TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): ____IOWA DOT_____

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 # *TPF-5(366)*	**Transportation Pooled Fund Program - Report Period:** Quarter 1 (January 1 – March 31, 2021) Quarter 2 (April 1 – June 30, 2021) **X** Quarter 3 (July 1 – September 30, 2021) Quarter 4 (October 4 – December 31, 2021)	
Project Title: Development of a Design Guide for the Structural Design of Ultra High Performance Concrete		
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Lead Agency Project ID:	**Other Project ID (i.e., contract #):** Addendum 618	**Project Start Date:** 6/15/17
Original Project End Date: 5/31/18	**Project End Date:** 10/31/2022	**Number of Extensions:** Pooled fund project – yearly budgets

X On schedule ☐ On revised schedule ☐ Ahead of schedule ☐ Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Total Percentage of Work Completed
$179,213	$145,349.11	65%

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
$28,677.34		5%

Project Description: Ultra-High Performance Concrete (UHPC) has been recognized as a choice of material for mitigating bridge infrastructure challenges as well as to introduce innovative construction projects. In recent years, the use of UHPC has gained momentum in bridge projects across the country. However, formal structural design guidance for this material does not exist in North America, and therefore a comprehensive effort is required to formulate recommended design guidance so that the application of this material can be broadened.

The overall objective of this study is to facilitate advancement in the state-of-the-practice for UHPC in the US highway sector, which will include development of a design and construction guide specification. These advancements will also focus on other critical needs that are currently hindering the wider use of UHPC

A Steering Committee will be formed for this Pooled Fund Project. This Steering Committee can include contributing entities and will be led by the host State. The tasks are:

1. Coordinate meetings amongst committee members with the goal of study execution and information dissemination.
2. Provide guidance on national level advancement efforts.
3. Develop and prioritize research needs statements.
4. Develop, verify, and/or standardize test methods for assessment of UHPC material properties.
5. Complete structural performance-related research as necessary to develop greater knowledge of structural behavior.
6. Complete construction-related research as necessary to develop greater understanding of optimal construction processes.
7. Coordinate, share, and advance existing special provisions for the use of UHPC in highway construction projects.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Progress This Quarter:

Testing at the fifth laboratory was completed. Test data have been collected and processed. The sixth and the final lab has been chosen and the samples have been shipped. The last set of specimens will be evaluated using an alternative test machine as it would provide some valuable information on the influence of the test machine.

A new task has also been proposed for the next set of tests and approved by the Project Advisory Panel. In this task, the tensile test procedure is further evaluated on specimens with different fiber types and specimen sizes. Additionally, the obtained responses are compared against responses from other available test methods. Close to a hundred specimens will be cast and tested for the new task at Iowa State University. The required UHPC material for this task has been obtained (except for different fiber types), a new set of molds have been manufactured and casting of specimens has begun.

Anticipated work next quarter:

Testing of the specimens from the first task is planned to be completed by the end of October. A technical paper summarizing the test results will be submitted for journal publication.
Different types of fibers have to be procured. All the specimens for the new task will be cast, and testing of at least two sets of specimens is planned for the next quarter.

Significant Results:

The test data from the fifth lab showed a success rate close to 70%. All the tests in the fifth lab are done with the suggested recommendations of reduced gripping pressure and usage of clamps and a low-capacity (110 kips) uniaxial machine.

The test results from the first task show that the crack straining phase of the UHPC response is dependent on the type of UHPC. To further evaluate this, a set of tests is proposed in the new task to test the specimens with the same UHPC type and varying amounts of fiber volume.