Call for Proposals

Asphalt Institute Foundation – Research Committee

August 1, 2025

In 2022 the Asphalt Institute Foundation held its second STrategic Asphalt Research (STAR) Symposium. This event served as an opportunity to assemble industry experts from across the globe to activate innovative thinking, creating a roadmap for continued industry success 10-20 or more years from now. Through this initiative, the Asphalt Institute Foundation established a forum in which participants could discuss a vision of where we need to be going, as well as identify important research areas needed to get us there. The outcomes of the STAR Symposium provided guidance on strategic research for the Foundation and others, which were ultimately crafted into a series of Strategic Research Initiative Statements

The Asphalt Institute Foundation Research Committee is now pleased to announce the solicitation of proposals for addressing the strategic research need statements. Understanding that such strategic research can take many forms, and in the interest of cultivating innovation and creativity in the received proposals, the committee has elected not to impose a pre-defined rigid framework around work plan, deliverables, funding, and timeline. However, the proposals are expected to adhere to the following general guidelines.

The proposals are due by 5:00 PM Eastern Time on September 19, 2025. Proposal should not be more than 10 pages long. Proposals should be electronically submitted to maull@asphaltinstitute.org as a single DOCX Word document. Proposals will be reviewed within 60 days of the due date. During the proposal review period the AIF research committee may request further information or a conference call with the research team to review any questions.

General Research Guidelines

The proposal falls under the following project type.

- Concept Exploration
    - Deliverable is a deep analysis, exploration, and/or modeling of a novel concept of strategic importance to the future of the industry.

The proposal should include a separate budget sheet using the form included in the attached cover sheet at the end of this document.

Although the AIF Sustainability Oversight Panel is not imposing strict limits on the requested funding level, it is anticipated that the granted funding will be between $100,000 - $150,000 and will be completed within a period of nine to 12 months. At the end of the project, the research team will need to provide all the deliverables listed in the RFP.

Budget and Cost Sharing

- At least half of the research must be performed directly by the proposing firm, individuals, or institution. In the case of a joint proposal by two or more institutions, only one budget sheet needs to be provided, prepared by one of the partnering institutions (acting as the prime contractor) with the other partners shown as subcontractors.

- Cost sharing is encouraged. Cost sharing includes direct cash contributions and/or indirect contributions and payment in kind. However, time should not be the major form of the proposed cost sharing. Cost sharing can come from the proposers, users, industry participants, state agencies, and other sources available to the proposers. Any cost sharing should be discussed in the proposal. Specific arrangements, if proposed, must be completed before an award is made.

Intellectual Property Rights Statement

- All proposals and other documentation submitted in response to the Call for Proposals become the property of the Asphalt Institute Foundation and will not be returned. The Asphalt Institute Foundation strongly prefers that no confidential information be submitted in any proposal and will not consider any proposal to be confidential unless the proposer and the Asphalt Institute Foundation execute a confidentiality agreement in advance of the submission of the proposal.

- Proposers whose proposals are accepted by the Asphalt Institute Foundation will be expected to sign the Asphalt Institute Foundation's contract, which will typically provide that all copyrights and other intellectual property rights associated with the proposer's work product will be owned by the proposer, subject to a non-exclusive perpetual license to the Asphalt Institute Foundation to use, publish, distribute, reproduce, prepare derivative works of and display the work product.

Contact

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Asphalt Institute Foundation – a brief history

The Asphalt Institute Foundation was formally established as a non-profit public charity on June 4, 2014, under section 501(c)3 of the US Internal Revenue Service tax code following several years of discussions among Asphalt Institute members. Meant to be complimentary to the Asphalt Institute's mission, the AIF focus is that of Strategic Research and Education. The Foundation's mission statement reads:

"To conduct strategic research and educational activities that are designed to advance and improve the liquid asphalt industry."

The Asphalt Institute's areas of strategic focus include, in part, both technical leadership and educational expertise and yet these are purposefully focused on near term research, performance improvement, and educational efforts aimed at today's industry professionals. The Foundation's role is strategic in nature – and purposefully seeks to address the long-range needs of the liquid asphalt industry and provide educational programs which not only improve pathways for professionals to enter the industry but to improve the educational opportunities for professionals seeking an asphalt career.

A Review of Methodologies for Sustainable Flexible Pavement Life Cycle Decision-Making

RFP for Asphalt Institute Foundation

08/01/2025

Background

Good quality pavements play a crucial role within societal economic development by facilitating uninterrupted freight and business-related movements. Public agencies at various geographic levels (e.g., federal, state, county) are tasked to secure and obligate funds for constructing new and maintaining existing pavement systems. Multiple key decisions are made both at network-level and at project-level for pavements. Examples of these key decisions include but are not limited to quantifying pavement service life for alternative designs under consideration, identifying optimum combination of preservation and maintenance strategies, and estimating rolling resistance emerging from pavement-vehicle interactions.

As defined by the Federal Highway Administration (FHWA), a pavement is deemed to be "sustainable" if it meets all the following objectives:

- Achieve the engineering goals for which it was constructed.
- Preserve and (ideally) restore surrounding ecosystems.
- Use financial, human, and environmental resources economically.
- Meet human needs such as health, safety, equity, employment, comfort, and happiness.

Inherent in these guidelines are that for a pavement to be "sustainable," it must meet the expected performance requirements. Along with this, there is the need to meet the triple bottom line principles of preserving the environment, using resources economically and meeting social needs.

Problem Statement

For predicting and validating flexible pavement structural and functional performances, there is a lack of cohesive assessment and standardization of high-quality methodologies. Currently, a wide array of methodologies with varying degrees of data quality are employed for assessing pavement structural and functional performances. The information provided by pavement performance tests/models dictates the quality of environmental and economic sustainability quantifications. Lack of reliable inputs around long-term pavement performance would lead to unreliable decision-making.

Objective

The objective of this research project would be to develop a guidance roadmap based on an in-depth literature review of high-quality methodologies used to:

- Predict pavement service life – this needs to include not just initial design but also different combinations of pavement preservation, maintenance and rehabilitation treatments.
- Identify optimized combination of pavement construction, preservation, maintenance, rehabilitation and reconstruction treatments
- Quantify rolling resistance (is a function of road roughness, deflection, and macrotexture) emerging from different pavement construction, preservation, maintenance, rehabilitation and reconstruction activities.

Scope of Research

1. Review of literature focused on validating laboratory tests/model simulation/test track data to field performance results with respect to estimating pavement service life, optimizing pavement maintenance strategies both at network and project level, and quantifying rolling resistance occurring during pavement's use-phase.
2. Review of literature looking at incorporation of various uncertainties (e.g., parameter, model, scenario) within methodologies used for service life estimation, optimizing pavement maintenance strategies (e.g., influence of different pavement condition evaluation methods) both at network and project level, and rolling resistance quantification.
3. Conduct a survey involving interactions with public agencies (federal/state/local level) to understand state of practice for aspects mentioned within (1) and (2).
4. Assess data quality of different methodologies identified through (1) and (2) in terms of accuracy, reliability, and reproducibility.
5. Discuss opportunities and challenges associated with widespread implementation of high-quality methodologies.
6. Develop a roadmap to achieve systemic implementation of high-quality methodologies for estimating pavement service life, optimizing pavement maintenance strategies both at network and project level, and rolling resistance quantification.

Expected Contributions

1. Comprehensive evaluation of existing methodologies used to estimate pavement service life, optimize pavement maintenance strategies both at network and project level, and quantify rolling resistance occurring during pavement's use phase.
2. Benchmarking state of the practice used by different state agencies for estimating pavement service life, optimizing pavement maintenance strategies both at network and project level, and quantifying rolling resistance occurring during pavement's use phase.
3. Developing a guidance roadmap for various public agencies to move towards high quality methodologies at both project and network level for assessing and implementing sustainable roadway systems. The roadmap could elaborate on gaps within the state of practice and provide a pathway to address these gaps.

Budget

Anticipated Budget: $100,000 - $150,000

Timeline

From the contract award date, a nine-to-12-month performance period will be agreed upon.

Document Date: August 01, 2025

*Proposal responders are encouraged to review the resources listed in the **"References"** section to develop respective proposals.*

References:

1. Van Dam, T.J., Harvey, J., Muench, S.T., Smith, K.D., Snyder, M.B., Al-Qadi, I.L., Ozer, H., Meijer, J., Ram, P., Roesler, J.R. and Kendall, A., 2015. *Towards sustainable pavement systems: a reference document* (No. FHWA-HIF-15-002). United States. Federal Highway Administration.

2. Bhattacharya, S., Taylor, R., D'Melo, D. and Campbell, C., 2024. Sustainable Design of Pavements: Predicting Pavement Service Life. *Infrastructures*, *9*(9), p.165.
3. Von Quintus, H.L., Mallela, J. and Buncher, M., 2007. Quantification of effect of polymer-modified asphalt on flexible pavement performance. Transportation research record, 2001(1), pp.141-154.
4. Abernathy, A.M., Colosi, L.M., Samaraee, A.A., Ozbulut, O.E., Lloyd, L.N. and Habbouche, J., 2024. Life Cycle Assessment of Recycled Plastic Modified Asphalt Pavements: A Case Study in Virginia. Transportation Research Record, p.03611981241302338.
5. Gao, Y., Geng, D., Huang, X., Cao, R. and Li, G., 2018. Prediction of remaining service life of asphalt pavement using dissipated energy method. *Journal of Transportation Engineering, Part B: Pavements*, *144*(2), p.04018011.
6. Gkyrtis, K., Loizos, A. and Plati, C., 2021. A mechanistic framework for field response assessment of asphalt pavements. *International Journal of Pavement Research and Technology*, *14*(2), pp.174-185.
7. Gkyrtis, K., Plati, C. and Loizos, A., 2022. Mechanistic analysis of asphalt pavements in support of pavement preservation decision-making. *Infrastructures*, *7*(5), p.61.
8. Wu, Z., Yang, X. and Sun, X., 2017. Application of Monte Carlo filtering method in regional sensitivity analysis of AASHTOWare Pavement ME design. *Journal of traffic and transportation engineering (English edition)*, *4*(2), pp.185-197.
9. Mohanraj, K. and Merritt, D.K., 2023. Use of Pavement–Vehicle Interaction-Related Models to Estimate Excess Fuel Consumption of Pavement Alternatives During the Design Stage. *Transportation Research Record*, *2677*(3), pp.104-112.
10. Brenes-Calderón, A. and Vargas-Nordcbeck, A., 2023. Use of chip seal treatments to mitigate pavement roughness progression in cold regions. *International Journal of Pavement Engineering*, *24*(1), p.2241963.
11. Wang, T., Harvey, J. and Kendall, A., 2013. Network-Level Life-Cycle Energy Consumption and Greenhouse Gas from CAPM Treatments.
12. Kim, C., Butt, A.A., Harvey, J.T. and Ostovar, M., 2024. Environmental impacts from traffic on highway construction work zones: Framework and simulations. *International Journal of Sustainable Transportation*, *18*(8), pp.680-694.
13. Levesque, W., Bégin-Drolet, A. and Lépine, J., 2023. Effects of Pavement Characteristics on Rolling Resistance of Heavy Vehicles: A Literature Review. *Transportation Research Record*, *2677*(6), pp.296-309.
14. Ydrefors, L., Hjort, M., Kharrazi, S., Jerrelind, J. and Stensson Trigell, A., 2021. Rolling resistance and its relation to operating conditions: A literature review. Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering, 235(12), pp.2931-2948.
15. Ejsmont, J., Ronowski, G., Ydrefors, L., Owczarzak, W., Sommer, S. and Świeczko-Żurek, B., 2024. Comparison of Tire Rolling Resistance Measuring Methods for Different Surfaces. International Journal of Automotive Technology, 25(4), pp.965-976.
16. Chen, F., 2016. *Sustainable implementation of electrified roads: structural and material analyses* (Doctoral dissertation, KTH Royal Institute of Technology).
17. Hernandez, J., Jayme, A., Cardenas Huaman, J.J. and Al-Qadi, I.L., 2025. Effect of heavy-duty electric vehicles on tire–pavement contact forces. *Journal of Engineering Mechanics*, *151*(1), p.04024104.
18. Cardenas, J.J. and Al-Qadi, I.L., 2024. Impact of Dynamic Wheel Loading on Flexible Pavement Responses for Non-Free Rolling Conditions. *Transportation Research Record*, p.03611981241242378.
19. Gharaibeh, N.G. and Darter, M.I., 2003. Probabilistic analysis of highway pavement life for Illinois. *Transportation Research Record*, *1823*(1), pp.111-120.
20. France-Mensah, J. and O'brien, W.J., 2019. Developing a sustainable pavement management plan: Tradeoffs in road condition, user costs, and greenhouse gas emissions. *Journal of Management in Engineering*, *35*(3), p.04019005.

21. del Campo Yañez, J.M., Lee, M.M.J. and Swei, O., 2023. Sustainable infrastructure is a two-way street: Balancing environmental and condition performance goals. *Journal of Management in Engineering*, *39*(3), p.05023004.
22. Eklöf, K. and Wendel, M., 2024. Lifetime Performance of Polymer-Modified Bitumen in Swedish Roads Evaluated with Survival Analysis. *Transportation Research Record*, *2678*(4), pp.106-117.
23. He, S., Salem, O. and Salman, B., 2021. Decision support framework for project-level pavement maintenance and rehabilitation through integrating life cycle cost analysis and life cycle assessment. *Journal of Transportation Engineering, Part B: Pavements*, *147*(1), p.04020083.
24. Lee, J. and Madanat, S., 2017. Optimal policies for greenhouse gas emission minimization under multiple agency budget constraints in pavement management. *Transportation Research Part D: Transport and Environment*, *55*, pp.39-50.

PROPOSAL COVER SHEET – AIF RESEARCH COMMITTEE INITIATIVE

(Note: Proposals for the AIF Research Committee Initiative should not exceed 10 pages. This page limit includes the cover, budget summary, and liability statement sheets, but not the letters of support/endorsement and the additional page following the cover sheet providing answers to the questions below)

<table>
<tr><td>For Use by AIF</td><td>Date Received</td><td colspan="2">Proposal Number</td></tr>
<tr><td colspan="2">Title of Project:

Title of Addressed RNS:</td><td colspan="2">[ ] Concept Exploration (Type 1)
[ ] Product Application (Type 2)
Project Duration _____ months
Number of Project Phases: _____</td></tr>
<tr><td colspan="2">Submission Date: Resubmission
Yes[ ] No[ ]</td><td colspan="2">Signed, unaltered, liability certification enclosed with the proposal [ ] Yes [ ] No</td></tr>
<tr><td colspan="2" rowspan="2">Name/Address of Organization and Name of Official to be Contacted</td><td>Telephone and Fax Nos.</td><td>E-mail</td></tr>
<tr><td colspan="2">AIF Budget $_____ + Cost Sharing $_____
= Total Project Cost $_____</td></tr>
<tr><td colspan="2">Business Type
[ ] Academic [ ] Profit [ ] Non-Profit</td><td colspan="2">Size (Number of Employees)
[ ] <10 [ ] <100 [ ] <200 [ ] >200</td></tr>
<tr><td colspan="2">Name/Address of Principal Investigator</td><td>Telephone and Fax Nos.</td><td>Fax and E-Mail</td></tr>
<tr><td colspan="4">Names of other Key Investigators</td></tr>
<tr><td colspan="4">AIF Research Committee Initiative Proposers:

Statement of Purpose:
Please do not delete or write in this box. On a page following this cover page, please provide separate answers to each of the following three questions. Please do not rephrase or combine the questions and be clear and concise in your answers (one page maximum):

1. Which AIF Research Initiative proposed problem statements is the subject of this proposal?

2. How could the proposed research affect the future state of practice for the addressed RNS?

3. How are the research deliverables strategic to the future of the asphalt industry?

Note: The page with answers to the above questions will not be counted in the 10-page limit for the full proposal. The letters of support or endorsement from collaborating public agencies or private industry also will not be counted in the 10-page limit</td></tr>
</table>

AIF RESEARCH COMMITTEE INITIATIVE BUDGET SUMMARY

Project Title:_____

Project Duration (Months): _____

(Please complete a separate copy of this form for each phase of the project)

FUNDING REQUESTED FROM AIF SOP INITIATIVE FOR THIS PHASE:

PERSONNEL:	# hours x $/hour	AIF Costs	Cost Sharing
Principal Investigator:	_____ x $_____	= $_____	$_____
_____:	_____ x $_____	= $_____	$_____
Other staff_____:	_____ x $_____	= $_____	$_____
	Subtotal	$_____	$_____
CONSULTANTS AND SUBCONTRACTORS: (specify)			
	Subtotal	$_____	$_____
MATERIALS & EQUIPMENT: (indicate items exceeding $1,000)			
	Subtotal	$_____	$_____
OTHER DIRECT COSTS: (specify)			
	Subtotal	$_____	$_____
OVERHEAD COSTS: (%)		$_____	$_____
GENERAL AND ADMINISTRATIVE: (%)		$_____	$_____
Project Total Cost:		**$**_____	**$**_____

PROPOSED COST SHARING (if any)

Direct (cash) contribution from proposing organization:	$_____
In-kind contribution from proposing organization:	$_____
Direct funding from other sources (specify):	$_____
Value of staff, etc., contributed by other sources:	$_____
Project Total Budget:	**$**_____

Signature:_____ Date:_____

AIF Research Committee Initiative Liability Statement

Proposal Title: _____

The signature of an authorized representative of the proposing agency is required on the following unaltered statement in order for the Asphalt Institute Foundation (the "Foundation") to accept the agency's proposal for consideration. **Proposals submitted without this executed and unaltered statement by the proposal deadline will be summarily rejected.** An executed, unaltered statement confirms the agency's intent and ability to execute a contract that includes the provisions below. The agency's signature below does not obligate the Foundation to enter into any contract. Any contract will be subject to acceptance and execution by the Foundation and will contain other provisions describing the rights and obligations of the parties.

Proposing Agency: _____

Name _____ Title _____

Signature _____ Date _____

CONTRACTOR LIABILITY

(a) The parties agree that the contractor and its employees and agents ("Contractor") will be responsible for performing the work required under the contract, and shall therefore be legally responsible for, and shall indemnify and hold the Foundation harmless for all claims asserted against the Foundation, its affiliates and their respective committee members, officers, directors, employees, and agents, by any third parties, whether or not represented by a final judgment, if such claims arise out of or in connection with Contractor's negligent or wrongful acts in performing such work, including without limitation all claims for bodily injury, death, personal injury, property damage, and other losses, liabilities, costs, and expenses (including without limitation attorney's fees) (collectively, "Losses").

(b) The term "wrongful act" as used herein shall include any tortious act or omission, willful misconduct, failure to comply with Federal or state governmental requirements, infringement of any copyright, trademark, patent or other intellectual property or proprietary right, libel, slander or other defamatory or disparaging statement in any written deliverable required under the contract, or any false or negligent statement or omission made by Contractor in its proposal to the Foundation.

(c) The obligations in paragraph (a) of this clause to indemnify and hold harmless the Foundation shall not extend to claims, damages, losses, liabilities, costs, and expenses to the extent they result directly from the wrongful acts or omissions of the Foundation, its committee members, officers, employees, and agents.

(d) Both the Foundation and Contractor shall give prompt notice to each other upon learning of the assertion of any claim, or the commencement of any action or proceeding, in respect of which a claim under this paragraph may be sought, specifying, if known, the facts pertaining thereto and an estimate of the amount of the liability arising therefrom, but no failure to give such notice shall relieve the Foundation or Contractor of any liability hereunder except to the extent actual prejudice is suffered thereby.

(e) The Foundation and Contractor agree to cooperate with each other in the defense of any claim, action, or legal proceeding arising out of or resulting from Contractor's performance of the work required under this contract, but each party shall control its own defense. The Foundation shall also have the option in its sole discretion to permit Contractor or its insurance carrier to assume the defense of any such claims against the Foundation, but in no event will Contractor agree to the settlement of any claim without the consent of the Foundation.

(f) The obligations under this clause survive the termination, expiration, or completion of performance under this contract.