

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(313) | | Transportation Pooled Fund Program - Report Period: Quarter 1 (January 1 – March 31, 2021) Quarter 2 (April 1 – June 30, 2021) Quarter 3 (July 1 – September 30, 2021) X Quarter 4 (October 1 – December 31, 2021) | |
| Project Title: Technology Transfer Concrete Consortium (TTCC) TPF-5(313) | | | |
| Project Manager: Khyle Clute | | Phone: 239-1471 | E-mail: Khyle.Clute@dot.iowa.gov |
| Project Investigator: Steve Tritsch | | Phone: 294-8103 | E-mail: stritsch@iastate.edu |
| Lead Agency Project ID: RT 0273 | Other Project ID (i.e., contract #): Addendum 532 | Project Start Date: 2/5/15 | |
| Original Project End Date: | Contract End Date: 5/31/2022 | Number of Extensions: Incremental funding, PFS | |

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 | Total Percentage of Work Completed |
|----------------------|--------------------------------|------------------------------------|
| \$2,064,000 | \$1,948,324.09 | NA |

Quarterly Project Statistics:

| Total Project Expenses This Quarter | Total Amount of Funds Expended This Quarter | Percentage of Work Completed This Quarter |
|-------------------------------------|---|---|
| \$15,897.19 | N/A | N/A |

Project Description:

The goal of the TTCC is to:

- Identify needed research projects
- Develop pooled fund initiatives
- Provide a forum for technology exchange between participants
- Develop and fund technology transfer materials
- Provide on-going communication of research needs faced by state agencies to the FHWA, industry, and CP Tech Center
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Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

- Work remaining on this pooled fund project are the 5 syntheses and training
 - Shrinkage & Crack Free Bridge Decks: Jason Weiss
 - Pavement ME Upgrades: Georgene Geary
 - Maintaining Smoothness: Jerod Gross
 - Fast Setting Patching Materials: Tyler Ley
 - Dowel Testing: Mark Snyder/ ACPA
- Copies of the PPTs from presentations on the projects are available on the NCC website: <https://cptechcenter.org/nc2-meetings/>
- Final reports have been submitted for review and editing:
 - Pavement ME Upgrades: Georgene Geary
 - Fast Setting Patching Materials: Tyler Ley
- Final reports for the following will be submitted, reviewed, and published prior to the April NCC meeting.
 - Shrinkage & Crack Free Bridge Decks: Jason Weiss
 - Maintaining Smoothness: Jerod Gross
- Mark Snyder has been given an additional \$32,950 to validate the recommendations of the previous research concerning the modified test protocol (i.e., that reducing the load levels, changing the support condition and moving the load rather than the specimen will produce load-deflection behavior in standard dowel groups that is similar to that of a single standard dowel when tested according to Section 5 of AASHTO T253). He will do the following:

Research Approach

Two replicate test specimens will be prepared for load-deflection testing using the ACPA- developed load-deflection test protocol with the modifications recommended in the previous study report (i.e., reduced load magnitude, rigid support, moving load rather than moving specimen for tests at four corners). Only one of these will be tested to the 50% overload condition, and only after completion of the standard loading protocol.

A third specimen will be prepared and tested according to the modified ACPA load-deflection test protocol using 1.5-inch diameter dowels rather than the 1.25-inch dowels that currently serve as the basis for the acceptance criterion in the AASHTO T253 load-deflection test. This will provide a basis for developing acceptance criteria for commonly used 1.5-inch diameter steel dowels and alternate dowels that are considered as substitutes for 1.5-inch steel dowels.

Two replicate standard AASHTO T253 tests will be performed using rigid foundation support (i.e., steel plate rather than plywood) to validate the relationship between standard and modified tests for rigid support conditions.

All concrete will be batched using the same component materials (obtained from established and reliable sources that are expected to be available for the foreseeable future) and a single mixture design that conforms with the specification requirements. Standard 1.25-inch (31.8-mm) epoxy-coated solid steel cylindrical dowels (18 inch [45 cm] long, spaced 12 inches [30 cm] apart) will be used in both standard AASHTO T253 specimens and two of the modified ACPA T253 specimens; 1.5-inch [38-mm] epoxy-coated solid steel cylindrical dowels will be used in the third specimen.

Companion 6-in x 12-in (15-cm x 30-cm) concrete cylinders will be cast with the specimens for compressive strength and elastic modulus testing at 28 days.

The load-deflection testing of standard AASHTO T253 specimens will be performed in accordance with the most recent version of that specification. The modified tests will be performed in accordance with the current ACPA load-deflection test specification (which has already been modified to reflect the recommendations from the previous study). All testing of all specimens will be performed within 24 hours of 28 days following specimen casting (i.e., 27 – 29 days).

Load-deflection data will be analyzed and finite element modeling will be used (if necessary) to assist in the analysis and in the validation of the proposed test protocol and acceptance criterion.

Any required further modifications to the new specifications for highway paving dowels and tests of those dowels will be incorporated in the specifications.

Anticipated Outcome and Benefit

The successful completion of these tests will enable the confident use of the new load-deflection test protocol by state highway agencies for fairly comparing the structural behavior of newer, innovative dowel load transfer systems, and for evaluating the relative benefits of different dowel sizes. It will also be useful to dowel manufacturers in the refinement of existing products and the development of new dowel products. All of these benefits will accrue to the public as opportunities are realized for the increased use of more sustainable (e.g., corrosion-resistant, long-lasting, economical) dowels in pavements.

Circumstance affecting project or budget (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). N/A

There are 34 TTCC TPF 5(313) TAC member states. Representative attendance varies by meeting.

| State & # of Reps | | State & # of Reps | | State & # of Reps | | State & # of Reps | | State & # of Reps | |
|-------------------|---|-------------------|---|-------------------|---|-------------------|---|-------------------|---|
| Alabama | 2 | California | 1 | Colorado | 2 | Florida | 2 | Georgia | 4 |
| Idaho | 2 | Illinois | 2 | Indiana | 4 | Iowa | 2 | Kansas | 4 |
| Louisiana | 2 | Massachusetts | 2 | Michigan | 2 | Minnesota | 2 | Missouri | 1 |
| Montana | 2 | Nebraska | 1 | Nevada | 1 | New York | 1 | North Carolina | 2 |
| North Dakota | 2 | Ohio | 2 | Oklahoma | 3 | Pennsylvania | 1 | South Carolina | 2 |
| South Dakota | 2 | Tennessee | 2 | Texas | 2 | Texas | 2 | Utah | 1 |
| Washington | 1 | West Virginia | 1 | Wisconsin | 1 | Kentucky | 2 | Massachusetts | 2 |
| Oregon | 1 | | | | | | | | |