Period Covered: October 1 through December 31, 2008 (Quarterly Report)

KSDOT Progress Report
for the

State Planning and Research Program

PROJECT TITLE: Construction of Crack-Free Concrete Bridge Decks		
PROJECT MANAGER: Richard L. McReynolds, P.E.	Project No: TPF-5(051)	Project is: ____ PLANNING ___X__ RESEARCH & DEVELOPMENT
Annual Budget	**Multi Year Project Budget** $950,000	

PROGRESS:

Current work for Phase I of Construction of Crack-Free Concrete Bridge Decks includes the evaluation of the bridge decks that were cast in Phase I, the completion of construction of the Phase I bridges, and the evaluation of results from laboratory work that was initiated in Phase I.

LAB ACTIVITIES:

A series of free shrinkage specimens to evaluate the effect of longer-term curing on concrete mixes containing a 40% replacement of cement with Class F fly ash were cast. The mixes include a control batch ,with 535 lb/yd^3 of cement and a water-cement ratio 0.45, and a batch with the 40% replacement of Class C fly ash with a paste content equivalent to the control batch. Specimens were cured for 7, 14, 28 and 56 days. The results at 180 days show that long-term curing reduces concrete shrinkage for both the control and fly ash batches. The specimens cured for 56-days had the least shrinkage, followed, in turn, by the specimens cured for 28, 14, and 7 days. For specimens cured for 7 days or 14 days, the concrete containing fly ash shrank more than the corresponding control batches. This is consistent with previous tests. For specimens cured for 28 and 56 days, however, the fly ash batches exhibited less shrinkage than the corresponding control batches. The concrete containing fly ash mix exhibited a significant reduction of shrinkage when cured for 56 days.

Scaling tests continue in accordance with the Canadian standard test NQ 2621-900/2002 Annex B. After 56 cycles, the scaling results for the SRA (shrinkage reducing admixture) series show that the specimens with 0% SRA met the test parameters in terms of mass loss (less than 1.5 kg/m^2). The specimens with 0.5% and 1% SRA will be finished and results detailed in the next quarterly report. Preliminary results of the 0.5% and 1% SRA batches at 35 cycles were 0.28 kg/m^2 and 0.75 kg/m^2, respectively.

ACTIVITIES PLANNED FOR NEXT QUARTER

Delays in construction activity have prevented more crack surveys from being completed. Weather and construction activity will continue to be monitored to determine the appropriate time to conduct the surveys.

Scaling and freeze-thaw specimens will continue to be evaluated to examine the effect of a shrinkage reducing admixture.

Communication with the Missouri and Kansas DOTs will continue to determine construction dates and provide assistance where needed for the remaining bridge decks in Phase I of the study.

Project Personnel: David Darwin (Principal Investigator), JoAnn Browning (Co-Principal Investigator)

STATUS AND COMPLETION DATE

Percentage of work completed to date for total project is: 99%*

___X___ on schedule _____ behind schedule, explain:

Expected Completion Date: _____March 31, 2010

*The project has been extended for an additional two years to allow the planned deck construction to be completed and the crack surveys to be conducted. The percentage of work completed will be held open at 99% for the balance of the project. Phase II of this project is now underway with funding from the KU Transportation Research Institute and the project has been approved for 100% SPR funding. TPF funding officially began on July 1, 2008.