

Period Covered: January 1, 2009 through March 31, 2009 (Quarterly Report)

ALDOT Progress Report for the
State Planning and Research Program

PROJECT TITLE: Accelerated Performance Testing on the 2006 NCAT Pavement Test Track		
PROJECT MANAGER(S): R. Buzz Powell, PhD, PE Ph #: (334) 844-6857	SPR Project No: TPF-5(124) ALDOT Research Project No. 930-637P	Project is: <input type="checkbox"/> PLANNING <input checked="" type="checkbox"/> RESEARCH & DEVELOPMENT
Annual Budget	Multi Year Project Total Budget for Project: \$9,412,225.00 Total Cost to Date for Project: \$8,573,024.67	

Background

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 current project represents the third three-year research cycle of the NCAT Pavement Test Track.

Objectives

The primary objectives of the project are to: (1) identify pavement structures and materials with superior field performance and lower life cycle costs; and (2) provide information for the calibration and validation of the Mechanistic-Empirical Pavement Design Guide (MEPDG).

Design and Construction of Test Sections

When each research cycle is completed, test sections are either left in place for the application of additional traffic or rebuilt in the manner that best meets the needs of sponsors. The third research cycle includes: (1) eight sections built in 2000 (all mix performance sections), 16 sections built in 2003 (12 mix performance sections and four structural sections) and 22 sections built in 2006 (15 mix performance sections and seven structural sections). Mix performance sections are perpetual pavements in which distresses are confined to various combinations of experimental surface mixes. Structural sections are typically thinner, highly instrumented pavements that are intended to provide information for the MEPDG.

Trucking Operations

Trucking operations for the third phase of the NCAT Pavement Test Track began after the completion of the reconstruction activities in November of 2006. A fleet of five trucks ran two shifts a day. An AM driver shift ran from 5:00 AM until approximately 2:00 PM, and a PM driver shift ran from 2:00 PM until approximately 11:00 PM.

Trucking operations for the third test cycle were completed on December 6, 2008; a total of 10,017,560 ESALs (100 percent of the 10 million ESAL goal) were safely applied to the surface of the 2006 NCAT Pavement Test Track. This means that the eight sections originally placed in 2000 had been subjected to over 30 million ESALs and the sixteen sections built in 2003 had been subjected to over 20 million ESALs. All mixes in both previous studies were designed for 10 million ESALs.

Wear and tear on the NCAT fleet resulting from traffic application in the third research cycle will be addressed before trucking operations begin again in the summer of 2009.

Laboratory Performance Testing

There were 31 unique asphalt mixtures that consist of 27 Superpave and Stone Matrix Asphalt (SMA) mixtures as well as four Permeable European Mix (PEM) and Open Graded Friction Course (OGFC) mixtures tested in the third test cycle. Laboratory testing focused on the evaluation of the 27 Superpave and SMA mixtures. NCAT finished testing of binder, dynamic modulus, flow number and rutting susceptibility using the Asphalt Pavement Analyzer (APA), and bending beam fatigue for bottom layer mixes. A report summarizing the laboratory testing results is being prepared.

Structural Pavement Study

Final data processing and uploading of data into their respective databases has been completed. Preliminary MEPDG investigations have been conducted to evaluate the accuracy of the MEPDG in predicting measured pavement performance at the Test Track. Figures 1 and 2 below illustrate measured and predicted rutting and cracking performance for Section S11. Note that the MEPDG captures the relative trend and magnitude of pavement rutting (Figure 1) while it does not capture the trend, but final magnitude of fatigue cracking (Figure 2). Further investigations of the other test sections will also be conducted.

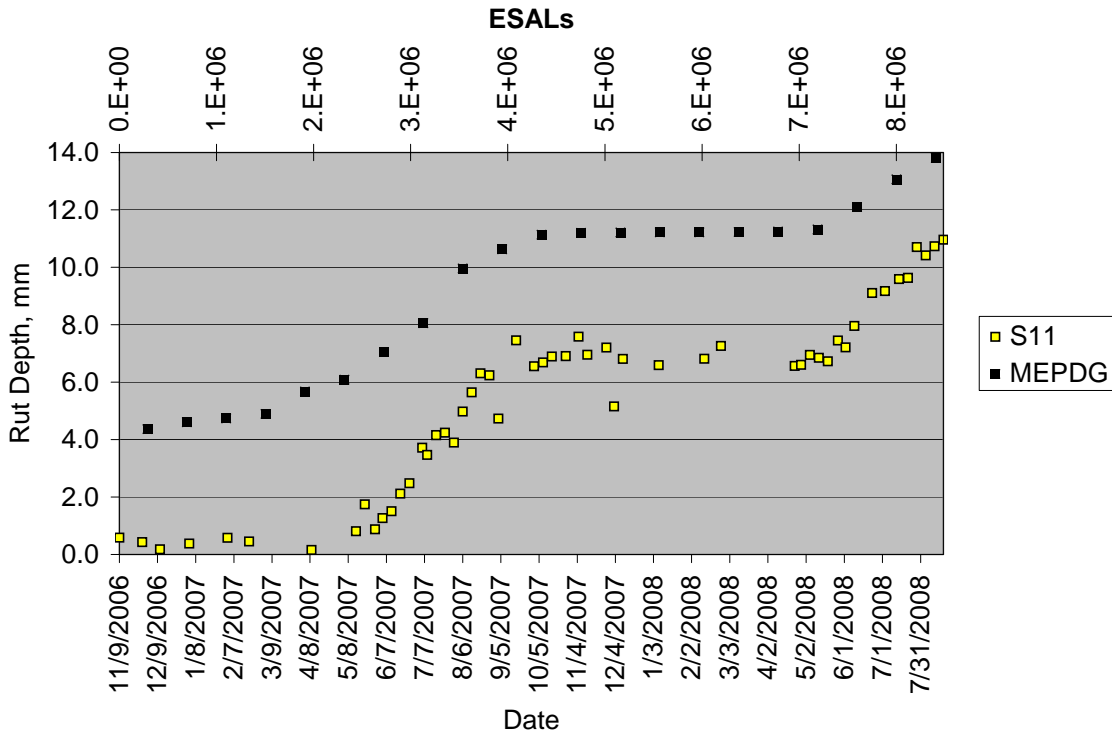


Figure 1. MEPDG and Measured Rutting at Test Track.

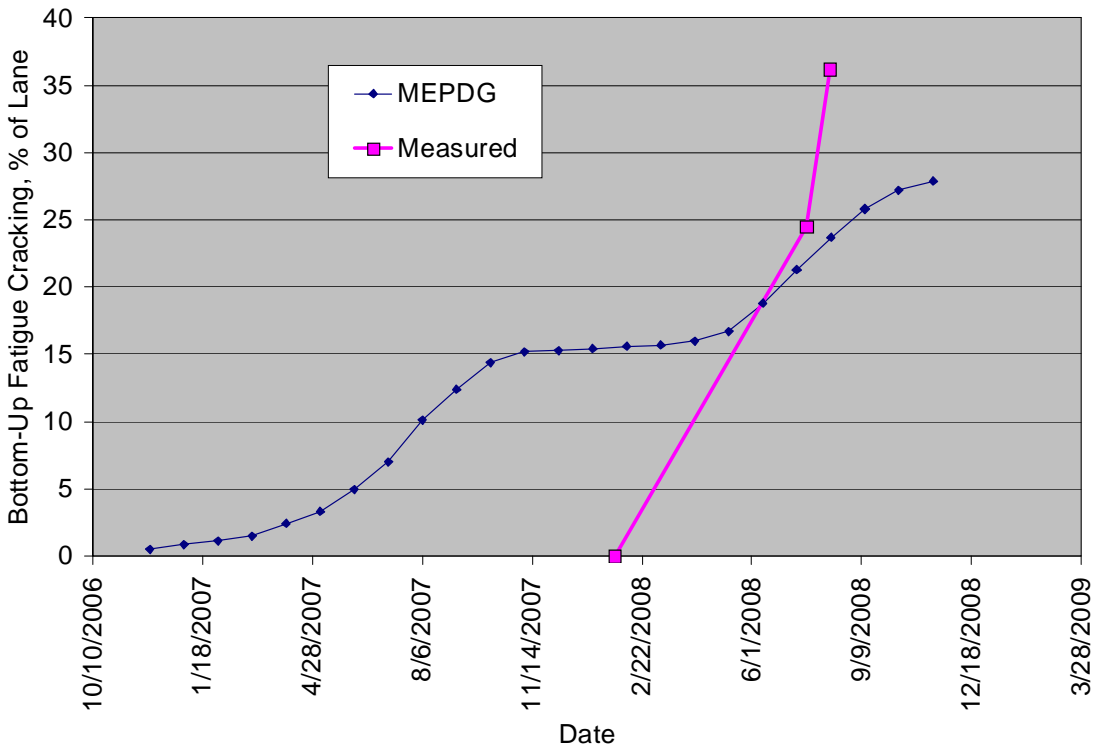


Figure 2. MEPDG and Measured Fatigue Cracking at Test Track.

Pavement Performance Evaluation and Forensic Investigation

Every Monday, trucking was suspended so that vehicle maintenance could be performed and pavement performance could be quantified. An inertial profiler equipped with a full lane width dual scanning laser "rutbar" was run weekly around the entire track in order to determine individual wheelpath roughness, right wheelpath macrotexture and individual wheelpath rutting for every experimental section. Additionally, three random locations were selected within each section in a stratified manner to serve as the fixed test location for nondestructive wheelpath densities. Transverse profiles were measured along these same locations regularly so that rutting could be calibrated with a contact method. Figures 3 and 4 illustrate rutting performance and International Roughness Index (IRI) of test sections at the NCAT Pavement Test Track after the completion of trucking operations.

Forensic testing was initiated following the completion of trucking operations on December 6, 2008. Final data collection requiring a continuous surface (e.g., roughness, friction, etc.) was completed before the end of the calendar year. Destructive forensics (e.g., trenching, coring, etc.) were completed before the end of the current reporting period. Data and analyses are being developed for an upcoming report.

Test Track Conference

A Test Track Conference was hosted on February 10th and 11th of 2009 for the purpose of disseminating findings from the third research cycle to the pavement community. The final 6-month sponsor meeting was hosted in a concurrent manner in order to optimize travel for attendees. The following agenda describes the general content of the Conference:

Monday (2/9/09)

6:00 PM Early Registration Begins
6:30 Private Sponsor Meeting with Dinner Provided
8:00 Early Registration Ends

Tuesday (2/10/09)

7:00 AM Breakfast at Marriott
8:00 Open Conference
9:30 Break
10:00 Performance Comparison Session
11:30 Break and Bus to Track
12:30 Lunch at Track
1:30 Track Tours and Demonstrations
3:00 Break and Bus to Marriott
4:00 Mechanistic Pavement Analysis Session
5:15 Adjourn
6:00 Reception
6:45 Dinner

Wednesday (2/11/09)

7:00 AM Breakfast

8:00 Lab versus Field Session

9:30 Break

10:00 Implementation and Panel Discussion Session

12:00 Adjourn

1:30 Optional NCAT Tour

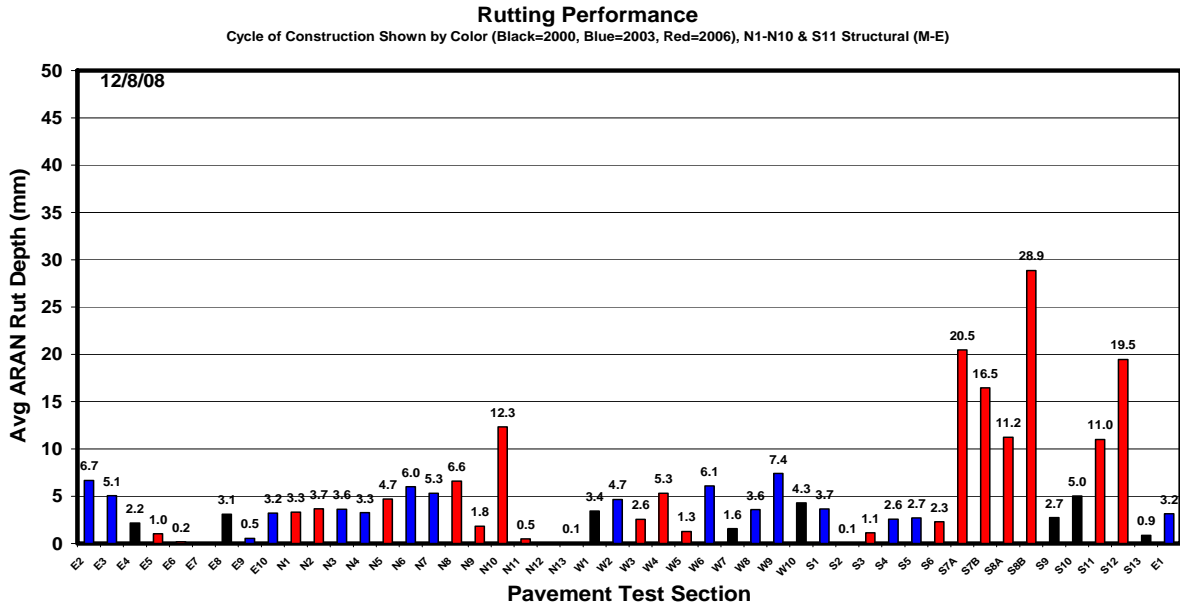


Figure 3 Rutting Performance of Test Sections at the End of the Third Test Cycle

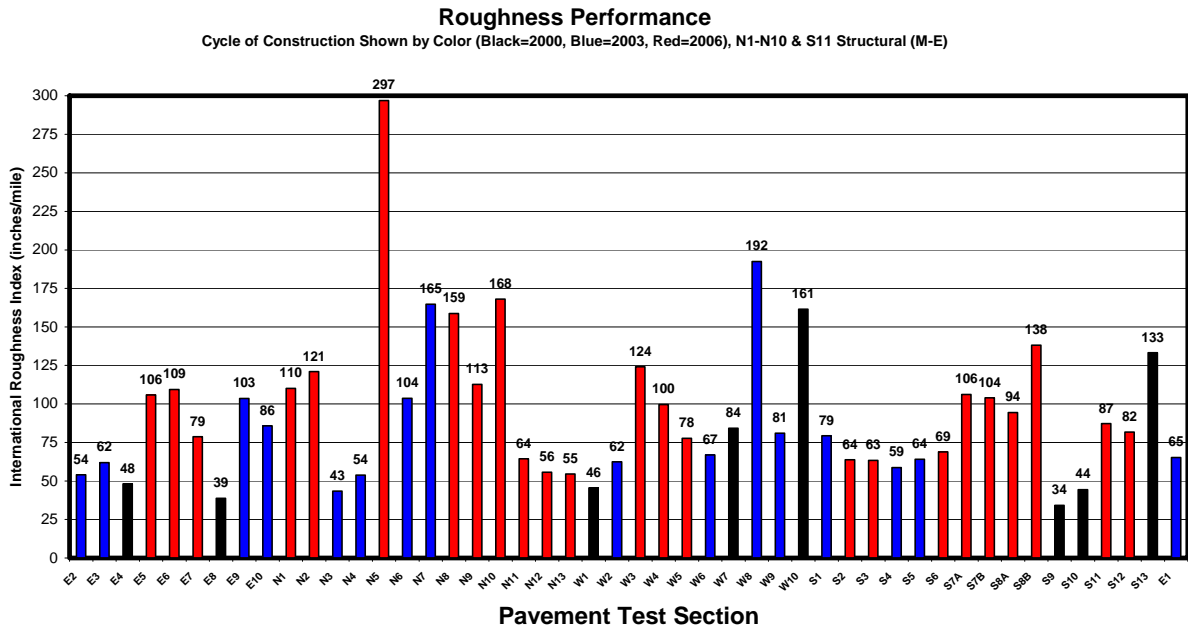


Figure 4 IRI of Test Sections at the End of the Third Test Cycle

STATUS AND COMPLETION DATE

Percentage of work completed to date for total project 91.3%

Project is:
X on schedule behind schedule, explain:

Expected Completion Date: August 31, 2009

Please note that this project has continued with renewed requests for services and additional funding obligations and may be extended beyond the current Expected Completion Date listed above.