

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): New Hampshire 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> <p style="text-align: center;">TPF-5(230)</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 1 – December 31)	
Project Title: <p style="text-align: center;">Evaluation of Plant-Produced High-Percentage RAP Mixtures in the Northeast</p>		
Name of Project Manager(s): <p style="text-align: center;">Jo Sias Daniel</p>	Phone Number: <p style="text-align: center;">603-862-3277</p>	E-Mail <p style="text-align: center;">jo.daniel@unh.edu</p>
Lead Agency Project ID:	Other Project ID (i.e., contract #):	Project Start Date: <p style="text-align: center;">8/11/2010</p>
Original Project End Date: <p style="text-align: center;">12/31/2013</p>	Current Project End Date: <p style="text-align: center;">12/31/2014</p>	Number of Extensions: <p style="text-align: center;">1</p>

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
781,706 Revised to 731,287	667,755	85%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	36,468	

Project Description:

Research Objectives

The objectives of this research project are to:

1. Evaluation the performance in terms of low temperature cracking, fatigue cracking, and moisture sensitivity of plant produced RAP mixtures in the laboratory and field.
2. Establish guidelines on when it is necessary to bump binder grades with RAP mixtures.
3. Provides further understanding of the blending that occurs between RAP and virgin binder in plant-produced mixtures.
4. Refine fatigue failure criteria for RAP mixtures that can be used in the simplified Viscoelastic Continuum Damage (S-VECD) model.

Research Plan

The research plan is broken down into three phases. Phase I will focus on evaluating the effects of binder grade and plant type on the properties of mixtures with various percentages of RAP. Phase II of the study will be geared towards evaluating the fatigue failure criteria in the S-VECD model. Phase III is a laboratory study to isolate the effects of mixture variables without changing plant production variables.

The following tasks will be required to achieve the research objectives for both phases of this project:

1. Producing Plant Mixtures.
2. Testing and Analysis of Asphalt Binders and Mixtures.
3. Construction and Evaluation of Field Test Sections.
4. Reporting.

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

During this quarter, the research team has focused on two tasks:

1. Phase III testing
2. Interim report summarizing the Phase I results

1. Phase III

The \$100,000 FHWA contribution has been received and the process of modifying the contract for the new amount and a new end date is underway.

UNH is in the process of fabricating specimens to be shipped to other laboratories for testing. This will be completed this quarter. All of the Phase III mixtures are shown in Table 1.

Mixture	Asphalt content	RAP Content (total weight)		
		0	20	40
NH Pike Mixture from Phase I, 12.5 mm	optimum	PG 64-28	PG 64-28 PG58-28	PG 64-28 PG 58-28
	+0.5%	-	PG 64-28	PG 64-28 (PG 58-28)
	+1.0%	-	-	PG 64-28 (PG 58-28)

The volumetric analysis of all of the Phase III PG 64-28 mixtures has been completed and the results are shown in Table 2 below. The optimum asphalt content from the original 2010 plant produced mixtures was 5.7%. The laboratory produced mixtures with 2013 materials show similar optimum asphalt contents. The higher asphalt contents (opt +0.5%, opt +1.0%) do not meet the Superpave volumetric criteria; either a change in volumetric requirements or a redesign of the aggregate gradation would be required for these mixtures to be produced and placed in the field.

Table 2. Mix Design Volumetrics for PG 64-28 Mixtures

	Criteria	Virgin	20% RAP				40% RAP		
		5.7	4.7	5.2	5.7	6.2	5.7	6.2	6.7
% Air Void	4	3.42	8.03	5.82	4.11	2.34	4.27	2.91	2.00
VMA	14	13.9	16.3	15.4	14.9	14.4	13.6	13.4	13.7
VFA	65-78	75.3	50.8	62.2	72.4	83.8	68.6	78.4	85.5
% Gmm @ Nini	≤ 90.5	90.9	85.5	87.7	89.3	90.9	88.8	90.1	90.9
DP	0.6-1.2	0.79	0.96	0.85	0.76	0.68	0.65	0.58	0.52

2. Interim Report

The research team is in the process of finalizing the interim report summarizing the Phase I testing results to include the updated binder testing results. This will be completed and submitted to the technical committee for comment this quarter.

Anticipated work next quarter:

1. Interim Report that includes data, analysis, and preliminary conclusions from the Phase I mixtures and updated binder testing will be finalized and submitted to the technical committee for review
2. Updated contract with FHWA contribution and new end date finalized
3. Finish specimen fabrication of Phase III test specimens
4. Continue testing and analysis of Phase III test specimens
5. Develop scope and budget for future tasks, formally add these tasks to the project and solicit funding
6. Continue testing remaining Phase II mixtures

Significant Results:

Significant results this quarter have been discussed in the above section.

Several presentations relating to this project were given at the NEAUPG meeting on October 23 and 24 in Portsmouth, NH.

A TRB paper and an AAPT paper related to this project have been accepted for presentation and publication.

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).

Delays in the actual transfer of FHWA funds to the pooled fund project have continued to delay progress. This should be resolved this quarter.

Potential Implementation: