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16. Abstract

A concrete pavement was constructed on US 50 east of Athens Ohio to determine the influence of ground granulated blast furnace slag on the curing of a high performance concrete pavement, and on the performance of that pavement as it was subjected to environmental cycling and nondestructive testing with a Falling Weight Deflectometer (FWD). Three test sections of high performance concrete and one control section constructed with ODOT Class C concrete were instrumented and monitored closely to determine any differences in response and performance. The high performance sections contained 25% ground granulated blast furnace slag. Several joints were not sealed to evaluate their performance when compared to joints sealed in accordance with ODOT specifications.

Based upon laboratory tests and field data obtained during this study, the following conclusions were derived from this pavement. Temperature gradients generated between the surface and bottom of concrete slabs during the curing process can have a significant impact on the formation of early cracks. Large values of strain recorded in the field during the curing period indicated that the two sections of high performance pavement constructed in October 1997 would likely experience early cracking, as was observed. Field data indicated that a third high performance section and a control section containing standard ODOT Class C concrete, both constructed in October 1998, had a lower probability of exhibiting early cracking, and no cracks were observed. The uncracked section of high performance concrete had less initial warping than did the control section constructed at the same time with standard ODOT Class C concrete. Early cracking in the other two cracked high performance sections precluded any comparison with the uncracked sections. FWD data indicated that the uncracked high performance section experienced slightly less deflection at the joints than did the section containing standard concrete, suggesting less curvature and less loss of support under these slabs than under slabs constructed with standard concrete. FWD joint deflections were higher in the cracked high performance sections after one year of service than before the sections were opened to traffic, probably due to the presence of the cracks. Limited data suggested that moisture in the subgrade at sealed and unsealed joints was similar and, in some cases, more under the sealed joints than under the unsealed joints. FWD deflections at sealed joints were generally higher than at the unsealed joints.

17. Key Words		18. Distribution Statement
High Performance Conrete Deflection Strain Granulated Blast Furnace Slag	Temperature gradient US 50	No Restrictions. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161

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