

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>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i> <div style="text-align: center;">TPF-5(267)</div>	Transportation Pooled Fund Program - Report Period: <input checked="" type="checkbox"/> Quarter 1 (January 1 – March 31) <input 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: <div style="text-align: center;">Accelerated Performance Testing for the NCAT Pavement Test Track</div>		
Name of Project Manager(s): <div style="text-align: center;">Dr. R. Buzz Powell, P.E.</div>	Phone Number: <div style="text-align: center;">334-844-6857</div>	E-Mail <div style="text-align: center;">buzz@auburn.edu</div>
Lead Agency Project ID: <div style="text-align: center;">930-822P</div>	Other Project ID (i.e., contract #):	Project Start Date: <div style="text-align: center;">May 8, 2012</div>
Original Project End Date: <div style="text-align: center;">September 30, 2015</div>	Current Project End Date: <div style="text-align: center;">September 30, 2018</div>	Number of Extensions: <div style="text-align: center;">1 (next 3-year cycle)</div>

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
\$27,979,706	\$17,513,075	63%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
63%	\$1,062,776	61%

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 100 and 200-foot test sections around the 1.7-mile oval test track. Each test section is constructed utilizing imported asphalt materials and design methods. A fleet of heavy trucks is operated on the track in a highly controlled manner in order to apply a design lifetime of truck traffic (10 million equivalent single axle loads, or ESALs) in two years. Select Track test sections were replaced in the summer of 2015 to facilitate a new research cycle in which preservation test sections were also built on nearby high traffic US-280 (to complement the existing low traffic test sections on Lee County Road 159) and at MnROAD in on- and off-track locations (with both low and high traffic) similar to those at NCAT.

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 County Road 159, US-280, MnROAD, Mille Lacs County Road 8, and US-169 in order to precisely quantify the life extending benefit of various pavement preservation alternatives on low and high traffic roadways in hot and cold climates;
7. Correlating field results from both the NCAT and MnROAD test sections 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.):

Detailed pavement condition assessments consisting of roughness, rutting, macrotexture, and cracking are performed weekly on the NCAT Pavement Test Track. Additional measurements are made monthly (e.g., wet ribbed surface friction) and quarterly (e.g., noise).

Precisely 3,141,455 ESALs had been applied to the surface of the 2015 NCAT Pavement Test Track as of the date of this report. The 2015 Track represents the 6th research cycle. Approximately 10 million ESALs can be added for test sections built in previous 3-year research cycles. For example, sections built on the original 2000 Track have now supported a total of 53 million ESALs.

560,000 ESALs have been applied by loaded trucks to the outbound lane on Lee County Road 159 since the summer of 2012.

50,000 ESALs have been applied by empty trucks to the inbound lane on Lee County Road 159 since the summer of 2012.

310,000 ESALs have been applied to the westbound truck lane on US-280 by approximately 1,060,000 vehicles since summer 2015.

The planning and procurement process is underway to build Cracking Group (CG) test sections on the MnROAD Mainline. Mix designs and preconstruction activities are ongoing.

The planning and procurement process is underway to place Preservation Group (PG) test sections on Mille Lacs County Road 8 (for low traffic performance) and US-169 (for high traffic performance) in Pease, MN (about 45 minutes north of MnROAD). Mix designs are ongoing and pretreatment pavement condition is being quantified.

No 6-month sponsor meetings were hosted during the current reporting quarter. Project personnel traveled to sponsor states and provided research updates at winter meetings.

Anticipated work next quarter:

Two and a half million ESALs a quarter are applied to the surface of the NCAT Pavement Test Track. Weekly, monthly, and quarterly pavement surface condition data collection will continue. Web performance reports will be updated to reflect the most recent vetted data.

Approximately 39,000 ESALs a quarter are applied to the heavily loaded outbound lane on Lee County Road 159. The more lightly loaded inbound lane only supports about 8 percent of the ESALs in the outbound lane, which is just over 3,000 ESALs a quarter.

US-280 supports approximately 159,000 ESALs a quarter over a 544,000 vehicle load spectra consisting of 16 percent trucks.

Construction will commence on the MnROAD Mainline sections as soon as the notice to proceed has been issued to the contractor.

The preconstruction and planning process is ongoing for pavement preservation sections that will be placed on Mille Lacs County Road 8 and US-169 in Pease, MN (the location of the northern low traffic and high traffic preservation sections, respectively). Construction will commence as soon as the notice to proceed has been issued to the contractor. Post construction pavement condition will be assessed on an ongoing basis thereafter (noting that winter conditions will limit pavement surface data collection over the next several reporting quarters), and traffic will be estimated as accurately as possible.

Technology transfer and implementation of findings are very important to this effort. In order to facilitate implementation, numerous technical presentations will be made on request for all sponsoring state DOTs. The next onsite 6-month sponsor meeting is being planned for NCAT on May 25-26, 2016. NCAT was selected for the spring/summer 2016 6-month meeting so sponsor states could visually inspect the quality of their test sections after a good month of high pavement temperatures.

Significant Results:

The 2015 research cycle on the NCAT Pavement Test Track includes high RAP content mixes, RAS mixes, high binder replacement (RAP+RAS) mixes, rejuvenators, high recycled ground tire rubber mixes, 100 percent RAP cold recycle mixes, high durability porous friction course mixes, alternative binder modifiers, interlayers for the prevention of reflective cracking, surplus sand and screenings stockpile mixes, asphalt based enhanced friction surfaces, and an array of pavement preservation treatments and treatment combinations (on the Track as well as on Lee Road 159 and US-280 in Alabama's southern climate and Mille Lacs County Road 8 and US-169 in Minnesota's northern climate). Additionally, a mix performance test experiment consisting of numerous sections with an intentionally broad range of expected cracking performance (e.g., low aged binder replacement, high aged binder replacement, highly polymer modified binder, etc.) are built on the NCAT Pavement Test Track as well as on the MnROAD Mainline. High construction quality is essential in both locations in order to avoid confounding experimental outcomes. It is a significant preliminary finding to note that no premature failures are pending and all sections have thus far exhibited good performance; however, this is expected to change as traffic is applied to both the southern and northern sections in future reporting quarters. Smaller nominal maximum aggregate size (NMAS) mixes and mixes designed on the fine side of the maximum density line that are commonly relegated to low volume road applications have proven to be some of the most durable and crack resistant surface mix options. Although more time and traffic are necessary to fully construct multi-distress life extending benefit curves for pavement preservation, control section comparisons have facilitated the construction of real time crack reducing benefit curves for all treatments and treatment combinations.

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 2015 research cycle includes a significant focus on sustainability and rapid implementation. Included experiments are designed to study high RAP content mixes, RAS mixes, high aged binder (RAP+RAS) content mixes, rejuvenators, high recycled ground tire rubber mixes, high durability porous friction course mixes, alternative binder modifiers, interlayers for the prevention of reflective cracking, surplus sand and screenings thinlay mixes, and an array of pavement preservation treatments and treatment combinations (on the Track as well as on Lee Road 159 and US-280 in Alabama's southern climate and Mille Lacs County Road 8 and US-169 in Minnesota's northern climate) 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 from the mix performance experiment will facilitate true sustainability innovation for states in both climate extremes. Arbitrary limits placed on mix designs can be eliminated, DOTs can approve mix designs with the expectation of good performance potential, and projects can be monitored during production to make sure the performance expectation of produced mix closely matches the expectation of the approved mix design. Emphasis will be placed on tests that have the most potential for rapid implementation for both mix design approval and quality control testing.