TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Michigan Department of Transportation

INSTRUCTIONS:
Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* TPF-5(363) [FY 2019]	**Transportation Pooled Fund Program - Report Period:** ☐ Quarter 1 (January 1 – March 31) ☐ Quarter 2 (April 1 – June 30) ☑ Quarter 3 (July 1 – September 30) ☐ Quarter 4 (October 1 – December 31)	
Project Title: Evaluation of 0.70 inch Diameter Carbon Fiber Reinforced Polymer (CFRP) Pretensioning Strands in Prestressed Beams		
Name of Project Manager(s): Matt Chynoweth/Steve Kahl	**Phone Number:**	**E-Mail**
Lead Agency Project ID: OR15-541	**Other Project ID (i.e., contract #):**	**Project Start Date:** December 5, 2017
Original Project End Date: September 30, 2020	**Current Project End Date:**	**Number of Extensions:**

Project schedule status:

☐ On schedule ☐ On revised schedule ☐ Ahead of schedule ☑ Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
$358,723.59	$152,350.67	55%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$52,416.26 14.6%	$149,343.05	65%

Project Description:
Currently, 0.7 inch diameter CFRP strands are available; thus, making the use of CFRP pre-tensioning in pre-stressed beams more viable. The proposed research is necessary in order to evaluate the safe use of 0.7 inch diameter CFRP strands in a beam to meet load carrying requirements.
TASKS:
Evaluate and report on the material properties of larger diameter (0.7 inch) CFRP strands.
Evaluate and report on the interaction between 0.7 inch CFRP strands and structural concrete in pre-tensioning applications.
Evaluate design criteria such as guaranteed ultimate tensile strength, transfer length, development length, bond strength, proper concrete cover, strands spacing, and effect of difference in coefficient of thermal expansion between concrete and CFRP on the bond strength under loads and severe weather conditions.
Evaluate and report on the performance of 0.7 inch CFRP strands under extreme events such as fire/loading events following ASTM E-119 and under multiple cycles of freezing and thawing on large-scale prestressed beams following appropriate test standards.
Evaluate and report on unique changes to CFRP prestressed beam design procedures when 0.7 inch CFRP strands are used for longitudinal pre-tensioning.
Test and evaluate the performance of full-scale precast prestressed beams prestressed with 0.7 inch strands and compare the performance with similar beams prestressed with 0.6 inch steel and CFRP strands.
Prepare design procedure/examples and construction specifications for 0.7-inch CFRP prestressed concrete highway bridge beams and identify fabrication concerns and potential solutions to the larger diameter strands in relation to the current stressing bed layouts.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):
Research Team worked on Tasks 4-7 and Task 9.

Anticipated work next quarter:
The research team will continue to work on different research items according to the proposed work schedule. During the next quarter, it is expected that the research team will work on Tasks 4, 5, 7, 8, and 9 and will continue to share and discuss the test results with MDOT Engineers.

Significant Results:
The research team continues to share the test results with MDOT engineers as well as engineers from other DOTs participating in the project. A progress meeting is scheduled in Dec. 2019, where the PI will provide a detailed update on the progress of the project.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

A state-of-the-art hydraulic prestressing system was purchased and assembled in the Lab. to meet the need for a safe and effective prestressing system. Load cells as well as several other sensors were also purchased recently. Both the environmental and the fire chambers went under extensive maintenance/repair that required replacement of key hardware components and refrigerants.

Potential Implementation: