Structural improvements of flexible pavements using geosynthetics for base course reinforcement
Quarterly Progress Report

April – June 2008
Next report due: October 31, 2008 (for period July to September 2008)

ACCOMPLISHMENTS DURING THE QUARTER:

ERDC-CRREL:

Traffic testing on Test Section 5 (6 in. asphalt, 24 in. base, unreinforced) was completed after reaching the target pass level of 464,000 passes. The average cumulative rut depth in TS 5 was less than 7.5 mm (Figure 1). Falling weight deflectometer (FWD) testing was conducted at the designated test points on all test windows at the conclusion of trafficking.

The HVS was positioned over the final test window, Test Section 7 (6 in. asphalt, 24 in. base, reinforced), and traffic testing started. The average cumulative rut depth after 414,000 passes in TS 7 was just under 7 mm (Figure 2). Traffic testing will continue to the target pass level of 464,000 passes, at which time final readings will be collected followed by FWD testing.

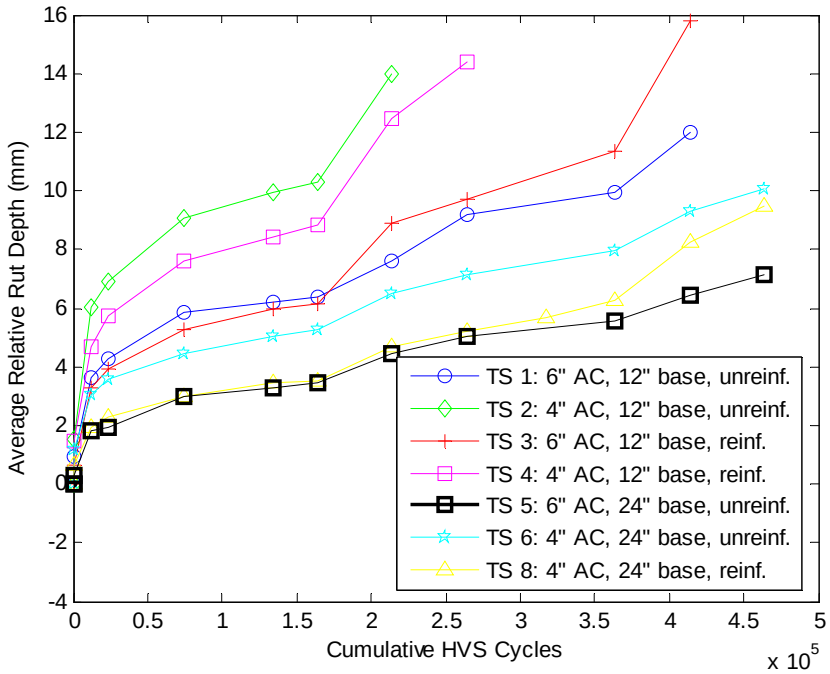

Figure 1: Average rut depth comparison for Test Section 5 after 464k passes and all completed test sections.

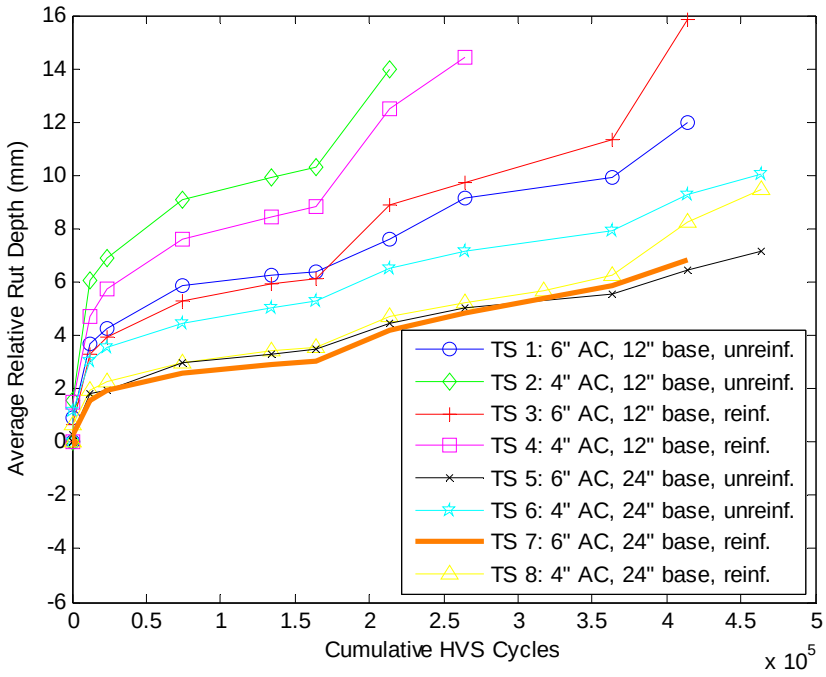

Figure 2: Average rut depth comparison for Test Section 7 after 414k passes and all completed test sections.

PROPOSED ACTIVITIES:

1. Complete trafficking of Test Section 7;
2. Conduct FWD testing of Test Section 7 after failure;
3. Finalize plans, with the University of Maine, for the forensics investigation.

UNIVERSITY OF MAINE:

Data collected at the interval test points has been received and processed using the protocols previously developed. The static test points in Test Section 7 were modified to correspond to the locations of functioning instrumentation.

The development of strain in the geogrid was closely monitored over the course of trafficking (Figure 3). It was found to be in good agreement with the development of surface rutting. This may indicate that the geogrid becomes more effective as the rut depth increases. Gages 1, 2, and 5 failed at the points where the strain exceeded the limits of the figure.

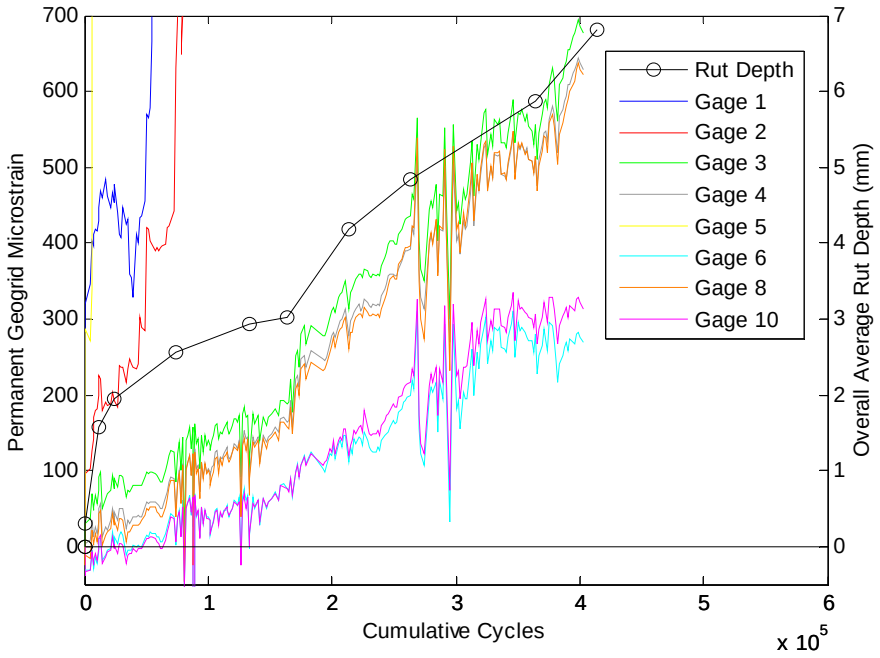

Figure 3: Permanent geogrid strain and rut depth comparison as a function of traffic cycles in Test Section 7 through 414k passes.

PROPOSED ACTIVITIES:

1. Continue to monitor data being generated by CRREL;
2. Finalize plans, with CRREL, for the forensics investigation;
3. Travel to CRREL facility to participate in the forensics investigation.

UNRESOLVED OR NOTABLE ISSUES:

1. CRREL has received the additional funding from FHWA allowing testing to continue;
2. The moisture sensor W5-M1 in test window 5 mid-base showed a large increase in readings just before the FWD testing was conducted. The sensor was checked and displays a high voltage output indicating failure is likely;
3. Some geogrid strain gages in test window 7 have failed requiring some changes in the static load test protocol in order to obtain the best data possible for modeling purposes.

Respectfully submitted:

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PURPOSE AND SCOPE:

This study will provide missing data required to help determine whether geosynthetic reinforcement is beneficial at conditions typically experienced in state highway construction. If the geogrid does

provide benefit, the study will develop an AASHTO specification for geosynthetic reinforcement of the aggregate base course of flexible pavement structures. Furthermore, the results will be published in a format to conform with future modifications to the AASHTO Pavement Design Guide.

The objectives of this study are:

1.To determine whether and under what conditions geosynthetics (geogrids and geotextiles) increase the structural capacity of pavements typically constructed by state DOTs.
2.To determine whether and under what conditions geosynthetics increase the service life of pavements typically constructed by state DOTs.
3.To measure in-situ stress/strain response of the reinforced material for use in current or future pavement design processes.