



FY 2025 Annual Program Research Project Statement 25-047

Title:	Enhancing Texas Mechanistic-Empirical Flexible Pavement Design System (TxME) Practice: Develop Enhanced Mix Aging Model and District-Level Calibration Guidance
The Problem:	<p>In 2024, TxDOT will be rolling out FPS23 in which TxME will be added so that Districts can compare long-term performance with the Mechanistic-Empirical (ME) design process. In ME design, the aging of asphalt mixes has a significant impact on long-term pavement performance. Currently, mix aging is considered within TxME using representative aging material properties and field calibration, which is working well for traditional asphalt mixes in Texas. However, new mixes recently developed, such as highly modified asphalt mixes being employed to improve mixture performance in some Districts, tend to age much faster than traditional mixes. Thus, there is an urgent need to enhance the mix aging model and ensure the long-term resilience of asphalt pavement with both traditional and new asphalt mixes. This aging model is to improve the TxME pavement check that will be utilized in the upcoming version of FPS23.</p> <p>Also, TxME was calibrated using statewide pavement performance data; however, Districts want to reevaluate calibration with their own high-quality materials and traffic data and compare long-term performance to FPS pavement designs in TxME pavement check. To achieve the successful calibration and long-term performance prediction of each district, a district-level calibration guidance should be developed and provided to the engineers in Districts.</p>
Technical Objectives:	<p>The objectives of this project are:</p> <ul style="list-style-type: none"> • Conduct a literature review and summarize state-of-the practice and key findings. <p>Develop Enhanced Mix Aging Model</p> <ul style="list-style-type: none"> • Review and identify practical aging models for pavement design, considering temperature, air voids, depth, and other factors. • Collect aging data of different mixes from the fields and corresponding information for aging models. • Evaluate and select the most suitable aging models for TxME pavement check based on field aging data. • Conduct laboratory performance tests to generate aging model parameters for traditional mixes and some new mixes. • Integrate the final aging model and parameters for various mixes into TxME pavement check. • Summarize results and recommend changes to specifications and pavement design manual for TxDOT's consideration. <p>Develop District-Level Calibration Guidance</p> <ul style="list-style-type: none"> • Revisit the calibration of the damage functions in the latest edition of the TxME using the Texas Flexible Pavement and Overlay Database (DSS) and the LTPP/Texas databases. • Identify five Districts (i.e., one from each of the five Texas climatic regions) that are willing to do comparisons between of FPS and TxME designs for selected recent projects. • Obtain high quality site-specific material & traffic data necessary for these design comparisons. • Perform lab testing to characterize local materials • Conduct comparisons between FPS and TxME designs. • Develop guidelines for collecting TxME material/traffic input and calibrating each damage model • Develop correction factors for the current damage models to represent local materials/mixes. • Develop training materials and train District personnel to calibrate models for other materials. <p>The expected technology readiness level (TRL) for this project is 8.</p>

<p>Anticipated Deliverables:</p>	<ol style="list-style-type: none"> 1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Training and Training materials 4. Project Summary Report 5. Research report documenting the findings of this research, including: <ul style="list-style-type: none"> • Validated aging models and parameters for Texas mixes. • Recommended updates to specifications and pavement manual in TxDOT standard format as applicable. • Guidelines for collecting TxME material/traffic input and calibrating damage models. • Library of TxME material properties. • Regional average traffic TxME input (class and axle load). • Correction factors for local materials/mixes. • Value of Research (VoR) that includes both qualitative and economic benefits.
<p>Proposal Requirements:</p>	<ol style="list-style-type: none"> 1. RFP#1 Q&A Deadline: 12:00 p.m. Central Time, Tuesday, February 20, 2024. 2. Proposal Deadline: 12:00 p.m. Central Time, Thursday, March 21, 2024. 3. Use the current “ProjAgre” and “PA Forms” templates located at the RTI Forms webpage. 4. Proposals will be considered non-responsive and will not be accepted for technical evaluation if they are not received by the deadline or do not meet the requirements stated in RTI's University Handbook. 5. Proposals should be submitted by the University Liaison in PDF format; (1) PDF file per proposal. File name should include project name and university abbreviation. 6. This project will be tracked during the life of the project using the Technology Readiness Level (TRL) scale. 7. The 2021 Texas Legislative Session requires that universities be in compliance with Senate Bill 475 by submitting a completed and signed TxDOT Security Questionnaire (TSQ) to RTIMAIN@txdot.gov. Universities that have not submitted a completed and signed TSQ one week after award will be considered non-compliant and unable to participate in the Program.