RMA Field Performance Evaluation

Proposed by: University of Missouri, Columbia and Tiger Eye Engineering
Prepared for: Tire Recycling Foundation
Proposed project window: July 15, 2026 – January 15, 2027
Date: 6/16/2026

1. Purpose and Industry Need

The use of Rubber Modified Asphalt (RMA) has gained significant popularity in the past decade due to proven performance enhancement and favorable economics. It is also seen as a sustainable use of scrap tires, not only in terms of environmental impact but also as an abundantly available raw material for asphalt mixture production that can be locally sourced.

Currently, an estimated 20-25% of the 450 million tons of asphalt mixture produced in the US is modified. One of the most commonly used modifiers is Styrene-Butadiene-Styrene (SBS), a virgin polymer. It is sourced from all over the world, including a portion being produced in the US. Given the uncertainty of global supply chains in the past few years, fluctuation in the price of oil, and stiff competition from other modifiers (fibers, plastics), there is currently a limited window of opportunity wherein RMA could capture a significant share of the modified asphalt market.

While there are several data gaps and research questions that need to be answered to increase the market adoption of RMA, none moves the needle as much as assimilating field data of RMA sections in the US to showcase performance enhancement and service life extension. The canceled EPA award (to the Scrap tire Research and Education Foundation, or STREF) included close to 1.5 million over three years to conduct such field evaluation including measuring ride quality, rutting, cracking, and documenting overall pavement condition. To make it presentable and easy-to-communicate to stakeholders, the grant had budgeted to present the data in a GIS-based visualization dashboard. As shown in Figure 1, the dashboard not only presents a standardized ***Pavement Condition Index*** (as per ASTM D6433), but also includes GIS-tagged, high-resolution pavement images with distress type, extent, and severity identified. Presenting data in this form makes it easier to communicate the benefits of RMA to policymakers as well as DOT engineers.

With the establishment of the Tire Recycling Foundation (formerly STREF), there is an opportunity to conduct the field performance evaluation activities proposed in the canceled EPA grant. The research team understands that there needs to be a quick turnaround on the initial results and to that end, proposes to break the project into two phases, described as follows:

- Phase I will have a focused evaluation of 1,000 lane-miles of RMA and control pavement sections across three states – MO, IL, GA – covering three different climatic regions. The team has compiled a priority list of projects in these three states, as presented in

Appendix A. The team will seek guidance from TRF members and will reach out to paving agencies to add more details to the preliminary list, such as precise starting and ending coordinates of RMA and control sections. Broadly, the team expects to cover 500 lane miles in GA and 250 lane miles each in MO and IL. Phase I will serve as a Go/No-Go decision point for Phase II.

- Phase II will expand the scope of field evaluation to include more lane miles, and regions (e.g. MI, AZ, CO, IL, MD, OK), and other RMA applications (e.g. chip seals).

All these results will be aggregated onto a centralized visual dashboard (Figure 1) which can be accessed by TRF. The following sections provide further details of the proposed Phase I study including detailed scope, data collection methods, timeline, and budget.

Figure 1. Examples of visual data dashboard a pavement section showing examples of detected pavement distress types and Pavement Condition Index (PCI)

2. Work Plan for Phase I

- **Project Scope and Duration:** The first phase will evaluate 1000 lane miles in three regions (IL, MO, GA) representing different climate zones. Proposed project duration is July 15, 2026 – January 15, 2027. Missouri sections will be evaluated in the first two months of the contract, followed by IL and GA sections.
- **Kickoff Meeting:** The team will organize a kickoff meeting with TRF and other stakeholders to confirm the final site list, project goals, reporting schedule and format. The team will work with TRF and its stakeholders to add any specific sections of interest to the list.
- **Data Collection and Evaluation:** The team will survey RMA and control pavements and report metrics presented in Table 1. Data will be collected using a portable vehicle-mounted sensing platform equipped with LiDAR, high-resolution pavement imaging, roadway right-of-way imaging, RTK-GNSS positioning (capable of centimeter-level location accuracy), and onboard high-performance computing (see Figure 2). This portable system is well suited for this project because the selected RMA and control sections may be distributed across multiple states and located far from each other. The system can be mobilized efficiently by traveling to each region, renting a vehicle, and installing the equipment without the need for a dedicated survey vehicle. During the field visits, the team will collect high-resolution pavement images identifying distresses, which will be included in the dashboard. Few examples of different distresses are shown in Figure 3.

Table 1. Proposed metrics for pavement performance measurement

Metric	Why it matters
Average PCI	Shows overall condition benefit
Distress quantity	Shows cracking/rutting reduction
Roughness Index	Shows ride-quality benefit
Rut depth	Shows structural/permanent deformation performance
Age-normalized condition	Makes old vs new sections comparable
RMA vs control charts	Easy for TRF and DOTs to communicate benefits of using RMA over standard HMA or polymers

- **Reporting:** Updates will be provided to TRF with a frequency finalized during the kickoff meeting. A final report will be provided detailing the tasks undertaken along with analysis and recommendations. A Phase II proposal will also be attached for consideration by TRF.

These AI tools have been used across the United States and abroad to aggregate and present distress data to various agencies. Some recent projects include the Island of Oahu (Hawai'i), Jefferson City (Missouri), and Thornton (Colorado). The researchers can provide a demonstration of the dashboard to the TRF, if needed.

Figure 2. Portable Vehicle-Mounted Pavement Data Collection System

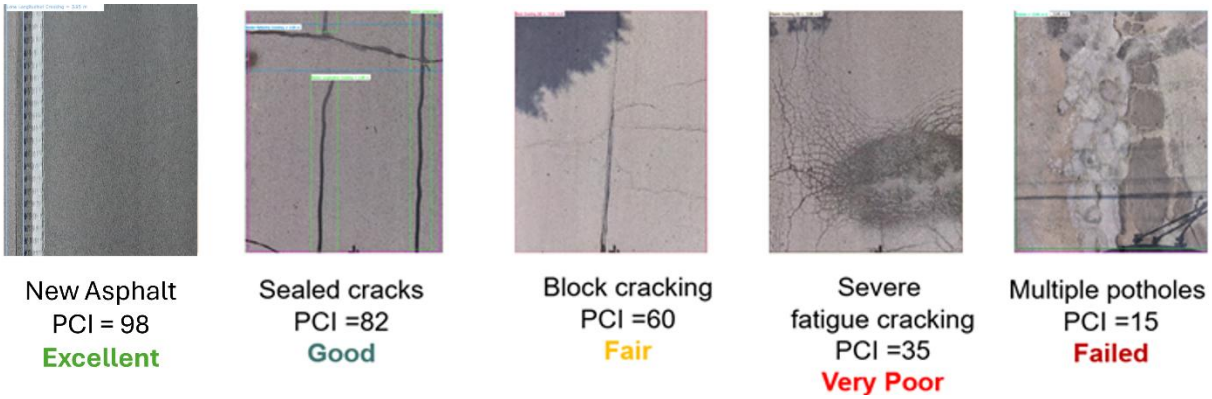

Figure 3. Examples of different sections with different conditions evaluated by the AI-system

3. Schedule and Budget

The proposed project can begin as soon as July 15, 2026 and, if so, would be completed in January 15, 2027. The schedule is designed to be short, practical, and useful for industry decision-making. Monthly updates will be provided so that TRF and industry partners can review progress, access data on dashboards as it is added, ask questions, and modify/add sites if needed.

Period	Main Activity	Deliverable
July 2026	Kickoff meeting with TRF, confirm project locations and data needs	Final site list and data collection plan
July – December 2026	Field data collection and monthly updates	Monthly updates to be given verbally or in a powerpoint format to TRF and stakeholders
January 2027	Final presentation of dashboard and data handover; Phase II Go/No-Go decision	Final Presentation; Phase II proposal (optional)

The proposed budget for Phase I study is ***$250,000*** and is based on $250/lane mile. This accounts for effort of the PIs and staff, cost of field data collection (including travel and mobilization), and building the visualization dashboard. A collaboration with Tiger Eye Engineering LLC is planned. The work would be divided into two equal parts from a budget standpoint, with Mizzou covering project administration, field data collection, and final reporting, while Tiger Eye would take the lead on AI-driven data analysis, data analytics, and visualization dashboard setup, data population, hosting and maintenance.

4. Expected Benefits

The proposed work is expected to provide significant benefits to the TRF and the tire industry while addressing several key questions raised in the State of Knowledge Report on Rubber Modified Asphalt published in 2021 by USTMA. Key anticipated benefits include:

- Quantifying the service life extension with the use of RMA based on pavement performance data obtained across the US, rather than relying on isolated project-specific reports.
- Enabling data-informed assumptions for Life Cycle Assessments (LCA) and Life Cycle Cost Analyses (LCCA) of modern RMA products, reducing dependence on outdated studies from the 1990s.
- Supporting and encouraging the adoption of RMA over other alternatives such as polymers, fibers, plastics, and other additives.
- Creating a centralized RMA field performance database which can be readily appended in future with more data, as it becomes available, providing a valuable long-term resource for researchers and practitioners.
- Providing state and federal policymakers with robust, data-driven evidence to support the widespread adoption of RMA across the US.

Appendix A – Preliminary List of Site Locations (details to be added)

Location	Year of Construction	Traffic Details	Is there a control section for comparison?
I-155, Hayti, MO	2023	Interstate, high traffic	Yes
I-70, Booneville, MO	2022	Interstate, high traffic	Yes
Stadium Blvd., Columbia, MO	2021	Mid-level traffic	Yes
St. Louis area (multiple projects, mostly state routes), MO	2021-2024	Mid-level traffic	Yes, for some projects
Rolla (US 63, near airport), MO	2024	Mid-level traffic	Unknown
I-75, Atlanta, GA		Interstate, high traffic	
I-20, GA		Interstate, high traffic	
I-85, GA		Interstate, high traffic	
I-475, GA		Interstate, high traffic	
I-520, GA		Interstate, high traffic	
I-95, GA		Interstate, high traffic	
I-516, GA		Interstate, high traffic	
I-88, Chicago, IL	2016	Interstate, high traffic	
I-294, Chicago, IL	2018	Interstate, high traffic	
I-355, Chicago, IL		Interstate, high traffic	