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:** May 31, 2017	**Number of Extensions:** 1

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	$322,971	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	94

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 Q1 2017:

• The Principal Investigator, Professor Khazanovich, recently accepted a faculty position in the Department of Civil and Environmental Engineering at the University of Pittsburgh, starting in January 2017. An initial plan to keep the University of Minnesota as the prime contractor did not work out, so the decision was made to close the contract with the University of Minnesota and move the contract to the University of Pittsburgh.

• As part of the closing out of the University of Minnesota contract, the research team prepared a report for the work completed to date in Task 4.

• Preparation began for establishing the new contract with the University of Pittsburgh to complete the project.

Anticipated work next quarter:

During Q2 2017, a major focus for the research team will be to establish and begin work under the new contract to develop an alpha-build of the front-end for the UCOCP procedure.

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).

The project work is currently progressing behind schedule due to the move of the principal investigator to the University of Pittsburgh.

The majority of the work on this project is now being proposed to be completed by May 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.