TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Alabama 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(267)	☐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: Accelerated Performance Testing for the NCAT Pavement Test Track

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:**
930-822P		May 8, 2012
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
September 30, 2015	September 30, 2015	None

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
$11,991,511	$10,633,057	91%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
89%	$659,480	71%

Project Description: The Pavement Test Track is a full-scale accelerated performance test (APT) facility managed by the National Center for Asphalt Technology (NCAT) at Auburn University. The project is funded and directed by a multi-state research cooperative program in which the construction, trafficking, and pavement evaluation are carried out on 46 different 200-foot test sections around the 1.7-mile oval test track. Each test section is constructed utilizing the asphalt materials and design methods used by individual sponsors. A fleet of heavy trucks is operated on the track in a highly controlled manner in order to apply a design life-time of truck traffic (10 million equivalent single axle loads, or ESALs) in two years. The 2012 research cycle represents the fifth three-year research cycle of the NCAT Pavement Test Track.

The primary objectives of the pooled fund project are as follows:
1. Constructing 200 ft test sections on the existing 1.7 mile NCAT test oval that are representative of in-service roadways on the open transportation infrastructure;
2. Applying accelerated performance truck traffic in the 2 years following construction;
3. Assessing/comparing the functional and structural field performance of trafficked sections;
4. Validating the M-E approach to pavement analysis and design using surface and subsurface measures;
5. Calibrating new and existing M-E approaches to pavement analysis and design using pavement surface condition, pavement load response, precise traffic and environmental logging, and cumulative damage;
6. Supplementing Track research with test sections on Lee Road 159 in order to precisely quantify the life extending benefit of various pavement preservation alternatives;
7. Correlating field results with laboratory data; and
8. Answering practical questions posed by research sponsors through formal (i.e., reports and technical papers) and informal (e.g., one-on-one responses to sponsor inquiries) technology transfer.

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

Performance data was collected as a function of heavy truck traffic on experimental pavements that make up the 2012 research cycle (on the Track as well as on Lee Road 159). While surface performance data was being collected on the surface of experimental pavements, high speed response measurements were made within the pavement structure to characterize how each pavement reacts to passing loads.

Trucks ran from approximately 5 AM to 11 PM Tuesday through Saturday, with fleet operations suspended on Mondays to facilitate weekly performance testing and preventive/corrective maintenance of the load vehicles. As of the date of this report, 9.7 million ESALs had been safely applied. Structural section S5 (the high RAP treatment section in the Green Group experiment) that was rebuilt because of a debonding failure continues to perform well. Cracking was first reported in this section after 2.2M ESALs. The rebuilt section supported over 4.2M ESALs before cracking was observed. The rate of deterioration in this section has been significantly lower than the rate of deterioration observed in the other Green Group sections, which include a control section (N5), a RAP+RAS section (S6), and a GTR section (S13).

Test sections on Lee Road 159 have been exposed to commercial truck traffic associated with the quarry and the asphalt mixing plant since the summer of 2012. Tare and gross load data are provided to NCAT by both businesses as a function of day and time, which is facilitating the construction of life extending benefit curves. The outbound land on Lee Road 159 has experienced approximately 10 times the ESALs as the inbound lane.

The Track Conference planned for March 3-5, 2015 will serve as the final 6-month onsite sponsor meeting.

Anticipated work next quarter:

Every Monday while the fleet is subjected to preventive and corrective maintenance, the surface condition of all experimental pavements is quantified. A comprehensive history of pavement condition can then be constructed by combining the hourly history of fleet operations, multi-depth temperature measurements, measured high-speed response, and pavement surface condition (i.e., roughness, texture, rutting, cracking, etc.). Trucking operations for the 2012 research cycle are expected to be complete by mid-October of 2014. After the fleet is parked, a complete set of terminal surface condition measurements will be made. The final dataset will be delivered to NCAT researchers thereafter. Destructive forensics (i.e., transverse trenches, longitudinal trenches, and cores) will be completed in November. The synthesis report that will be provided to attendees of the Track Conference (March 3-5, 2015) will be prepared during the end of the 2014 calendar year and the first part of the 2015 calendar year. This document will contain all the findings from the 2012 research cycle in individual as well as group experiments. Although performance data collection will continue on Lee Road 159, the cutoff point for data analysis in the 2012 research cycle will also be mid-October of 2014 in order to facilitate the preparation of the synthesis report.

Significant Results:

The 2012 research cycle includes high RAP content mixes, RAS mixes, high binder replacement (RAP +RAS) mixes, high recycled ground tire rubber mixes, high durability porous friction course mixes, alternative binder modifiers, interlayers for the prevention of reflective cracking, low volume road mixes, comparative tack methods and materials, and an array of pavement preservation alternatives (on the Track as well as on Lee Road 159).

Reconstruction of the high RAP focused Green Group section (S5) included corrective measures identified during a postmortem forensic investigation. The 35% RAP highly polymer modified base layer that exhibited an unusually high strain tolerance was replicated. The tack rate on top of the base layer was doubled as a result of shear measurements on cores cut from slabs produced with original plant run material that were tacked with varying rates. The binder content of the 50% RAP intermediate layer was increased by 0.2% and the mix was run hot in the hope of achieving more ideal mixing of the new and aged binders. The foamer was engaged (as it was when the original mix was run warm) in order to avoid confounding the effectiveness of the corrective actions. Finally, the SMA surface was changed from an SGC to a Marshall hammer mix design. The rebuilt section exceeded the performance of the original section by 90% before cracks began appearing. Since starting, cracking has progressed at a much slower pace than in other sections.

Preliminary observations on Lee Road 159 illustrate the benefit of crack sealing and scrub sealing.

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 project is expected to be completed on time and within the allotted budget.

Potential Implementation:

It is expected that the findings previously mentioned will be implemented by sponsoring state DOTs. The 2012 research cycle includes a significant focus on sustainability. Included experiments are designed to study high RAP content mixes, RAS mixes, high aged binder (RAP+RAS) content mixes, high recycled ground tire rubber mixes, high durability porous friction course mixes, alternative binder modifiers, interlayers for the prevention of reflective cracking, low volume road mixes, comparative tack methods and materials, and an array of pavement preservation alternatives (on the Track as well as on Lee Road 159) with an emphasis on implementation. Life extending benefit curves from all the treatments and combinations will provide DOTs with an objective selection process for pavement preservation that can be calibrated to local conditions, materials, contractors, etc. using feedback from their own pavement management system. Findings for mixes containing higher percentages of reclaimed and recycled materials were communicated to state DOTs in off-season annual meetings throughout the US. Lessons learned from the original failure and successful reconstruction of high RAP content S5 should lead to significant savings in DOTs who choose to implement similar changes.