TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Virginia 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)*	**Transportation Pooled Fund Program - Report Period:**
TPF-5 (225)	☐ 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:		
Validation of Hot-Poured Crack Sealant Performance Based Guidelines		
Name of Project Manager(s):	**Phone Number:**	**E-Mail**
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Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:**
VCTIR 98160		09/01/2010
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
09/01/2014	09/01/2014	-

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	117,448.43	20%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
64,217.73 (8.8%)	64,217.73	27%

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-fund 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

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

Meetings:

No meetings took place this quarter.

Task-I: Laboratory Validation (20% completed):

A small size kettle was rented from Sherwin Industries (a distributor of Crafco products in Illinois) to perform a laboratory sealant aging study. The kettle was kept in the laboratory for four weeks to conduct the needed experiments. Ten of the sealant products, proposed in this study, were melted in the kettle for a certain period of time in order to collect samples from the kettle. The samples were collected at 2, 3, 4, and 5th hours of heating.

Mechanical and rheological characterization of these samples is currently underway to evaluate the effects kettle-aging of sealants during construction. Bending beam rheometer (BBR), rotational viscometer (RV), direct tension dynamic shear rheometry, and adhesion tests are planned for testing the collected sealant the samples. BBR and RV tests are being conducted.

In addition, eight of the products melted in the kettle were used to seal routed cracks in a test section at ATREL facility of the University of Illinois. These sealants will be sampled every six months for mechanical and rheological characterization to evaluate field aging.

Task-II: Field Testing and Installation (40% completed):

Test site installations in two states and a Canadian province were completed during this quarter. These states are Wisconsin, Minnesota, and Ontario, Canada. Some of installation details and information on test sites follows:

1- Hwy 92, Brooklyn, Wisconsin - July 18-20: Five sealant materials were installed down on the test site. These products are Crafco 244, Crafco 522, McAsphalt 3060LM, Right Pointe 3405 and Right Pointe 3405M. All cracks are routed and

Anticipated work next quarter:

1. Preparation of field installation for other test sites is underway. New Hampshire installation will take place on the week of October 3rd. The sealant products (five products were proposed for this site) and survey tools were already sent to the test site (Task-II).
2. Laboratory tests on the samples collected during installation of test sites and laboratory kettle study in addition to original samples will be continued. In addition to BBR and RV tests, which is already underway, dynamic shear rheometer (DSR), direction tension test (DTT), and adhesion tests will also be conducted on these samples (Task-I).
3. Scheduling for winter evaluation of the installed test sites is in progress (Task-III).
4. Search is in progress for candidate test sites for three states whose installations were postponed to 2012. These states are New York, Michigan, and Rhode Island (Task-II).
5. A face-to-face meeting will be scheduled to discuss and review the progress in the project within the first completed year after TRB annual meetings.

Significant Results:

Preliminary results were obtained from laboratory kettle-aged samples using BBR and RV tests. According to the BBR tests, the change in stiffness with heating time is product dependent.

Three of the products from one of the manufacturers exhibited decrease in stiffness whereas stiffness increased for the products from another manufacturer. This behavior could be related to the chemical formulation of the sealants. When the results were compared to that of original unaged samples, it was observed that most of the kettle-aging occurred in the first 2-3 hours.

According to the viscosity (RV test) results, results are more consistent for almost all tested sealants. Preliminary results showed that viscosity increases by kettle heating time.

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 major problems were encountered during this quarter.

Potential Implementation:

Based on the field validation study at various test sites, performance thresholds will be updated for the laboratory tests designed for sealant grading. These thresholds were initially determined based on limited field data. The finalized grade system can be used by the states on the selection of sealants in their climatic region. Sealant field installation guidelines will also be available at the end of this project for the use of states.