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

January – March 2007
Next report due: June 30, 2007

ACCOMPLISHMENTS DURING THE QUARTER:

ERDC-CRREL:

Trafficking continued on Test Section 1(6" asphalt, 12" base, no grid) (testing began on 7 December 2007). There were several delays in testing due to the need for repairs on the HVS, including refurbishing of the main hydraulic system cylinder and a complete oil change (approximately 110 gallons). Presently, the HVS is running, and testing continues. (Test section 1 reached failure in early April 2007.) Testing will continue on Test Section 3 (6" asphalt, 12" base, with grid).

The draft construction report was completed and registered into the ERDC-CRREL publications system for publication as a special report. As an ERDC Special Report, the construction report will be available on the web for free downloading. Mark McDaniel of Texas DOT will be a technical reviewer, and until final publication, please contact Karen Henry (Karen.S.Henry@erdc.usace.army.mil) for a draft copy.

A test protocol has been developed by ERDC-CRREL and University of Maine and is attached for the information of the technical advisory committee.

FWD analyses required by the University of Maine were provided upon request.

UNIVERSITY OF MAINE:

Optimal layer moduli have been finalized for use in FE models. The soil layer moduli are close to the average FWD values. The de-bonded asphalt/ base interface condition is more appropriate than the fully-bonded condition.

NCHRP rutting models were modified to include the horizontal confining strains produced by geogrid reinforcement. Individual material laboratory rutting data from the three available test sections was used to calibrate the rutting models. The rutting models are able to reasonably capture the observed rutting behavior of the three different pavement configurations.

Parametric studies were conducted, where the results indicate that geogrid is relatively more effective in pavement sections with larger asphalt moduli, lower base moduli, lower subgrade moduli, thinner AC layers, and thinner base layers. The optimal location of the geogrid is always predicted to be at the bottom of the base layer. Contrary to previous studies, geogrid is predicted to offer significant benefits to pavement sections with base layer thickness up to 600mm (24in). However, this discrepancy should be considered with caution since the maximum base layer thickness used for calibration was 300mm (12in).

PROPOSED ACTIVITIES:

ERDC-CRREL:

1. Traffic test section 3 to failure.
2. Continue publication process for construction report.
3. Prepare Gant chart for remainder of project.
4. Analyze FWD tests conducted to date.

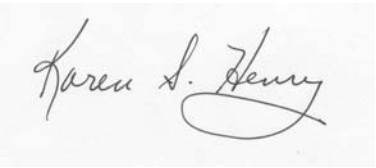
UNIVERSITY OF MAINE:

1. Finalize rutting models and parametric studies.
2. Document work performed through May, 2007.

UNRESOLVED OR NOTABLE ISSUES:

Approximately $73,000 additional funding will be needed to complete the project. Two states have verbally committed additional support in the total amount of $50,000.

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.