

Period Covered: October 1, 2003 through December 31, 2003

KSDOT Progress Report
for the

State Planning and Research Program

PROJECT TITLE: Midwest Accelerated Testing Pooled Fund		
PROJECT MANAGER: Andrew Gisi, P.E., TAC Chair Richard L. McReynolds, P.E., Admin. Contact Dr. Stefan Romanoschi, KSU, PI	Project No: TPF-5(048) RE-0328-01	Project is: <input type="checkbox"/> PLANNING <input checked="" type="checkbox"/> RESEARCH & DEVELOPMENT
Annual Budget (active projects) FY 2003: \$267,302 FY 2004: 269,973	Multi Year Project Budget	

Progress:

FY 2003: The objective of this research is to compare the performance of an A7-6 clay subgrade soil stabilized with lime, fly ash, cement and EMC2 (a commercial chemical compound commercialized by Soil Stabilization Products Co.) using a full-scale accelerated pavement test at the KSU Civil Infrastructure Systems Laboratory. Four pavement sections were constructed during November and December 2002. All were constructed with a four-inch thick asphalt concrete surface layer. The subgrade soil was stabilized to a depth of six inches with the four different stabilizing agents. The research efforts in the first quarter of 2003 were concentrated on improving the testing capabilities of the ATL machine. A mechanical system able to move the ATL machine in the lateral direction during testing has been added. The system will allow the simulation of the lateral wander of wheel loads observed for in-service pavements. A system of sensors has been installed to better control and monitor the ATL machine and to allow unsupervised operation. This will result in an increasing the testing productivity of up to three times. Electronic load cells have been installed on each wheel to monitor the dynamic load that each wheel applies to the pavements. The research efforts in the fourth quarter of 2003 were concentrated on subjecting the constructed pavements to full-scale accelerated testing, using the ATL machine. Since April 1, 2003, more than 800,000 passes of the 30,000 lbs dual axle were applied to the pavement with lime treated embankment soil while more than 1,300,000 passes of the 30,000 lbs dual axle were applied to the pavements with cement and fly-ash treated embankment soil. The pavement with the EMC2 stabilized base has failed at approximately 50,000 load repetitions after exhibiting severe rutting and cracking. The asphalt concrete surface layer was removed and replaced with a four inch PCC pavement, to allow the continuation of testing of the lime treated base pavement structure. Each of the three remaining pavements exhibited more than 0.5 of rutting so far, but no fatigue cracking. It was decided to continue the application of loading until the pavements will exhibit fatigue cracking.

FY 2004: The objectives of this research are: a) to construct and evaluate thin PCC overlays on existing PCC and HMA pavements; b) to determine the parameters that effect the performance of these sections; c) to develop design input parameters and to modify/enhance the existing design procedure (s) for thin PCC overlays. The objectives will be accomplished by conducting a full-scale accelerated pavement test at the Civil Infrastructure Systems Laboratory on: two pavements with thin PCC overlays on existing PCC and two pavements with thin PCC overlays on distressed HMA layers.

The two thin white-topping pavements were constructed. The asphalt concrete layers were first placed and, compacted. Longitudinal and transverse saw cuts were performed in the HMA layers to simulate severely cracked layers. Milling was then performed on the asphalt concrete layers and the PCC overlay was placed. Curing of the PCC will be allowed for at least 28 days before accelerated testing will be started.

BENEFITS

The results of this research will lead to improved practices related to the design and construction of thin bonded concrete overlays on distressed PCCP and HMA pavements. This will finally lead to the optimized use and design of bonded concrete overlay technology and extended life of flexible and rigid pavements rehabilitated with this method.

SUMMARY OF ACTIVITIES EXPECTED TO BE PERFORMED NEXT QUARTER:

FY 2003: Following the recommendations of the Project Monitor, full-scale accelerated testing of the four pavements will continue on the three pavement structures that have not failed until November 7, 2003, with the intent of causing fatigue cracking the three remaining pavement structures. After that, post-mortem investigation will be conducted to determine the failure mode of the pavement layers. Performance and response data collected during the experiment will be analyzed and the analysis results will be made available to the four state agencies involved in this project for further analysis and interpretation

FY 2004: The PCC overlay on distressed PCC pavements will be constructed. Accelerated pavement testing will be started on these pavements only after the accelerated testing and the postmortem evaluation will be concluded on the pavements constructed in the FW2003 experiment.

STATUS AND COMPLETION DATE

Percentage of work completed to date for total project is: 90% (FY2003) and 10%(FY2004)

_____ on schedule X behind schedule, explain

FY 2003 project testing and reporting got behind schedule because of equipment repairs and modifications that were required on earlier experiments. Also, more the cumulative number of passes of the double axle already applied to the two pair of pavements is more than three time the number of passes estimated initially.

FY 2003 project testing and reporting got behind schedule because of equipment modifications and the delay of FY2003 project

Expected Completion Date: April 31, 2004 (FY2003) and December 31, 2004 (FY2004)