

Accelerated Load Testing of Full-Scale CCP Pavements – Part A (Laboratory Experiments, Mix and Pavement Design)

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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.

Laboratory experiments were carried out to evaluate the effects of incorporating Class F fly ash and bottom ash in a concrete pavement slab, base, and subgrade, as well as the base, subbase, and subgrade of asphalt pavements. The engineering and environmental properties of the CCP mixes were evaluated and compared with those of control samples. The CCP mixes developed were optimized to increase the amount of CCPs without compromising the engineering and environmental performance of the pavement structure. The CCP mixes were then implemented into AASHTO pavement design procedures for a state highway with a design life of 20 years.

The companion Part B paper describes the construction, instrumentation, and the structural as well as environmental monitoring of the full-scale pavement sections subjected to accelerated loading.

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