Accelerated Load Testing of Full-Scale CCP Pavements – Part B (Construction, Instrumentation, and Monitoring)

Tarunjit S. Butalia[1], Harold Walker[1], William E. Wolfe[1], Sung-Hwan Kim[2], Behrad Zand[1], Min C. Cheng[1]

[1]The Ohio State University, Department of Civil and Environmental Engineering and Geodetic Science, 470 Hitchcock Hall, 2070 Neil Avenue, Columbus, OH 43210; [2]Korea Highway Corporation, Daegu, Korea

KEYWORDS: pavement, base, subbase, wearing surface, asphalt, concrete

ABSTRACT

Accelerated load testing of flexible and rigid pavements offers several advantages over conventional demonstration projects, particularly that full-scale pavement sections can be monitored for traffic loads up to and beyond the pavement life (about 20 years) but in a duration similar to laboratory experiments (2-3 months).

With support from the Ohio Coal Development Office, the USDOE's Combustion Byproducts Recycling Consortium, and the American Coal Ash Association, The Ohio State University embarked upon the accelerated load testing of full-scale pavement sections made of CCPs. Flexible (asphalt) and rigid (concrete) pavements were studied. The objective of this research program was to evaluate the load and environmental response of CCP and control pavements for a state highway road up to its design pavement life.

In this study, three concrete and three asphalt sections (one control and two CCP sections each) were constructed at the OSU/OU Accelerated Pavement Load Facility in Lancaster, Ohio. Design characteristics are discussed in the Part A companion paper. Class F fly ash and lime were used in the construction of the subgrade of all sections. Fly ash and bottom ash were incorporated into the construction of the base and subbase of the CCP sections of both the asphalt and concrete pavements. The CCP concrete slab included 30% and 50% replacement of cement with Class F fly ash. The instrumented pavements were constructed in summer of 2003. Instrumentation included pavement strain and displacement gauges, soil pressure and moisture gauges, pore water pressure transducers and environmental sampling ports. The control and CCP sections were subjected to accelerated load testing equivalent to 20 years of state highway traffic. The structural and environmental instrumentation pavement response was measured at regular intervals of loading.

Submitted for consideration in the 2005 World of Coal Ash, April 11-15, 2005, Lexington, Kentucky, USA.