TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Wisconsin 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 # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* TPF-5(302)	**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: Modified Binder (PG+) Specification and Quality Control Criteria		
Name of Project Manager(s): Barry Paye	**Phone Number:** (608)246-7945	**E-Mail** barry.paye@dot.wi.gov
Lead Agency Project ID: 0092-14-20	**Other Project ID (i.e., contract #):**	**Project Start Date:** 9/30/2014
Original Project End Date: 9/30/2015	**Current Project End Date:** 9/30/2016	**Number of Extensions:** 0

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
$195,686.00	$134,245.85	60%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$43,480.27 22%	$43,480.27	63%

Project Description:

The intent of this project is to provide essential information to five partner state agencies (Wisconsin, Ohio, Idaho, Kansas and Colorado DOTs) to support standardization of PG+ specifications by identifying those PG+ test methods that are reproducible and show promise in simulating actual field performance.

Based on the stated needs and goals, the main objectives of the proposed pooled fund research include:

1- Perform detailed assessment of current PG+ and modified binder quality control procedures in partnering states in terms of reliability, applicability, and relevance to performance and quality of modified asphalt binders.

2- Use a range of modified binders, representative of the products currently specified by partner states, to develop unified test procedures and specification criteria based on products placed in the field.

3- Improve product quality and reliability through conduct of ruggedness studies and development of precision and bias statements for selected tests.

4- Introduce consistency to current products supplied by elimination or reduction of differences in modified binder acceptance tests and criteria throughout member states.

5- Validate and establish relevance of suggested PG+ and quality control procedures in terms of mixture performance

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

In November of 2015, Pooled Fund members and MARC researchers discussed the latest task report that summarized results from Work Area #2 of the proposed work plan. Objectives of the conference call were to:

1-Discuss interpretation of the results presented in the Work Area #2 task report.

2- Select mixture performance tests to be conducted for Work Area #3 of the proposed work plan.

3-For test methods that show promise as a potential replacement to current PG+ tests, organize multi-lab variability testing.

4- Identify field data collection steps

From the conference call, the following summary includes significant points from the discussions:

1-Semi-circular beam, indirect tension fatigue and Asphalt Thermal Cracking Analyzer test methods are to be conducted on the Pooled Fund Mixtures.

2-Individual states have identified test methods that could potentially be used to replace the current PG+ test methods. Representatives from Ohio identified the ER-DSR procedure as a potential replacement for the current AASHTO T301 procedure. Colorado identified the BYET test method as a potential replacement for the current Toughness and Tenacity test method.

3-Representatives from Ohio currently organize a round robin testing plan within the state and are incorporating the ER-DSR procedure into the testing plan. Round Robin test results will be used for Multi-lab variability analysis. Representatives from Colorado are currently working with MARC researchers to determine the next potential steps to potential implementation of the BYET procedure.

4- Representatives from Ohio also requested further investigation of the ER procedure to minimize the total time of the test method. No additional testing was required to do this analysis and a summary of the analysis is provided in the

Anticipated work next quarter:

Work for next quarter will entirely be dedicated to performance testing of asphalt binders and mixtures. Agreed upon binder and mixture tests will be conducted on a set of materials provided by the Pooled Fund member states. Writing of a Task Report will also start next quarter to document analysis of the binders and mixture tests. This is in partial fulfillment of Area #3 of the proposed work plan.

Significant Results:

- During the November teleconference call, some of the Pooled Fund Members requested further investigation of the ER DSR procedure to reduce the time required to maintain high correlations with the current AASHTO T 301 procedure. Two factors were identified to minimize the testing time: aging and actual test time.
- To address the testing time results were collected after 15 and 30 minutes of recovery time using the ER-DSR procedure. Results gave the same ranking of elastic recovery independent of time. However, each binder recovered approximately 5% less using the 15 minute recovery time, as expected. If a shorter recovery time is desired, state DOT limits will need to allow lower recovery limits proportional to the recovery time.

- To address the aging condition, elastic recovery testing is conducted on RTFO aged binder and is measured using the 8 mm plate. To consider unaged binder, testing was conducted using 25 mm plates in the DSR. The results were correlated with the results reported in Task Report #2. A correlation value of 0.75 was determined along with a similar ranking of elastic recovery measurements.

- The following points summarize significant findings from the ER-DSR analysis:

• The ER-DSR procedure can accommodate testing using the 25 mm plate and unaged binder samples.
• The ER-DSR procedure can be shortened by using a 15 minute recovery interval.
• The total testing time for the ER-DSR procedure is estimated to be 40 minutes, which is less than 20 % of the time required for the T301 elastic recovery procedure. In addition more information can be obtained ($G^*/\sin\delta$ parameter, for example), on the same sample used for the ER-DSR test.

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).

Due to differences between the contract dates listed and the actual start date of the project, new start and end dates were requested and approved. The new start and end dates of the Pooled Fund project are 10/1/2014 and 9/30/2016, respectively.

Potential Implementation:

N/A