

Period Covered: January 1, 2005 through March 31, 2005

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
<b>Annual Budget (active projects)</b> FY 2003: \$267,302 FY 2004: 269,973	<b>Multi Year Project Budget</b>	

Progress:

**FY 2003:** The objective of this research is to compare the performance of an A 7-6 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 half of 2004 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 1,200,000 passes of the 30,000 lbs dual axle and 800,000 passes of the 24,000 lbs single 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, the pavements with cement and fly-ash treated soil exhibited cracking in the asphalt surface layer. The cement stabilized showed very similar performance to that of the lime treated embankment. After 2 million passes, the pavement with fly-ash stabilized soil showed more cracking than the pavements with cement and lime treated soils. Post mortem investigation was conducted to observe the failure mode and the condition of the foundation layers. Drafting of the final report is in the last stage.

**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. Accelerated loaded has started; more that 2.0 million passes of the 26,000 lbs single axle were applied to date but no visible distresses have been observed with the exception of a single transverse crack in the 4 inch thick overlay. The distresses PCC overlay was constructed and now is under loading to cause deterioration.

The PCC pavements were placed and distresses using thumping load applied at the joints. The distressed pavements were shot blasted and the PCC overlays was poured and left to cure. Loading will start after 28 days of curing.

**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:** The first draft of the final report is in preparation and should be submitted for review by May 2005. The effort will be concentrated on the comparison between measured and theoretical pavement responses.

**FY 2004:** The accelerated pavement testing of PCC overlay on distressed PCC pavements will start after the 28 days curing is finished. The postmortem evaluation of the thin whitetopping pavements will also be performed in the next quarter.

**STATUS AND COMPLETION DATE**

Percentage of work completed to date for total project is: 98% (FY2003) and 65% (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, the cumulative number of passes of the double axle applied to the two pair of pavements was more than three time the number of passes estimated initially.

FY 2004 project testing and reporting got behind schedule because of equipment modifications and the delay of FY2003 project

Expected Completion Date:  June 30, 2005 (FY2003) and January 31, 2006 (FY2004)