

**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 TPF-5(229)	Transportation Pooled Fund Program-Report Period: √Quarterly 1 (January 1—March 31) Quarterly 2 (April 1—June 30) Quarterly 3 (July 1—September 30) Quarterly 4 (October 4—December 31)	
Project Title: Characterization of Drainage Layer Properties for MEPDG		
Name of Project Manager(s): Brain K. Diefenderfer	Phone Number: (434)293-1944	E-Mail: Brain.Diefenderfer@VDOT.Virginia.gov
Lead Agency Project ID:	Other Project ID (i.e., contract #): VTRC-MOA-11-005(98289)	Project Start Date: September 1, 2010
Original Project End Date: August 31,2013	Current Project End Date: August 31,2013	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	\$109319	40%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
\$22500, 92%	\$20700	100% (based on quarter)

Project Description:

The objectives of this pooled fund study are to develop methods for characterizing 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. Specimen fabrication**

More specimens of 6" diameter and 7" height were made by gyratory compactor. The air void contents of these specimens range from 20% to 32%. All of these specimens were then cored and cut to be 4" diameter and 6" height, which is the standard size used for strength tests. Until now all the open graded asphalt stabilized aggregates from Virginia have been used for making specimens for further testing. The total number of compacted specimens is 30.

2. Bulk specific gravity (Gmb) determination

The bulk specific gravity (Gmb) of the laboratory compacted specimen has been determined both before and after coring and cutting. Three methods were applied to the specimens to determine the bulk specific gravity, which are Dimensional method, Parafilm method and Revised SSD method.

3. Data analysis

The data from the bulk specific gravity testing were analyzed and air void content for each specimen was calculated according to the testing data. Results from the three methods were compared. It is found that the Gmbs obtained from the three methods are consistent with each other. In addition, the air void content before and after coring and cutting were compared for all the specimens. It shows that the air void content dropped by about 3% after coring and cutting for specimens with 20% to 32% air void content, indicating the peripheral air void contents are even larger.

4. FEM simulation

The FEM simulation was used to investigate the structural contribution, failure modes as well as the position effect of the drainage layer. A typical pavement structure with ATPB located under the base course was set up in the FEM simulation and results were analyzed.

Anticipated work next quarter:

More specimens with air void content ranging from 20% to 35% will be made with the gyratory compactor using the asphalt stabilized aggregates from Oklahoma. The loose aggregates from Oklahoma will be used to produce cement treated permeable material and more specimens will be made with this material.

The Virginia Test Method-84 will be followed for the permeability testing and the dynamic modulus testing will also be conducted on the laboratory compacted specimens.

The data acquired from laboratory testing will be analyzed. The relationship between the dynamic modulus, the permeability and the porosities of ATPB will be investigated.

The structural contribution and location effects of drainage layer will continue to be investigated and suggestions would be made for selecting the location of drainage layer.

Significant Results:

1. All the specimens have been compacted with the open graded asphalt stabilized aggregates from Virginia.

2. The bulk specific gravity testing was conducted on all the laboratory compacted specimens. The results from three different methods were analyzed and compared. The difference between the air void content before and after coring and cutting was determined to be about 3% for specimens with air void content ranging from 20% to 32%.

3. FEM simulation was conducted to investigate the structural contribution, failure modes and the location effect of the drainage layer. Results were analyzed and compared between different pavement structure and different modulus of the drainage layer.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect 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 have been encountered to date. It took more time than expected to prepare the testing systems for testing.

Potential Implementation: