

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Missouri 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> TPF-5(213)	Transportation Pooled Fund Program - Report Period: <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input checked="" type="checkbox"/> Quarter 2 (April 1 – June 30) <input type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 1 – December 31)	
Project Title: Performance of Recycled Asphalt Shingles in Hot Mix Asphalt		
Name of Project Manager(s): R. Christopher Williams	Phone Number: 515-294-4419	E-Mail rwilliam@iastate.edu
Lead Agency Project ID:	Other Project ID (i.e., contract #): RD 09 28	Project Start Date: Oct 1, 2009
Original Project End Date: October 31, 2011	Current Project End Date: July 31, 2013	Number of Extensions: 3 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
\$765,000	\$730,191.22	98%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
730,191.22 / 765,000 = 95.5%	\$0	98%

Project Description:

State highway agencies are increasingly interested in using recycled asphalt shingles (RAS) in hot mix asphalt (HMA) applications, yet many agencies share common questions about the effect of RAS on the performance of HMA. Previous research has allowed for only limited laboratory testing and field surveys. The complexity of RAS materials and lack of past experiences led to the creation of Transportation Pooled Fund (TPF) Program TPF-5(213). The primary goal of this study is to address research needs of state DOT and environmental officials to determine the best practices for the use of recycled asphalt shingles in hot-mix asphalt applications. Agencies participating in the study include Missouri (lead state), California, Colorado, Illinois, Indiana, Iowa, Minnesota, Wisconsin, and the Federal Highway Administration. The agencies conducted demonstration projects that focused on evaluating different aspects (factors) of RAS that include RAS grind size, RAS percentage, RAS source (post-consumer versus post-manufactured), RAS in combination with warm mix asphalt technology, RAS as a fiber replacement for stone matrix asphalt, and RAS in combination with ground tire rubber. Field mixes from each demonstration project were sampled for conducting the following tests: dynamic modulus, flow number, four-point beam fatigue, semi-circular bending, and binder extraction and recovery with subsequent binder characterization. Pavement condition surveys were then conducted for each project after completion.

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

This quarter the research team completed the final draft report and submitted it to participating states for review. The research team also updated the executive summaries for each demonstration project based on comments from reviewers. The executive summaries were published by Iowa State University's Institute for Transportation (Intrans) and submitted to participating states.

Anticipated work next quarter:

The research team anticipates receiving comments to the final draft report from reviewers from the participating states. Based on the comments, the research team will revise the report and submit it for final publication.

Significant Results:

The demonstration projects showed that pavements using RAS alone or in combination with other cost saving technologies (e.g., WMA, RAP, GTR, SMA) can be successfully produced and meet state agency quality assurance requirements. The RAS mixes have very promising prospects since laboratory test results indicate good rutting and fatigue cracking resistance with low temperature cracking resistance similar to the mixes without RAS. The pavement condition of the mixes in the field after two years corroborated the laboratory test results. No signs of rutting, wheel path fatigue cracking, or thermal cracking were exhibited in the pavements. However, transverse reflective cracking from the underlying jointed concrete pavement was measured in the Missouri, Colorado, Iowa, Indiana, and Minnesota projects.

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: