TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Minnesota 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(269)		**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: Development of an Improved Design Procedure for Unbonded Concrete Overlays		
Name of Project Manager(s): Tom Burnham	**Phone Number:** 651-366-5452	**E-Mail** tom.burnham@state.mn.us
Lead Agency Project ID: TPF-5(269)	**Other Project ID (i.e., contract #):** 99008 Work Order No. 83	**Project Start Date:** June 17, 2013
Original Project End Date: May 31, 2016	**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
$407,987	$85,000	30%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$50,000	$0	50%

Project Description:

This project was created to address the timely need for an improved mechanistic-empirical based design procedure for unbonded concrete overlays of existing concrete and composite pavements (UCOCP).

The objectives of the projects are:

1. Study and understand the field performance history of UCOCP as demonstrated by various test sections and in-service pavements.
2. Determine suitable separator layer (interlayer) materials and properties to insure long term performance of UCOCP systems.
3. Develop a design procedure for unbonded concrete overlays of existing concrete and composite pavements utilizing existing validated performance models, as well as new analytical models derived to address deficient or missing design parameters in existing methods. The design guide will be based on mechanistic-empirical principles, including the effects of various concrete overlay materials, separator layer (interlayer) types, panel thickness (4" to 10"?) and panel size, joint load transfer mechanisms, traffic loads, and climates (nation-wide) in which they must perform.
4. Provide improved or supplemental guidance on the suitability of projects for unbonded concrete overlays.

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

Concrete beams with existing HMA on top were obtained from an in-service composite pavement at MnROAD, and shipped to the University of Pittsburgh. These compliment the beams which the University of Pittsburgh obtained from the pavements in Michigan. The beams were catalogued and prepared for laboratory testing. Laboratory test modifications were also made to accommodate the specimen size. The loading frame was fabricated, the loading regime was programmed, and the data acquisition system was finalized for all 3 mechanisms to be tested. A test protocol was finalized for carrying out the testing for two of the three mechanisms to be studied. A total of 6 beams were tested in this quarter; the lab data will later be used in the development of the structural models. Modifications are still being made to the test setup for the final mechanism (characterization of reflective cracking) to be investigated. In addition, the Q4 2014 research effort included analysis of the Michigan unbonded overlay survey and distress data obtained in Q3 2014.

Anticipated work next quarter:

During Q1 2015, an additional nonwoven geotextile fabric will be selected for testing, and the testing of the 3rd mechanism (reflective cracking) will be finalized. The preparation of field beams with an HMA interlayer will be continued and sand patch testing will be performed on these beams to characterize the texture on the HMA surface prior to casting the concrete overlay. Testing on these specimens is expected to begin in early February with the bulk of beam testing occurring during Q1 2015. Vertical pull-off testing will be performed concurrently with the beam testing and will not interfere with the completion of the beam testing. It is estimated that the laboratory component of Task 2 will be completed in Q2 2015.

Significant Results:

Six existing UBOL design procedures were discovered as being relevant to this effort. There is strong interest in packaging the new UBOL procedure developed under this contract, with the recently developed BCOA-ME product from pooled fund TPF 5-165.

The team has done preliminary investigation on data from MnDOT's pavement management system database, which included some valuable longer term performance of UBOLs. This historical information will be very helpful toward the development of the new design procedure.

A new longitudinal cracking model has been developed, which will be important to the development of the new design procedure.

Laboratory test protocols have been finalized for carrying out the testing for two of the three interlayer mechanisms to be studied.

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).

Delays in subcontracting with the University of Pittsburgh required a modification of the project timeline and amendment of the contract. The contract modification is under way. The project work is currently progressing as scheduled in the amended work plan. No additional delays in the project research are currently anticipated. As a result, the project work is on task as set forth in the amended work plan.

Potential Implementation:

There is great and immediate demand for the product from this project.

Once the design procedure and guidelines are accepted as viable and reliable by the design community, the implementation will occur very quickly.