

## Research Project Statement 22-034 FY 2022 Annual Program

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Title:	Determine Feasibility and Methodologies of Using Structural Data from Traffic Speed Deflection Devices in Network-Level Treatment Decision Making
The Problem:	Traffic speed deflection devices (TSDDs) non-destructively measure structural condition while traveling at traffic speed. Advancement in TSDDs has enabled evaluation of structural condition at network level, reducing safety hazards associated with traditional Falling Weight Deflectometer (FWD) devices, and can also be cost effective. TxDOT is an active participant in Transportation Pooled Fund TPF-5(385), Pavement Structural Evaluation with Traffic Speed Deflection Devices (TSDDs). As a participant, TxDOT has collected more than 1,000 miles of TSDD data in several TxDOT districts and is expected to continue collecting TSDD data in the next three years. Recent interest from TxDOT districts on using continuous structural data in network treatment decisions has necessitated the need to verify TSDD measurements and provide guidelines and analysis methodologies to implement the structural condition data collected with TSDDs for network and project-level pavement management applications in Texas.
Technical Objectives:	<ul> <li>This research shall investigate the feasibility and methodologies of using TSDD measurements for both network and project level applications. The work to be performed shall include:</li> <li>1. Conduct in-depth literature review to capture international and national TSDD related efforts, research studies, and applications.</li> <li>2. Conduct field studies on different pavement structures to assess, evaluate, and validate the capability of TSDDs to properly measure the deflections and other pavement responses for pavement structural evaluations. The study results shall shed some light on which pavement types TSDD can be used on. In addition, a temperature correction procedure shall be recommended based on the field study results.</li> <li>3. Develop guidelines and analysis methodologies with case studies for using TSDD measurements to classify pavement sections structurally into different structural soundness categories or indexes, which can be used with pavement surface condition to select better-informed and more cost-effective pavement rehabilitation and preservation strategies.</li> <li>4. Investigate the feasibility of using TSDD measurements for the project level applications. This includes modulus back-calculation, structural number, and pavement remaining life.</li> <li>The expectation of the project end product(s) shall attain a Technology Readiness Level of 7.</li> </ul>
Anticipated Deliverables:	<ol> <li>Technical memorandum for each task completed.</li> <li>Monthly progress reports.</li> <li>Value of Research (VoR) that includes both qualitative and economic benefits, to be included in the final research report; <u>not a stand-alone deliverable</u>.</li> <li>Research report documenting the findings of the research, including a methodology which will enable districts to optimize treatment type selection, thus minimizing life cycle cost while maintaining the pavement above acceptable level of service for the user.</li> <li>Project Summary Report</li> </ol>
Proposal Requirements:	<ol> <li>Utilize the "Proj/Agre" and "PA_Form" templates located at the <u>TxDOT RTI website</u>.</li> <li>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 <u>University</u> <u>Handbook</u>, which is also located at the RTI website.</li> <li>Proposals should be submitted in PDF format, 1 PDF file per proposal. File name should include project name and university abbreviation.</li> <li>This project will be tracked during the life of the project using a Technology Readiness Level (TRL) scale. For more information about the use of a <u>TRL</u>, click.</li> </ol>