

Posted: July 28, 2026 at 9:00 a.m.
MHTC Central Office
105 West Capitol
Jefferson City, Missouri 65101

Copies of this notice may be obtained by contacting:
Jennifer Jorgensen
Secretary to the Commission
(573) 751-3704

Missouri Highways and Transportation Commission Tentative Agenda

Department of Transportation Lab
Conference Room MLCN201E/W
1617 Missouri Boulevard
Jefferson City, MO

August 5, 2026

Open Meeting 12:00 p.m.

1. **Non-Action Item** – Commission Workshop: Research and Pavement Innovations.

Est. Time
12:00 – 1:30

Brandi Baldwin, State Construction and Materials Engineer, and Willie Johnson, Construction and Materials Liaison Engineer

RECESS.

Department of Transportation Building
105 West Capitol Avenue
Jefferson City, MO

Closed Meeting 3:00 p.m.

VOTE TO CLOSE MEETING.

Personnel administration regarding particular employees
Legal actions or attorney-client privileged communications

Section 610.021(3), (13) RSMo
Section 610.021(1) RSMo



Workshop



Commission Workshop: Research and Pavement Innovations

August 5, 2026

RUN OF SHOW

- 12:00 p.m. Call to Order – Chairman Erdman
- 12:03 p.m. Safety Minute – Brandi Baldwin, State Construction and Materials Engineer
- 12:05 p.m. Introductions and Overview – Eric Schroeter, Chief Engineer
- 12:10 p.m. [Research and Pavement Innovations](#)
- Brandi Baldwin, State Construction and Materials Engineer
 - Willie Johnson, Construction and Materials Liaison Engineer
- 12:35 p.m. [“Concrete Innovation” Presentation by American Concrete Pavement Association \(ACPA\)](#) – Arij Humeida, Executive Director
- 12:50 p.m. [“Asphalt Innovation” Presentation by Missouri Asphalt Pavement Association \(MAPA\)](#) – Dale Williams, Executive Director
- 1:05 p.m. [“Pavement Innovation: Progress Report from the Missouri Center for Transportation Innovation \(MCTI\)” by MCTI](#) – Glenn Washer, Director
- University of Missouri-Columbia (MU)
 - Missouri University of Science and Technology (S&T)
 - University of Missouri-St. Louis (UMSL)
 - University of Missouri-Kansas City (UMKC)
- 1:30 p.m. Concluding Remarks
- Ed Hassinger, Director
 - Warren Erdman, Chairman
- 1:35 p.m. Workshop Concludes

COMMISSION WORKSHOP: RESEARCH AND PAVEMENT INNOVATIONS

-- Presented by Brandi Baldwin, State Construction and Materials Engineer, 573-751-7455, and Willie Johnson, Construction and Materials Liaison Engineer, 573-522-5047.

ISSUE: The purpose of the workshop is to provide the Commission with an overview of MoDOT's research program, with emphasis on current pavement innovations moving from research evaluation to field implementation. The workshop allows Commissioners to hear directly from MoDOT's staff and key industry partners - American Concrete Pavement Association (ACPA), Missouri Asphalt Pavement Association (MAPA), and Missouri Center for Transportation Innovation (MCTI) - about the value, readiness, and real-world impact of these innovations.

RECOMMEND that the Commission:

- This item is for information only; no action is required.

DEPARTMENT VIEW:

- MoDOT's research program is designed to deliver practical, implementable solutions that improve safety, performance, and system value for Missourians. Current pavement initiatives are producing measurable, Missouri-specific benefits. Demonstrating these improvements directly to the Commission supports transparency, stewardship, and informed decision-making.
- The workshop is strengthened by participation from MCTI, MAPA, and ACPA, who provide essential perspectives on field deployment, contractor readiness, industry capabilities, and national benchmarking. Their involvement underscores that pavement innovation is a shared statewide effort, not just a laboratory exercise.
- The tour of the Central Office Lab allows Commissioners to see how staff test materials to ensure consistency and quality of the materials used on Missouri roadways.

OTHER VIEWS:

- External partners such as MAPA, ACPA, MCTI, and industry contractors typically endorse MoDOT's research model, which emphasizes practical outcomes. These collaborators appreciate the chance to engage in early discussions regarding MoDOT's needs, participate in joint project development, and contribute to technology transfer exchanges.

MHTC POLICY:

- Research and Planning – Research Agreements.

OTHER PERTINENT INFORMATION:

- Not applicable.

SOURCE OF FUNDING: State Planning and Research Funds.



AN INTRODUCTION TO RESEARCH & PAVEMENT INNOVATIONS AT MoDOT

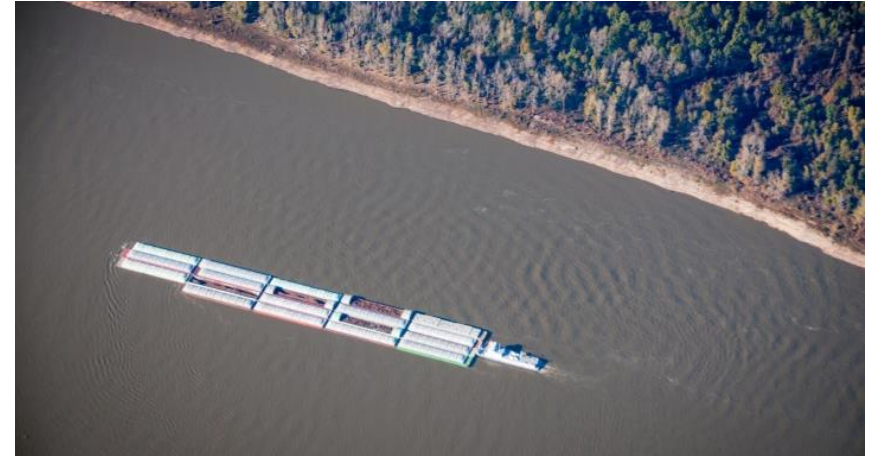
Brandi Baldwin, P.E. State Construction & Materials Engineer
Willie Johnson, P.E. Construction & Materials Liaison Engineer

RESEARCH TEAM

- Jen Harper, research director
 - Jen.harper@modot.mo.gov, 573-526-3636
- Brent Schulte, senior research analyst
- Jenni Hosey, senior research analyst
- Jake Bennett, research analyst
- Robin Survis, research librarian

WHAT WE DO

ALL THINGS TRANSPORTATION



WHY DOES MoDOT DO RESEARCH?

To find better and more efficient ways of providing transportation services



RESEARCH FOCUS

- Practical
- Implementable
- Makes a difference NOW



FEDERAL RESEARCH FUNDING

2% Takedown for Statewide Planning and Research
Federal fiscal year 2026: approximately \$25.5 million

75% to Transportation
Planning (max.)
\$19.1 million

25% to Research (min.)
\$6.4 million

Total Federal
Research
Funding
\$6.4 million

Total State
Research
Funding
\$1.1 million

Estimated MoDOT Research Funding SFY 2027 \$7.5 million

NCHRP
\$1.4M

TRB
\$230k

AASHTO
TSP
\$219k

FHWA
Pooled
Funds
\$1M

100% Federal Funding

Research Projects
= \$3.4M

Local Assistance
Programs = \$720k

Admin. = \$600k

RESEARCH AT A GLANCE

Average 35-40 contracts at any given time

Projects can range from \$50,000-\$500,000+

Research is performed by universities, consultants, or a partnership of the two

Research projects can be engineering or non-engineering

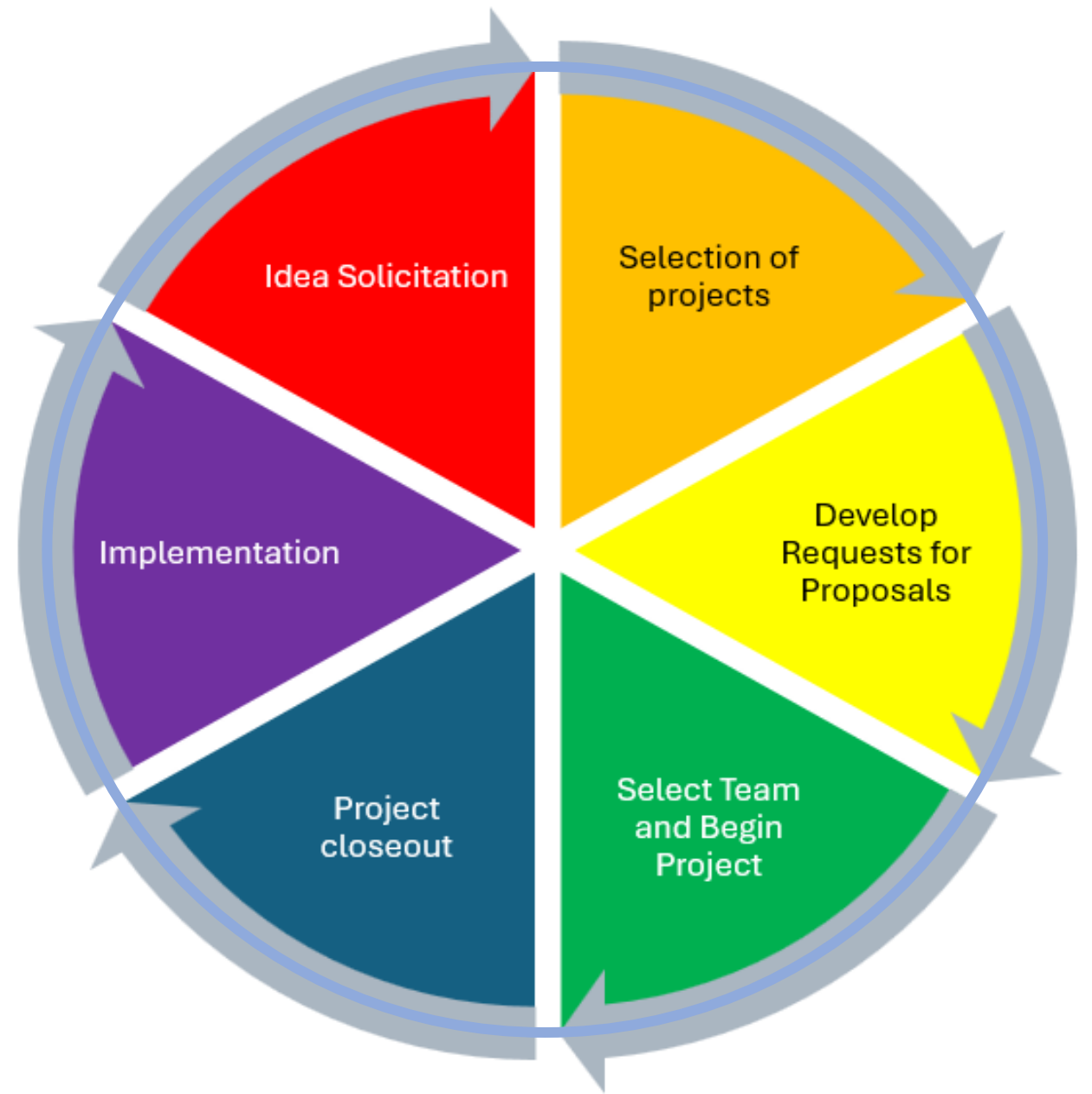
Research Section meets
with divisions and
districts

Call for ideas from
external partners

RESEARCH IDEA GENERATION

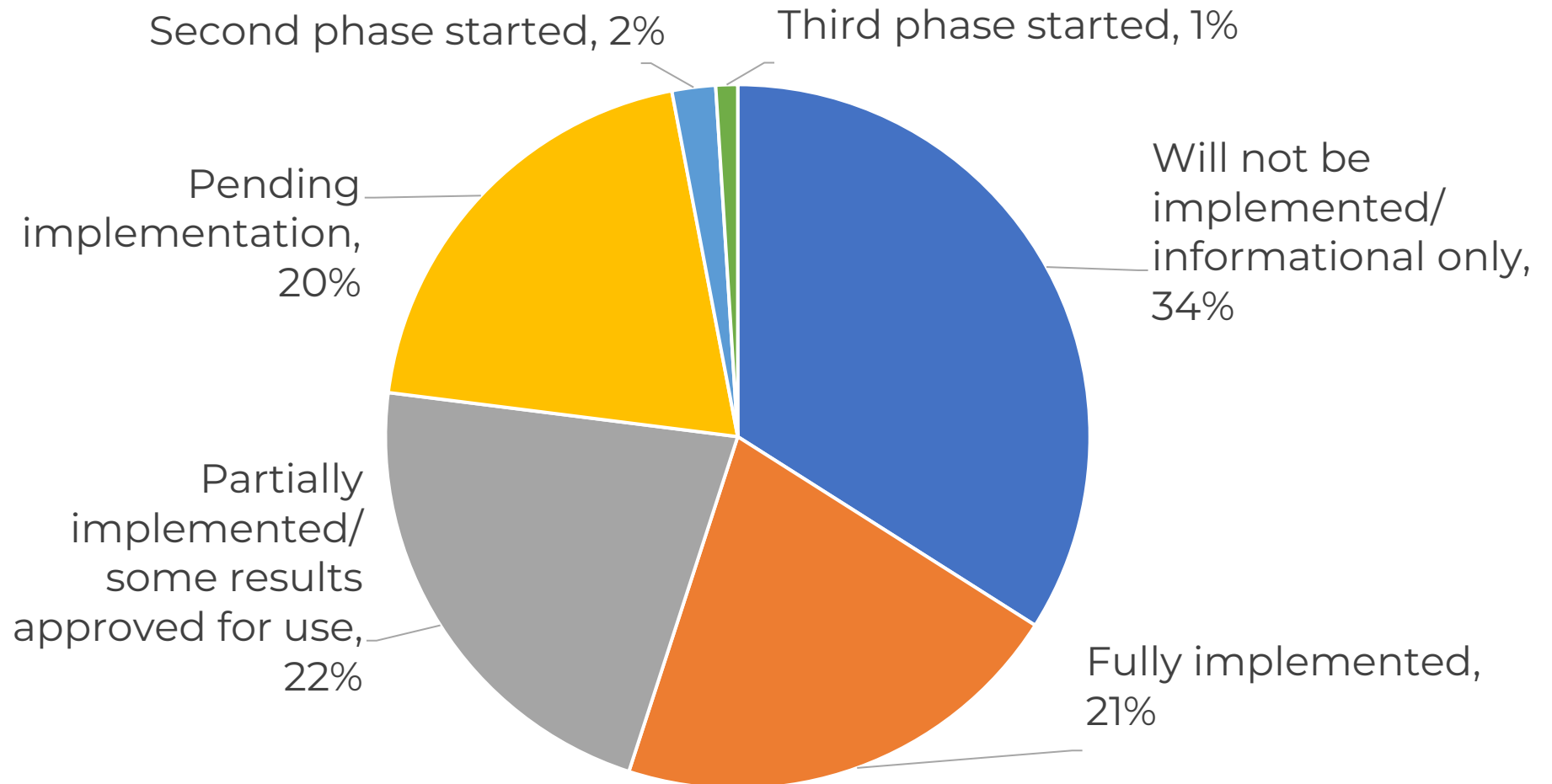
Host MoDOT Research
Needs Day

RESEARCH IS A CYCLE



RESEARCH IMPLEMENTATION

Status of All Projects Completed since 2020



PAVEMENT INNOVATIONS

MoDOT has
been using
local materials
for 100+ years



ASPHALT AND CONCRETE

AND THE ADDITIVES THAT HELP THEM WORK

- Smallest components of pavements
- Most expensive part
 - Work to find highest quality for lowest cost

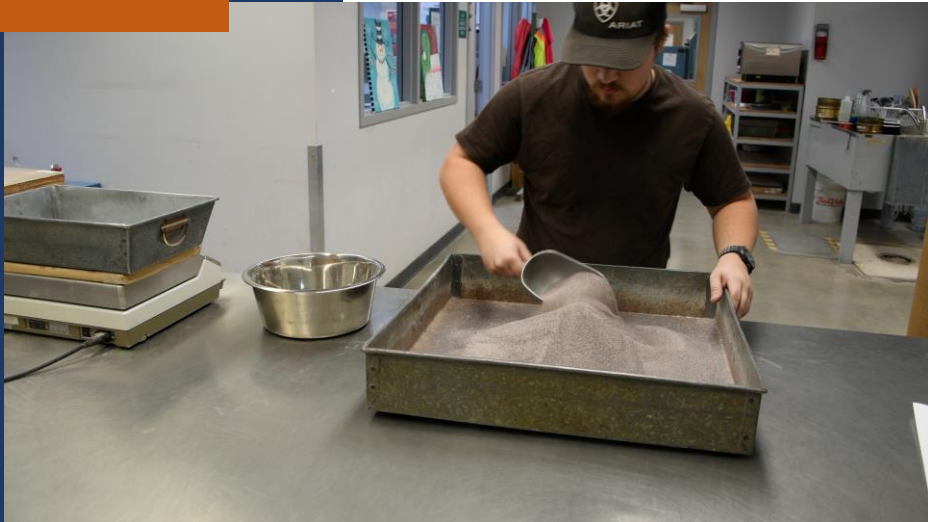


BALANCED MIX DESIGN (BMD)

IN ASPHALT PAVEMENTS



- Cracking resistance
- Rutting resistance
- Moisture susceptibility



BALANCED MIX DESIGN (BMD)

- 2018: began search for new performance tests
- Identified testing thresholds and specification language with Research
- Developed JSP (Job Special Provision) with industry
- 2020: early pilot projects
- Quarterly technical committee meetings for industry input
- Allowed industry option to include BMD in any job
- 2027: final version of updated spec to take effect

BALANCED MIX DESIGN

- Research underway to sample these new mixes to update calibration factors
- More accurately model failure thresholds on pavement designs
- HiMOD asphalt mixes on the radar



AASHTOWare Pavement MEDesign



- MEDesign recommends:
 - Pavement types
 - Thickness
- Nationwide program supported through AASHTO

CONCRETE PAVEMENTS

- Improved mix design – Performance Engineered Mixtures (PEM)
 - Improved aggregate structure allows for less cement
 - Better ways to test for durability



CONCRETE PAVEMENTS (PEM)



- Developed JSP for pilot projects with concrete paving industry
- Quarterly technical committee meetings to find appropriate testing methods and specification thresholds

CONCRETE PAVEMENTS (PEM)



- 2025: First project constructed using PEM
- Revised JSP available for 4-5 additional pilot projects to be constructed next year

OTHER CONCRETE IMPROVEMENTS

- Non-destructive testing
 - Strength
 - Thickness
 - Dowel bar alignment
- Use of sealers to protect joints from harsh winter chemicals



INNOVATIVE CONCRETE RESEARCH

- Compacted Concrete Pavement ('18-'21)
- Performance of Concrete Overlays ('19-'20)
- Rubber Powder to Improve Freeze/Thaw Resistance ('24-'26)





**“CONCRETE INNOVATION” PRESENTATION BY AMERICAN CONCRETE
PAVEMENT ASSOCIATION (ACPA)**

-- Presented by Arij Humeida, MO/KS ACPA Executive Director.

ISSUE: The American Concrete Pavement Association (ACPA) represents Missouri’s concrete industry, working in partnership with MoDOT, contractors, suppliers, consultants, and research institutions to advance pavement quality, innovation, and sustainability. They will provide the Commission with updates on current concrete pavement research, performance trends, and emerging innovations that affect MoDOT’s concrete pavement specifications, construction practices, and long-term pavement performance. ACPA’s presentation shows how MoDOT and industry partners collaborate to evaluate new technologies and improve pavement durability and reliability.

MoDOT STAFF POSITION:

- MoDOT values the partnership with ACPA and appreciates the association’s leadership in advancing concrete pavement quality, innovation, and sustainability. ACPA’s collaborative efforts support MoDOT’s mission.

WORKING TOGETHER: MODOT & ACPA

Advancing Quality Concrete Pavements Through Partnership

MO/KS Chapter, American Concrete Pavement Association

Arij Humeida , Executive Director

WHO WE ARE

- Mission:
 - To promote excellence in concrete pavement design, construction, and advocacy throughout Missouri and Kansas.
- Concrete paving contractors
- Concrete producers and suppliers
- Equipment manufacturers
- Engineering and industry partners

A SHARED GOAL

- Safe roadways
- Durable infrastructure
- Responsible stewardship of taxpayer dollars
- High-quality construction
- Long-term pavement performance

HOW WE WORK TOGETHER

- Technical discussions
- Training and education
- Specification implementation
- Industry feedback
- Research sharing
- Quality initiatives
- Open communication

QUALITY MUST BE BUILT IN

Quality cannot be inspected into a project at the finish line—it must be built into the process.

- Good design
- Quality materials
- Skilled contractors
- Proper inspection
- Effective communication

TRAINING & EDUCATION

Improved consistency, knowledge transfer, and enhanced construction practices.

- ACPA Mid-Year Meetings
- Technical workshops
- Best practice exchanges
- Peer-to-peer learning

RECENT EXAMPLE: TYPE IL CEMENT

- Working together to:
 - Share information and research
 - Discuss constructability considerations
 - Understand contractor experiences
 - Support successful implementation

CONNECTING MISSOURI TO NATIONAL EXPERTISE

- National ACPA technical expertise
- CP Tech Center research
- Experiences from other states
- Emerging technologies
- Industry best practices

LOOKING AHEAD

- Opportunities for continued collaboration:
 - Workforce development
 - Innovation
 - Quality improvement
 - Constructability discussions
 - Knowledge sharing
 - Long-life pavement solutions

THANK YOU

Thank you for your leadership and continued partnership.

Questions?

Arij Humeida, Executive Director

MO/KS Chapter, American Concrete Pavement Association

arij@moksacpa.com

913-213-4066

“ASPHALT INNOVATION” PRESENTATION BY MISSOURI ASPHALT PAVEMENT ASSOCIATION (MAPA)

-- Presented by Dale Williams, P.E., MAPA Executive Director.

ISSUE: The Missouri Asphalt Pavement Association (MAPA) represents Missouri’s asphalt industry, working in partnership with MoDOT, contractors, suppliers, consultants, and research institutions to advance pavement quality, innovation, and sustainability. MAPA’s presentation highlights current industry priorities, collaborative research efforts, and the impact of asphalt innovations on Missouri’s transportation network.

MoDOT STAFF POSITION:

- MoDOT values the partnership with MAPA and appreciates the association’s leadership in advancing asphalt pavement quality, innovation, and sustainability. MAPA’s collaborative efforts support MoDOT’s mission.

Asphalt Innovation

More Pavement Life. More Miles Improved.

Practical innovations that help MoDOT stretch limited dollars.

Dale A. Williams, PE
MAPA Executive Director

Presentation for the Missouri Highway Commission



MAPA: Who We Are

Who we are. What we do.



Represents Missouri's
asphalt pavement industry



Advocates for sound
transportation policy



Partners with MoDOT on
innovation and specifications



Promotes quality pavements
and value for taxpayers



A Large System. Limited Dollars.



MoDOT maintains about
36,000 miles of roadway



Needs across the system
exceed available funding



Every pavement dollar
has to go farther



Innovation should help
improve more miles

ABOUT
36,000
MILES OF ROADWAY



Better pavement life = more miles improved



The Value of One More Year

Investing in pavement performance today creates more miles improved tomorrow.



One More Year
of Pavement Life



MORE
BUYING POWER



More Miles
Improved Each Year

- Every added year of pavement life increases buying power
- Longer-lasting pavements free up dollars for additional miles
- Small performance gains create major systemwide value



Balanced Mix Design

Building pavements for performance

Balanced Mix Design helps create asphalt mixes that resist rutting and cracking and support longer-lasting pavements.



Focuses on how asphalt mixtures perform



Balances rutting resistance and cracking resistance



Moves beyond a recipe-only approach



Supports longer-lasting, more reliable pavements



HiMod Asphalt: The Bigger Opportunity

Less material. Same performance. More miles improved.

Missouri Conventional Interstate

Typical asphalt pavement



Utah HiMod Experience

Up to 40% reduction



Missouri First Step

Working with MoDOT on a full-depth pavement concept



Utah shows the potential. Missouri is taking a **measured first step**.

Rubblized Concrete Shows the Potential

Not the biggest market — but a clear proof point of how far HiMod can go.

Missouri Typical Approach

Conventional Asphalt



VS.

Utah HiMod Application

HiMod Asphalt



From 12 inches to 5.5 inches over rubblized concrete. This shows the reach of the technology.

The Missing Piece: Missouri Data

To move forward confidently, Missouri needs pilot projects and calibration data.



Current challenge:

AASHTOWare Pavement ME is not yet calibrated for HiMod.



1
Identify pilot project



2
Build & instrument



3
Collect performance data



4
Develop calibration inputs



Pilot projects are needed to turn potential into Missouri data.

MoDOT has not yet identified an instrumented pilot project.

Collaboration Moves Innovation Forward

Practical progress happens when industry and MoDOT work from the same playbook.



1. Shared goals



2. Open communication



3. Pilot projects



4. Performance data



5. Better decisions

- Early communication matters
- Clear expectations reduce risk
- Pilot projects help prove new ideas
- Data should guide next steps

Collaboration helps turn innovation into better pavements and better value.



The Opportunity for Missouri

Missouri has the expertise and opportunity to use practical asphalt innovations to improve more miles with limited dollars.



Missouri has a capable asphalt industry



Proven innovations are available



Better performance means better use of limited dollars



Every added year of pavement life helps improve more miles



Goal: better value for Missouri taxpayers



Better pavement life = more miles improved

“PAVEMENT INNOVATION: PROGRESS REPORT FROM THE MISSOURI CENTER FOR TRANSPORTATION INNOVATION (MCTI)” PRESENTATION

-- Presented by Glenn Washer, Ph.D., P.E., Director of MCTI.

ISSUE: MoDOT and the University of Missouri System created the Missouri Center for Transportation Innovation (MCTI) in November 2019 to enhance research collaboration across campuses and strengthen national transportation research efforts. This presentation updates MCTI's progress, focusing on pavement innovations.

MoDOT STAFF POSITION:

- MoDOT appreciates the partnership with the University of Missouri System and the collaborative efforts of MCTI to advance transportation innovation in Missouri. The Center's work supports MoDOT's mission and positions Missouri as a leader in transportation research and practice.



MISSOURI CENTER FOR
**TRANSPORTATION
INNOVATION**

PROPELLING PEOPLE • CONNECTING COMMUNITIES • ENERGIZING ECONOMIES

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION PRESENTATION

August 5, 2026



MCTI OVERVIEW & VISION

- Center Grand Opening - December 17, 2019
- A partnership between the University of Missouri System and MoDOT, in cooperation with FHWA, other universities and the transportation community at large



- Vision: To establish Missouri as a showcase and a clearinghouse for safe, accessible, sustainable and resilient transportation, and moreover, to:
Propel People...Connect their Communities...and Energize their Economies

MCTI GOALS

- To Prioritize, Coordinate, Synergize and Disseminate Transportation Research in Missouri
- To Attract Top Talent to Transportation-Related Disciplines and to Accelerate the Pace of Transportation Workforce Development in Missouri, Including a More Diverse and More Technically Trained Workforce
 - To Implement and Showcase Cutting-Edge Transportation Technologies in Missouri
- To Address the Transportation Funding Gap through Cost Savings, Durability, and Development of New Revenue Sources

MCTI EXECUTIVE CABINET

GLENN WASHER, Ph.D., P.E.
University of Missouri-Columbia (Director)

CEKI HALMAN, Ph.D.
University of Missouri-Kansas City

TRILCE ENCARNACION, Ph.D.
University of Missouri-St. Louis

WILLIAM BUTTLAR, Ph.D., P.E.,
University of Missouri-Columbia (MCTI Founding Director)

JOHN MYERS, Ph.D., P.E.
Missouri S&T (Past Director)

JEN HARPER, P.E.
Missouri Department of Transportation



MCTI CABINET

MAGDY ABDELRAHMAN, Ph.D.
Missouri S&T

GANESH THIAGARAJAN, Ph.D.
University of Missouri – Kansas City

INCOMING AUGUST 2026
University of Missouri-St. Louis



MCTI STAFF SUPPORT

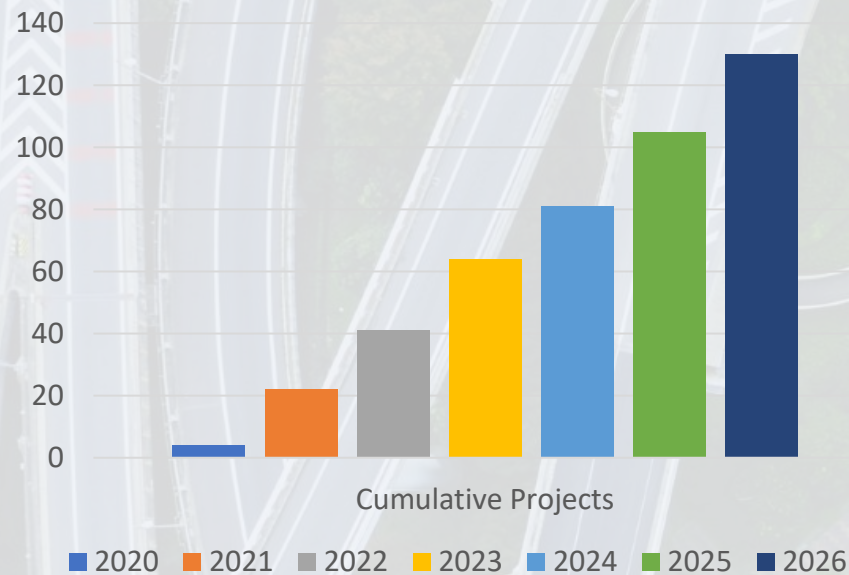
HENRY BROWN, P.E.
University of Missouri-Columbia

KAYLEY BOZARTH
University of Missouri-Columbia

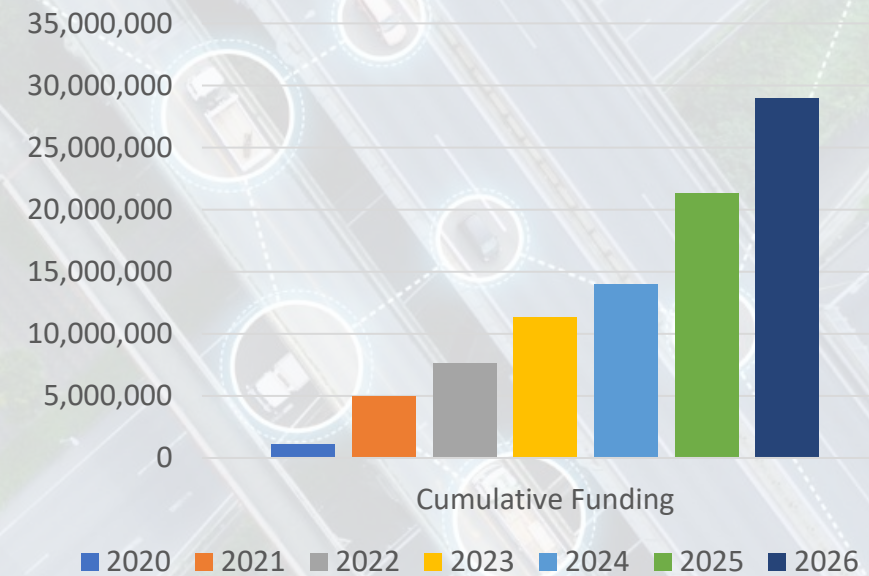


EXTERNAL RESEARCH FUNDING SECURED

MCTI Secured Projects

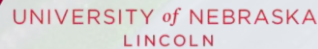


MCTI Secured Funding



MCTI has secured 130 projects totaling \$28,924,447

FUNDING SOURCES & RESEARCH PARTNERS





LOCAL IMPACT – MODOT SPECIFICATIONS



**Improving MODOT Asphalt
specification = Improving roads
in Missouri**

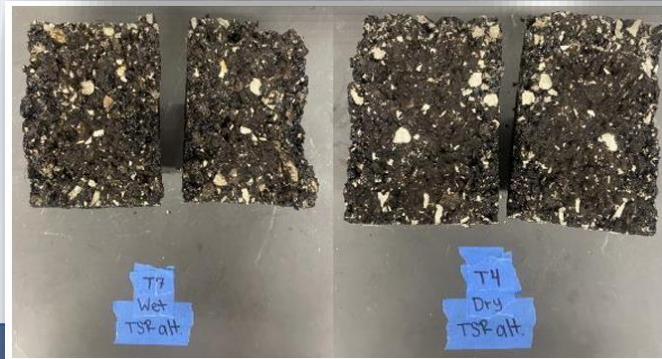
MoDOT TM-100 - Procedure to Calculate the Slope Ratio (SR) and Stripping Inflection Point (SIP) using the Hamburg Wheel-Track (HWT) Test

1. Run the HWT test in accordance with AASHTO T 324 at 50 +/- 1 ° C for 20,000 passes (regardless of the mix type and contract binder grade).

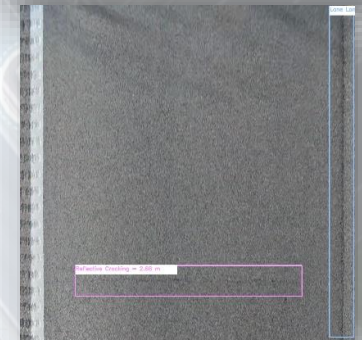
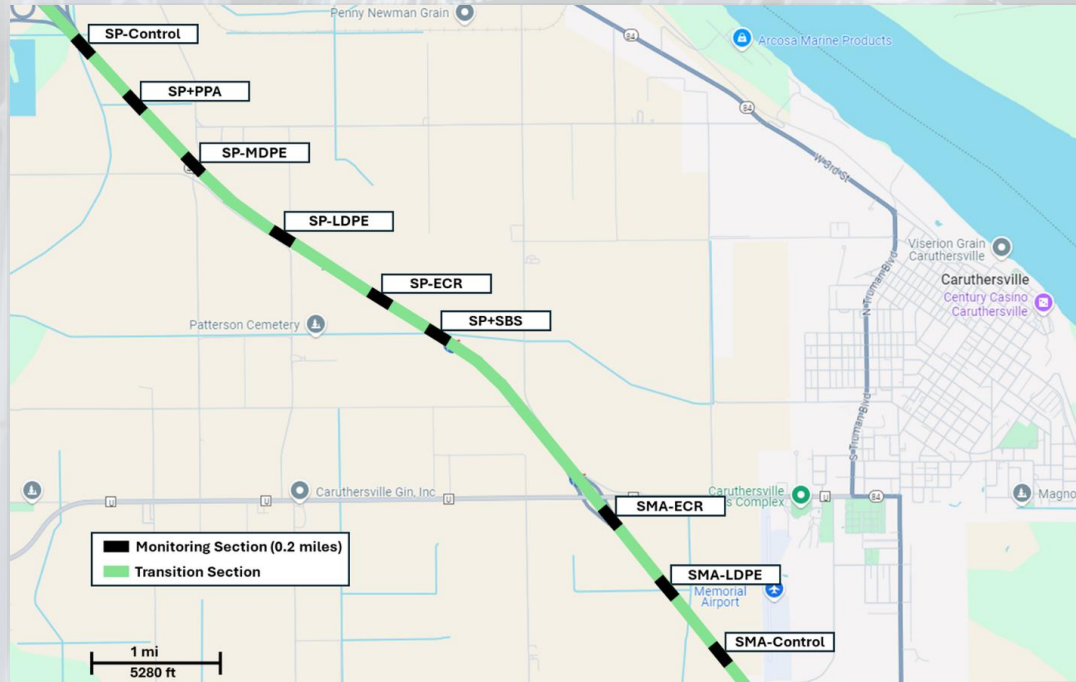
Record rut depth at each cycle or at regular cycle intervals during the test.

2. Plot the average rut depth versus number of cycles up to the 20,000 passes

Create a graph with:



NATIONAL IMPACT – REFLECTIVE CRACKING MITIGATION

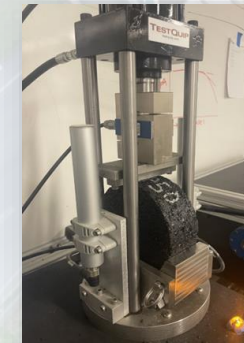


FUTURE WORK – MULTI-CAMPUS COLLABORATION FOR MODOT’S I-55 TEST SECTIONS (FRICTION + BMD)

Section ID/Name ¹	Log Miles (Includes Transitional Areas and Test Section Location)	Mile Marker Test Section Location ²	General Description
SP095B w/ Hi-Mod asphalt binder	103.92 to 105.22	Mile-Marker 104.8 to 104.6 (104.97 to 105.17)	SP095 dense graded mixture using highly polymer modified asphalt binder
SP095BSM w/ PG 76-22 and lower virgin asphalt content	105.22 to 105.62	Mile-Marker 104.4 to 104.2 (105.37 to 105.57)	SMA Mixture that sets the virgin asphalt content by meeting the minimum BMD criteria.
SP095BSM w/ PG 76-22 SMA Mixture per JSP2401	Not to be used on Mainline (For Shoulder Construction Only – 105.22 to 105.62)	Place mix on shoulder adjacent to previous test section	SP095BSM w/ PG 76-22 following JSP2401 Requirements
SP095BSM w/ ECR plus Fibers	105.62 to 106.02	Mile-Marker 104.0 to 103.8 (105.77 to 105.97)	SMA mixture using Elastiko™ Engineered Crumb Tire Rubber – 10 % by weight of virgin asphalt binder. Cellulose fibers included with mixture.
SP095BSM w/ ECR no Fibers	106.02 to 106.42	Mile-Marker 103.6 to 103.4 (106.17 to 106.37)	SMA mixture using Elastiko™ Engineered Crumb Tire Rubber – 10 % by weight of virgin asphalt binder. No Cellulose fibers.
SP095BLP w/ PG 76-22	106.42 to 106.82	Mile-Marker 103.2 to 103.0 (106.57 to 106.77)	SP095 Dense Graded Mix meeting Sec 403.3.3 aggregate requirements.
CONTROL SP095B w/ PG 76-22	106.82 to 107.20	Mile-Marker 102.8 to 102.6 (106.97 to 107.17)	Same as Typical Section

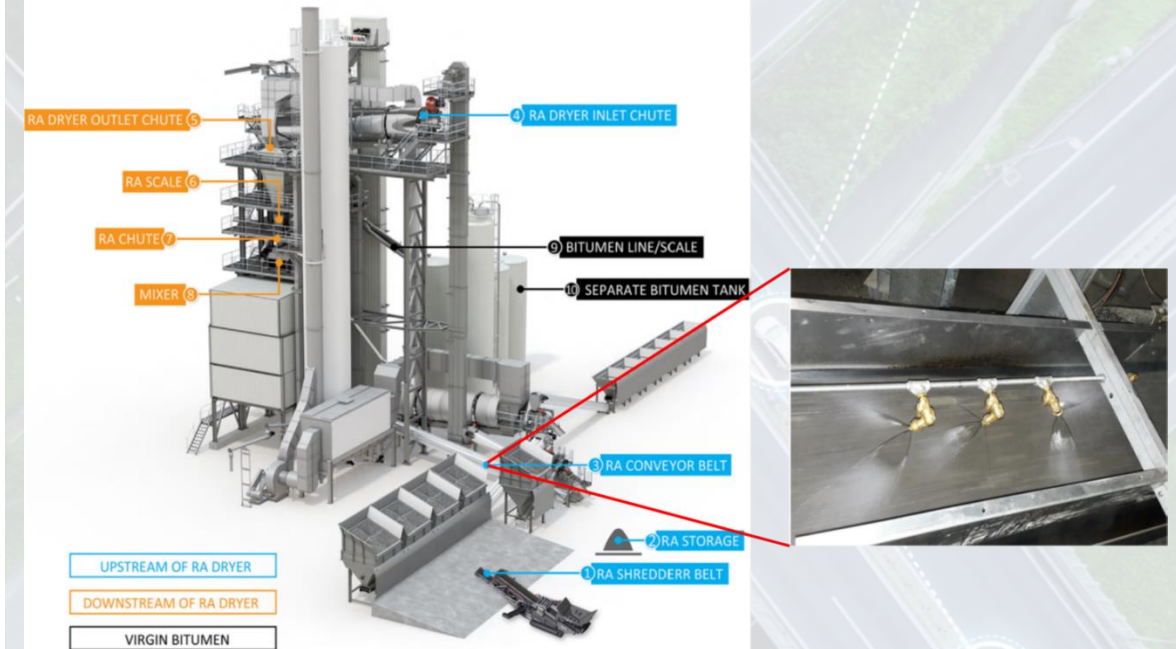
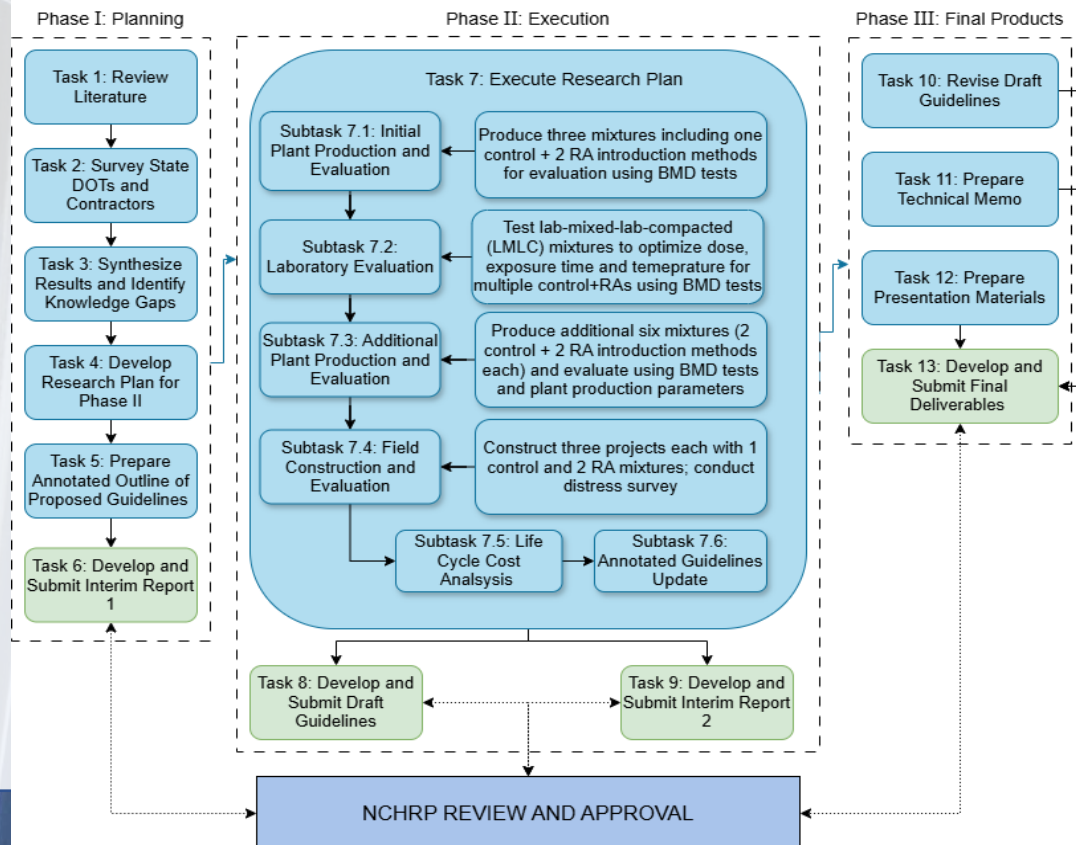


Friction Testing at S&T Campus



Mixture Testing at Mizzou Campus

FUTURE WORK – NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM



FEATURED PROJECT – EVALUATION OF COLLOIDAL SILICA-BASED FINISHING AIDS FOR CONCRETE PAVEMENT



Background

- Type IL cement reduces bleed water → harder finishing
- Common practice: adding surface water → weakens surface
- Colloidal silica finishing aids are promising to improve finishability without performance loss, but lack systematic evaluation

Jenny Liu, Xiong Zhang, John Myers

Objective

- Evaluate feasibility of colloidal silica as a finishing aid for concrete pavement

Methods

- Literature review and survey of current colloidal silica finishing practices
- Three-stage testing plan for performance evaluation
- Cost-effectiveness analysis
- Recommendations for implementation in Missouri paving (products, application, and evaluation)

Stage	Tests
Before finishing	1) Workability; 2) Air content; 3) Setting time; 4) Bleeding; 5) Moisture evaporation
During and after finishing	1) Finishing time; 2) Surface texture change
After hardening	1) Compressive strength; 2) Abrasion resistance; 3) Scaling; 4) Permeability; 5) Carbonation; 6) ASR; 7) Skid resistance



FEATURED PROJECT – SUSTAINABLE ANTI-ICING SOLUTIONS REDUCING CONCRETE DAMAGE WITH ORGANIC-BASED AGENTS

Kamal Khayat, Joel Burken, Seongho Han, Mariam Al-Lami



- Develop organic-based deicers from agricultural byproducts (Beet, Corn, Sugarcane, etc.)
- Evaluate performance, concrete durability, and environmental impact
- Benchmark against conventional chloride-based deicers (MoDOT)



MISSOURI
S&T

UMSL SCHOOL OF ENGINEERING

In 2025, UMSL opened the doors to a brand-new School of Engineering. We are excited to have the new Civil Engineering Program Director join our cabinet in August 2026 as we usher in further collaboration and innovation.

UMSL | University of
Missouri–St. Louis

School of Engineering

PLANS FOR CONTINUING MCTI'S GROWTH AND IMPACT

- Continued **team building across MCTI and with strategic partners** to be competitive with large, federal funding proposals, particularly where we have had only limited success in the past.
- Continued **investment in graduate students and post-docs**, including bridge funds to grow the number of PhDs and Post-Docs in our system, and to help with workforce development.
- Lead the **National Summer Transportation Institute (NSTI) Program** in Missouri.
- Develop a **Summer Research Program** with an emphasis on broadening participation.
- Sustain **future leadership in the MCTI cabinet**: continue to engage more faculty, mentor new leaders, implement leadership rotation strategy, **to maintain center stability**.
- Keep pushing to (and beyond) our **long-term goal of \$10M research expenditures annually**.
- Develop an external **Advisory Panel** of prominent stakeholders to advance MCTI research goals.
- Host a conference on **Transportation Innovation in Missouri** to elevate University research program across the four campuses.