

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 checked="" type="checkbox"/> Quarter 3 (July 1 – September 30) <input 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: 12/31/2015	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	684,671	75%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
13,361	13,361	76% (with updated schedule)

Project Description:

Recently, performance-based guidelines were developed as a systematic procedure to select hot-poured bituminous crack sealants. 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:**

Conference call meeting took place on September 15th. A progress summary was presented during the two hour meeting.

Task-I: Laboratory Validation (80% completed):

Progress in the laboratory testing is summarized as follow:

- BBR tests are completed on the field aged samples collected from New York and New Hampshire test sites during 2014 survey. Therefore, at least one set of field aged samples were tested from each test site. These results were correlated with the field performance of the sealants to validate and fine-tune the BBR test method.

- New concept for an adhesion test is under development. Initial results suggested that the test is feasible. Different sample sizes and shapes are being evaluated using the new fixture utilizing aggregate (mostly limestone) and aluminum subgrade.

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

- An additional test site was installed in Virginia in the last week of September. Four different sealants were selected (including soft to stiff materials) to validate the findings from other test sites.

Task-III: Test section monitoring (90% completed).

Due to a new test site installation in Virginia, a winter survey is being expected for this test site.

Task-IV: Threshold value fine-tuning (70% completed).

The work on 2014 field survey data is completed including statistical analysis. Initial lab-field performance correlation is performed on the field survey data and BBR test results. The statistical results show a good correlation between field and lab performance. Analysis validates the BBR test method and indicates that there is a need for a low limit threshold as well as high limit threshold for sealant's low temperature stiffness.

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 (50% completed).

First draft of the installation guidelines is submitted in the previous quarter. It is expected to collect the reviews from the panel in this quarter.

Anticipated work next quarter:

1. ATLAS testing facility will be used to develop a new test using DSR to grade the sealants at intermediate and high performance grade temperatures. Sealants will be graded at high and intermediate in-service temperature for the sealants used in the test matrix.
2. Development of a new adhesion test will be continued.
3. Development of a new direct tension test will be started.
4. BBR test method validation and fine tuning will be completed.
5. Samples from ATREL test site will be tested for aging study.
6. New labs will be added to the interlaboratory study. A testing package will be sent in this quarter.

Significant Results:

1. Most of the products and configurations failed within three years.
2. Rout and seal application is recommended as an effective treatment approach.
3. BBR test results show good correlation with field performance.
4. It is suggested that a minimum and maximum BBR stiffness thresholds be established.

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).

Potential Implementation:

Based on the field validation study at various test sites, performance thresholds 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.