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:** October 31, 2018	**Number of Extensions:** 2

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
$463,787	$345,469	70%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$0	$0	84%

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.):

During Q4 2017:

- No work was completed on this project during the contract renewal process.
- A new contract with the University of Pittsburgh was approved on November 8, 2017.
- Work resumed after November 8th, however no significant progress was reported as of December 31st.

Anticipated work next quarter:

During Q1 2018, the major focus for the research team will be resume work on the remaining tasks outlined in the new contract with the University of Pittsburgh. The proposed schedule in the new contract indicates the alpha version of the the new design procedure will be available for TAP review by late January, 2018.

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 testing of beam samples have revealed some interesting behaviors of interlayers under load, particularly with asphalt-based materials.

The primary failures modes of UBOLs have been identified. Updated drainage guidelines for UBOLs have been developed.

Significant knowledge has been gained on the characterization of interlayers for UBOLs.

Significant progress has been made on developing new structural models for UBOLs.

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).

Work on this project is significantly behind the original completion date, due to the relocation of the principal investigator to the University of Pittsburgh. A new contract has been approved, and work has resumed on this project.

The remaining work on this project will now be completed by October 2018.

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.