



Research Project Statement 20-031 FY 2019 Annual Program

Title:	Performance and Improvement of Texas Poor Boy Continuous Bridge Deck Details
The Problem:	<p>TxDOT has established poor-boy continuous bridge deck details that enable a continuous bridge deck usually involving precast prestressed concrete beams designed as simple spans. The continuous bridge deck limits the number of expansion joints on bridges, which are point sources of maintenance and durability issues. TxDOT has had an approximate 40 year history of this type of construction. The Texas system relies on a concept which involves an intended crack former since the deck at bent locations cannot structurally resist the flexural demand nor the rotational deformation without intended cracks.</p> <p>In other areas of the country, a different concept of structural design "link-slab" is employed where localized deck debonding from the beam, deck reinforcing steel, and sometimes special concrete materials are used to increase resistance and lower flexural demand in the continuous bridge deck. The basic problem is two-fold:</p> <ol style="list-style-type: none"> 1. Does TxDOT experience performance issues with the current poor boy continuous bridge deck details? No one has performed a comprehensive survey to determine performance. In certain environments (high ADT, high rainfall, or high deicing salt zones), performance might be less than ideal. 2. Are there specific design and detailing methods for these poor boy continuous bridge deck details to improve performance in noted environments, maintain simplicity and constructability advantages of the current technique?
Technical Objectives:	<p>The researchers shall address the following:</p> <ol style="list-style-type: none"> 1. Perform a comprehensive survey of bridge decks constructed using the current poor boy continuous technique. Utilize NBI inspection data, as-built plans, and select site visits to determine performance and identify key variables (exposure, ADT, span length, age). Identify damage such as local deck spalls, beam end corrosion, cap deterioration, and controlled crack width. 2. Perform a comprehensive literature search and survey of national and international bridge design and detailing practices in this area. 3. Develop candidate design and detailing practice modifications that would improve performance, especially in more challenging environments. These modifications should maintain the simplicity of the simple span precast prestressed beam construction and basic bridge deck construction. Continuous for live load concepts are discouraged. Consider the following situations: <ol style="list-style-type: none"> a. New bridge construction with a focus on precast prestressed TxGirder bridges. b. Existing simple span bridges with expansion joints at every support, and retrofit details that add link slabs as a rehabilitation measure. 4. Conduct modeling, experiment, or a combination thereof, to develop a method to predict behavior improvements. 5. Develop design methodologies and recommended details. <p>The expectation of this project is that the end product will obtain a TRL level 7.</p>
Desired 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. 4. Research report documenting the findings of the research, including candidate design and detailing practice modifications, for review and approval prior to advancing. 5. Project Summary Report. 6. Half-day workshop.
Proposal Requirements:	<ol style="list-style-type: none"> 1. Utilize the "Proj/Agre" and "PA_Form" templates located at the TxDOT RTI website. 2. 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, which is also located at the RTI website. 3. Proposals should be submitted in PDF format, 1 PDF file per proposal. File name should include project name and university abbreviation. 4. 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 TRL, click.