



Research Project Statement 24-090 FY 2024 Annual Program

Title:	Develop Performance of Base Plate Connections in COSS and Traffic Signal Structures
The Problem:	<p>TxDOT cantilever overhead sign structures (COSS) and traffic signal pole structures have a baseplate with an air gap above a drilled shaft foundation, a double nut anchor rod connection, and commonly a socketed fillet welded connection between the column and the base plate. While economical, this connection has a low fatigue-resistance threshold. Some current and past TxDOT designs and contractor submitted alternates involving multi-sided bent plate columns were not designed using fatigue provisions. Fatigue provisions did not exist in the design specification of the time.</p> <p>TxDOT is currently updating various ancillary structure standards for LRFD-LTS specifications, which does include fatigue provisions. Research is needed to ascertain the best connection type and design, while balancing economy and performance for new structures. Identifying the fatigue life of existing structures, including critical cases and means of repair and retrofit, should be included in the research.</p>
Technical Objectives:	<p>The results of this research will lead to improved ancillary structure details with mitigated fatigue risk, as well as a method of identifying existing inventory with fatigue risks. To meet the objectives of this project, the research team shall:</p> <ul style="list-style-type: none"> • Perform synthesis of research already conducted. • Utilize an industry advisory group to outline fabrication practices and economic considerations that may affect proposed connection type and design. • Develop an inventory database of COSS and traffic signal pole structures that are representative of the structures found in Texas. • Utilize structural modeling to identify from within the inventory critical cases that should be advanced to a testing program. • Develop and execute a targeted testing program that isolates critical design parameters for the fatigue performance of both the critical cases found in the inventory and proposed connection types and designs. • Provide recommendations for connection types and designs based on fatigue provisions. • Provide recommendations for identifying fatigue-critical of existing inventory. <p>The expected technology readiness level (TRL) for this project is 8.</p>
Anticipated Deliverables:	<ol style="list-style-type: none"> 1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Value of Research (VoR) that includes both qualitative and economic benefits, to be included in the final research report. This is not a stand-alone deliverable. 4. Research report documenting the findings of the research, including an inventory database on COSS and traffic signal pole structures and design recommendations and identified fatigue-critical inventory. 5. Project Summary Report.
Proposal Requirements:	<ol style="list-style-type: none"> 1. Project duration shall not exceed 36 months. 2. Proposal Deadline: 12:00 p.m. Central Time, Monday, March 6, 2023. 3. RFP#1 Q&A Deadline: 12:00 p.m. Central Time, Wednesday, February 1, 2023. 4. Use the current “ProjAgre” and “PA Forms” templates located at the RTI Forms webpage. 5. 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. 6. Proposals should be submitted in PDF format; (1) PDF file per proposal. File name should include project name and university abbreviation. 7. This project will be tracked during the life of the project using the Technology Readiness Level (TRL) scale. 8. 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 in advance of a proposal submission. Universities found to not submit a completed and signed TSQ in advance of proposal submitting will be held in non-compliance and unable to participate in the Program.