

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>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i> <p style="text-align: center;">TPF-5(229)</p>	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 4 – December 31)	
Project Title: <p style="text-align: center;">Characterization of Drainage Layer Properties for MEPDG</p>		
Name of Project Manager(s): <p style="text-align: center;">Brian K. Diefenderfer</p>	Phone Number: <p style="text-align: center;">(434)293-1944</p>	E-Mail <p style="text-align: center;">Brian.Diefenderfer@VDOT.Virginia.gov</p>
Lead Agency Project ID:	Other Project ID (i.e., contract #): <p style="text-align: center;">VTRC-MOA-11-005(98289)</p>	Project Start Date: <p style="text-align: center;">September 1, 2010</p>
Original Project End Date: <p style="text-align: center;">August 31, 2013</p>	Current Project End Date: <p style="text-align: center;">August 31, 2013</p>	Number of Extensions:

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
\$270,000.00	18.27%	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
\$49,329/29%	\$14182	19.5%

Project Description:

The objectives of this pooled fund study are to develop methods to estimate the elastic modulus and strength of pavement drainage layers for the Mechanistic-Empirical Pavement Design Guide (MEPDG), to perform analysis of the stability and failure of the drainage layer in the pavement structure, and to develop specifications for required minimum porosity for effective drainage.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**1. Collection and storage of the drainage material from participating states for laboratory tests:**

The drainage material collected from the participating states so far is the asphalt stabilized open graded material from Virginia. The material is stored in the laboratory of Virginia Tech Transportation Institute (VTTI).

2. Improving the test protocols:

Based on the information collected from available literature we decided that the dynamic modulus test would be conducted on the Asphalt Treated Permeable Base (ATPB) from Virginia. Although the resilient modulus was widely used and reliable to characterize the mixture properties in the past, the new 2002 AASHTO M-E Design Guide adopted the dynamic modulus for asphalt concrete mixtures. The Standard Test Method for Dynamic Modulus of Asphalt Mixtures according to ASTM D3497-79 will be followed for testing ATPB. The specimens will be 4 inches in diameter and 6 inches in height because the maximum particle size of the aggregate is 1 inch. The gyratory compactor will be used to prepare specimens with air void contents ranging from 20% to 35%. The AASHTO T215 procedure, Permeability of Granular Soils (Constant Height), will be followed to perform the permeability test of drainage material at different porosities.

3. Laboratory equipment calibration:

The gyratory compactor has been set up and calibrated. It is ready for compacting specimens with air void contents ranging from 20% to 35%. The loading ram of the Interlaken's Asphalt Mix Performance Tester is broken and we are trying to fix it. The Asphalt Mix Performance Tester will be calibrated again after repair.

4. Training on personnel to conduct tests:

Two graduate students are trained to use the equipment in the asphalt laboratory and to conduct the tests.

5. Simulation on the location effects of drainage layer

The location effects of drainage layer to the performance of the pavement structure will be evaluated by using the finite element method in ABAQUS.

Anticipated work next quarter:

Acquire adequate materials from participating states: Idaho, Oklahoma and Wisconsin.

Training procedure will be continued for graduate students to conduct dynamic modulus test using the Interlaken Asphalt Mix Performance Tester, as well as to perform a series of standard tests such as the permeability test and gyratory compact test on the typical drainage layer materials.

About 25 specimens with air void contents ranging from 20% to 35% will be made by the gyratory compactor and the dynamic modulus test will be conducted on these specimens.

The AASHTO T215 procedure, Permeability of Granular Soils (Constant Height), will be followed to perform the permeability test on these specimens.

Data acquired from laboratory test will be analyzed. The relationships between the dynamic modulus, the permeability of ATPB and the porosities will be investigated respectively.

The location effects of drainage layer will continue to be investigated and suggestions will be made to select the location of drainage layer.

Significant Results:

Typical asphalt stabilized aggregates used by Virginia for the drainage layer have been collected and stored for a series of tests.

The gyratory compactor has been set up and calibrated and the Interlaken Asphalt Mix Performance Tester is now under repair.

The test protocols to characterize the asphalt stabilized open graded aggregates have been revised and improved. The dynamic modulus test is selected as the major test method to characterize the ATPB instead of using the resilient modulus test.

Graduate students are trained to conduct the gyratory compact test and specific gravity test in the asphalt laboratory.

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 Asphalt Mix Performance Tester for dynamic modulus test was broken unexpectedly and we are trying to fix it. This might affect the original schedule slightly.

Potential Implementation: