circular on BMD Mixture Adjustments:**
<https://www.trb.org/Publications/Blurbs/183271.aspx>

Want to learn more? Follow this link to learn how to access the webinar:
<https://webinar.mytrb.org/Webinars/Details/1780>



UPCOMING TRB PRESENTATIONS BY TEAM MEMBERS

If you're attending TRB, be sure to catch our team members' presentations! While the presentations are not necessarily tied to the AIEI Program SOWs, many topics relate to the innovation areas of AIEI focus. Use the list below to identify dates and times that work with your schedule:

Jan. 5 (9:00 AM) • Tim Aschenbrener | FHWA

Don't Let Asphalt Recycling Scare the RAP Out of You

Setting the Stage for Using High Reclaimed Asphalt Pavement (RAP)

Jan. 5 (9:00 AM) • Fan Yin | NCAT

Don't Let Asphalt Recycling Scare the RAP Out of You

Corrected Optimum Asphalt Content (COAC) - Georgia and South Carolina Experiences

Jan 5 (1:30 PM) • Jhony Habbouche (Presider of the Workshop and Presenter) | AI

Revisiting and Refining Specification: What Have We Learned and What Are We Still Missing?

Revisiting and Refining Specification: Setting Up the Stage

Jan. 6 (8:00 AM) • Fan Yin | NCAT

Plastics in Asphalt: What Have We Learned So Far?

Using Recycled Plastics in Asphalt via the Dry Process: Lessons Learned from NCHRP and NCAT Test Track

Jan. 6 (8:00 AM) • Ilker Boz (Corresponding Author) | VTRC; Jhony Habbouche | Asphalt Institute; Stacey Diefenderfer | VTRC

Advancements in the Characterization of Rutting of Asphalt Mixtures

Assessing the Impact of Test Conditions on Indirect Tensile Test Results for Evaluating Rutting Potential in Asphalt Mixtures

Jan. 6 (1:30 PM) • Julissa Jasmin Larios Rodriguez (Corresponding Author) | UNR; Dario Batioja-Alvarez | FAA; Elie Hajj | UNR; Adam Hand | UNR; Peter Sebaaly | UNR; Scott Gibson | Regional Transportation Commission of Washoe County (NV)

Innovative Approaches to Sustainable Asphalt Mixtures

Enhancing Thermal Cracking Resistance in Asphalt: Evaluating RAP and WMA for BMD Implementation at Local Agency Level

Jan. 6 (1:30 PM) • Saqib Gulzar (Corresponding Author) | NCSU; Jaime Preciado | NCSU; Andrew Fried | NCDOT; Cassie Castorena | NCSU; Benjamin Shane Underwood | NCSU; Jhony Habbouche | Asphalt Institute; Ilker Boz | VTRC

Innovative Approaches to Sustainable Asphalt Mixtures

Cross-Scale Aging Dynamics of Recycled Asphalt Binder Blends and Mixtures Containing Recycling Agents

UPCOMING TRB PRESENTATIONS BY TEAM MEMBERS

Jan. 6 (1:30 PM) • Raquel Moraes (Corresponding Author) | NCAT; Maede Mottaghi | Arkema; Todd Tambling | Dow; CJ DuBois | Dow; Gayle King | GHK; Fan Yin | NCAT; Randy West | NCAT

Toward More Sustainable Asphalt Pavements

Evaluation of Fumes Emitted During Laboratory Methods of Incorporating Post-Consumer Recycled (PCR) Plastics in Asphalt Mixtures Via the Dry Process

Jan. 7 (8:00 AM) • Omar Othman (Corresponding Author) | NCSU; Benjamin Shane Underwood | NCSU; Jhony Habbouche | Asphalt Institute; Ilker Boz | VTRC

Asphalt Mixture Design and Performance

Mechanistic-Based Evaluation of Performance Thresholds for Balanced Mix Design Asphalt Surface Mixtures

Jan. 7 (8:00 AM) • Nicole Elias (Corresponding Author) | UNR; Elie Hajj | UNR; Thomas Bennert | Rutgers; Fujie Zhou | Texas A&M; Jon Epps | Texas A&M; Adam Hand | UNR; Kin Ming Chan | Texas A&M

Airfield Asphalt Pavements: Rutting Study and Tests, Use of Reclaimed Asphalt Pavement, Characterization of Cracking Potential, and Mechanism Analysis

Rutting Mechanical Tests for BMD of Airfield Asphalt Mixtures

Jan. 7 (8:00 AM) • Fan Yin (Corresponding Author) | NCAT; Matthew Kmetz | Auburn; David Timm | Auburn; Randy West | NCAT; Adam Taylor | NCAT

Recycled Materials and Sustainable Innovations in Asphalt Concrete

Laboratory and Field Performance Characterization of Recycled Plastic Modified Asphalt Mixtures at the NCAT Test Track

Jan. 7 (10:15 AM) • Rita Nasr (Corresponding Author) | UNR; Adam Hand | UNR; Elie Hajj | UNR; Peter Sebaaly | UNR; Gaylon Baumgardner | Ergon; Codrin Daranga | Paragon

Modeling the Many Factors Impacting Flexible Pavement Design

Evaluation of Tack Coat Bonding Performance in Flexible Pavements

Jan. 7 (10:15 AM) • Fan Yin (Corresponding Author) | NCAT; Anurag Anand | Transtec; Chen Chen | NCAT; Raquel Moraes | NCAT

Additives and Modifiers in Asphalt

Laboratory Performance Evaluation of OGFC Mixtures with Epoxy-modified versus SBS-modified Asphalt Binders

Jan. 7 (10:15 AM) • Maede Mottaghi | Arkema; Chen Chen (Corresponding Author) | NCAT; Fan Yin | NCAT; Randy West | NCAT; Adam Taylor | NCAT

Additives and Modifiers in Asphalt

Evaluation of Laboratory-produced RPM Asphalt Mixtures using Different Types of Recycled Plastics

Jan. 7 (10:15 AM) • Emilio Turbay | NCSU; Saqib Gulzr | NCSU; Cassie Castorena (Corresponding Author) | NCSU; Benjamin Shane Underwood | NCSU; Jhony Habbouche | Asphalt Institute; Ilker Boz | VTRC; Kazuo Kuchiishi | VTRC

Additives and Modifiers in Asphalt

Assessment of the Aging Sensitivity of High Reclaimed Asphalt Pavement Asphalt Mixtures with Recycling Agents

Jan. 7 (10:15 AM) • Wes Cooper (Corresponding Author) | Asphalt Institute; Jason Wielinski | Asphalt Institute; Kelly Senger | Illinois DOT

Asphalt Binders: Advances in Physical and Chemical Characterization

Examining ΔT_c : Variability Factors and Relationships with Other Rheological Shape Parameters

Jan. 8 (10:15 AM) • Bilin Tong (Corresponding Author) | VTech; Wenjiang Huang | VTech; Jhony Habbouche | Asphalt Institute; Ilker Boz | VTRC; Qing Guo | VTech; Stacey Diefenderfer | VTRC; Gerardo Flintsch | VTech

Applications of Machine Learning for Characterization and Evaluation of Asphalt Mixtures

Machine Learning – Based Prediction and Optimization of Balanced Mixtures Design (BMD) Performance Indices

Jan. 8 (3:45 PM) • Trung Tran | Auburn; Chen Chen (Corresponding Author) | NCAT; Nam Tran | NCAT; Fan Yin | NCAT

Pavement Material Behavior and Testing Methodologies

Developing a Durable Alternative Friction Course (AFC) for Suburban Environment in Florida

Jan. 8 (3:45 PM) • Raquel Moraes | NCAT; Fan Yin (Corresponding Author) | NCA; Chen Chen | NCAT; Nam Tran | NCAT

Asphalt Binders: Advances in Alternative Binders and Recycling Technology

Impact of Recycled Binder Availability on Rheological Properties of Extracted Asphalt Binders from RAP Mixtures



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CATCH US ONLINE!

Tech Briefs: REOB + PPA Overview

REOB: To access the FHWA-HIF-23-043 2023 Tech Brief:

https://www.fhwa.dot.gov/pavement/recycling/apiprt/HIF_Rerefined_Engine_Oil_Bottoms_Report.pdf

PPA: To access the FHWA-HIF-23-005 2023 Tech Brief:

https://www.fhwa.dot.gov/pavement/asphalt/HIF_Polyphosphoric_Acid_Modification.pdf

To access DAPT Webinars:

<https://www.unr.edu/wrsc/asphalt/webinars>

To access the Cutback Report:

<https://scholarwolf.unr.edu/items/ea201ac9-9e6b-4583-bc5d-d8bdb830c976>



**Connect with us on our LinkedIn page to keep current with
all team member events and program progress!**

For other cooperative agreements materials, information or technical assistance, please visit:

<https://www.fhwa.dot.gov/pavement/asphalt/coopmaterials/>

<https://www.unr.edu/wrsc/tools/asphalt>

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