

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Virginia 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>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i> TPF-5 (225)	Transportation Pooled Fund Program - Report Period: <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input type="checkbox"/> Quarter 2 (April 1 – June 30) <input type="checkbox"/> Quarter 3 (July 1 – September 30) <input checked="" type="checkbox"/> Quarter 4 (October 1 – December 31)	
Project Title: Validation of Hot-Poured Crack Sealant Performance Based Guidelines		
Name of Project Manager(s): Imad L. Al-Qadi	Phone Number: 217-265 0427	E-Mail alqadi@illinois.edu
Lead Agency Project ID: VCTIR 98160	Other Project ID (i.e., contract #):	Project Start Date: 09/01/2010
Original Project End Date: 09/01/2014	Current Project End Date: 09/01/2015	Number of Extensions: 1 extension for a year

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
730,000	541,221	74%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
34,338	34,338	83.3%

Project Description:

Recently, performance-based guidelines were developed as a systematic procedure to select hot-poured bituminous crack sealant. These guidelines are the outcome of the pool-funded North American Consortium led by the University of Illinois at Urbana-Champaign and the National Research Council of Canada. The work proposed a "Sealant Grade" (SG) system to select hot-poured crack sealant based on environmental conditions. A special effort was made to use the equipment originally developed by the Strategic Highway Research Program (SHRP), which was used to measure binder rheological behavior as part of the Performance Grade (PG) system.

These developed laboratory tests allow for measuring hot-poured bituminous-based crack sealant's rheological and mechanical properties over a wide range of service temperatures. Preliminary thresholds for each test were identified to ensure desirable field performance. Then, the preliminary thresholds were utilized in the SG system based on extensive laboratory testing, limited between-laboratory testing, and limited field performance data.

However, because the preliminary thresholds were determined based on only limited field data, mainly from Canada, a comprehensive field study is urgently needed to validate and fine-tune the present threshold values.

Furthermore, the developed guidelines should be validated in several states under various climate zones.

Tasks:

- I. Laboratory Validation
- II. Field testing and installations
- III. Test section monitoring
- IV. Threshold value fine tuning
- V. Cost effectiveness quantification
- VI. Development of crack sealant selection procedures and installation guidelines.

Objectives:

The developed laboratory tests and the new guidelines must be verified for precision and bias between laboratories as well as within laboratories. In addition, since preliminary thresholds were established for each test based on extensive laboratory testing but with limited field and within-laboratory data, an extensive field study is urgently needed to validate and fine-tune the threshold values. Hence, this proposed study aims 1) to validate the developed laboratory tests, 2) to determine the thresholds using a more diverse array of field performance data, and 3) to implement crack sealant guidelines for field application.

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

No meetings took place in the last quarter.

Task-I: Laboratory Validation (75% completed):

Progress in the laboratory testing is summarized as follows:

- Low temperature SG determination of all materials used in this study was completed. This allows correlating these results with field performance data. A summary of laboratory test results and low temperature sealant grade is attached to the current quarter report.
- Testing of field aged sample collected during the second survey from four sections (Minnesota, Ontario, Wisconsin and New Hampshire) is started using low temperature tests (CSBBR, CSAT and CSDTT). There are two objectives for testing the field aged samples. First is to correlate the field performance with the lab results and second to utilize the results in the validation of the vacuum oven aging (VOA) as a long-term aging procedure.
- Sealant performance test at installation temperature, using viscosity test, is complete for 10 materials and will be completed in the next quarter.
- New set of samples were sent to New Hampshire for BBR testing as part of the interlaboratory testing program.

A updated laboratory report summarizing the tests conducted on the samples installed in different sites and aging study is in progress.

Task-II: Field Testing and Installation (100% completed):

This task was completed.

Task-III: Test section monitoring (60% completed).

No progress in this task this quarter. Third survey were planned to take place through Feb 2014 to March 2014

Task-IV: Threshold value fine-tuning (50% completed).

The work on the field survey data is in progress including statistical analysis. Survey data were analyzed to investigate the effects of rout geometry, overbanding, installation temperature, and treatment type.

Correlation between field and laboratory performance data is being investigated.

Task-V: Cost effectiveness quantification (0% completed).

No progress in this task this quarter.

Task-VI: Development of crack sealant selection procedures and installation guidelines (90% completed).

First draft of the installation guidelines is prepared.

Anticipated work next quarter:

1. Sealant grading process at installation temperatures will be completed for all sealants used in the test matrix using rotational viscometer.
2. Sealant grading process at high and intermediate in-service temperature will be continued for the sealants used in the test matrix using dynamic shear rheometer.
3. Laboratory testing will be conducted on the aged sealant samples collected from four different sections in the second winter survey.
4. Laboratory testing will be conducted on the samples collected from ATREL sealants in October 2013.
5. Third round of winter surveys will be conducted for the five test sites.
6. An updated document will be prepared to summarize the outcome of the laboratory testing program.
7. Statistical analysis of field and laboratory data will be performed.

Significant Results:

Based on the low temperature sealant grading, it can be seen that there is a poor correlation between the ASTM type of sealant and their corresponding low SG and field performance. Field performance and laboratory performance ranking of selected sealants using proposed AASHTO tests were in good agreement except couple of products.

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).

No significant problems encountered this quarter.

Potential Implementation:

Based on the field validation study at various test sites, performance thresholds use in Sealant Grade System will be Updated. These thresholds were initially determined based on limited field data. The finalized grade system can be used by states and other agencies for selecting sealants based on climatic region. Sealant field installation guidelines will also be available at the end of this project.