



Research Project Statement 24-023 FY 2024 Annual Program

Title:	Develop an Interactive State-Wide Production Rate Estimation Tool for Reliable Contract Time Determination
The Problem:	<p>Understanding and estimating realistic production rates of major work items in a highway project is critical to determine reasonable project contract time and ultimately complete the project on time. When using months of barricades as an estimate for the number of calendar days required to complete a project, more than two-thirds of TxDOT projects from 2014 to 2018 finished late. While there are many reasons for this it remains strong evidence that more systematic efforts across the state need to be made to improve the accuracy of project duration estimation and project schedule performance monitoring. One of the core requirements to achieve this goal is to have a better system for estimating production rates of major work items.</p> <p>TxDOT publishes and updates a construction production rate table every two years; however, this table merely works as a ballpark value and leaves a lot of room for interpretation. This makes it very difficult to find a realistic production rate for a specific work item in a specific region that better accounts for project intricacies. TxDOT often relies on engineering judgment to finalize the production rate, but with an abundance of available data, proper mining and presentation of that data can improve an engineer's decision making to avoid inaccurate production rate selection.</p> <p>Research studies show that highway production rates can significantly vary based on key project characteristics such as project type, size, bid quantities, construction time, and the location of the project. The variability of production rate is significant especially for a large state like Texas.</p>
Technical Objectives:	<p>TxDOT has a significant amount of historical project performance data in a digital format, such as bid documents, project performance, and daily work reports, that can be used to obtain the information of production rates of various work items. While TxDOT has such historical data, utilizing them has been challenging due to the lack of a method to extract meaningful insights.</p> <p>This research will leverage TxDOT historical data and will develop an interactive tool that can generate color-coded heat maps to visualize feasible ranges of production rates across Texas for major work items. An advanced and interactive production rate estimation tool will significantly help TxDOT achieve the goal of completing highway projects on time. Such a decision-aid tool can significantly improve TxDOT's practice in determining more accurate production rates, resulting in more accurate contract time determination, and contractor's baseline schedule evaluation and progress schedule monitoring. In the proposed tool, TxDOT engineers can easily select a work item and enter several input parameters such as quantities of work, project type and size, construction season, and then the tool can generate a state-wide heat map to visualize the production rate across the state. Such data-driven and practical production rates may provide a higher certainty and reliability in comparison with current TxDOT production rate table.</p> <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 interactive toolkit that will generate visualized interactive production rate heat maps for different work items for TxDOT. 5. Project Summary Report

Proposal Requirements:	<ol style="list-style-type: none">1. Proposal Deadline: 12:00 p.m. Central Time, Monday, March 6, 2023.2. RFP#1 Q&A Deadline: 12:00 p.m. Central Time, Wednesday, February 1, 2023.3. 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 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 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.
-------------------------------	--