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16 . ABSTRACT

An investigation was performed to develop four different high performance concrete (HPC) mixtures for the Oklahoma Department of Transportation's (ODOT's) 2004 Innovative Bridge Research and Construction (IBRC) project funded by the Federal Highway Administration. These HPC mixtures are designed to achieve a greater durability than normal concretes with an emphasis on the shrinkage developed. These mixtures were developed by studying the affects of air entrainment, cementitious materials content, water to cementitious materials (w/cm) ratio, supplemental cementitious materials, fiber reinforcement, and a shrinkage-reducing admixture. Additionally, a large focus of this investigation was developed in the aggregate blend used in the concretes. This study was performed by conducting a separate study of the validity of the Shilstone method of blending aggregates.

The research consisted of two parts: a laboratory and a field investigation. The laboratory investigation consisted of an initial system of batching matrices and a succeeding empirical study to develop the four mixtures required. The field investigation consisted of test slabs for the HPC mixtures and actual bridge construction where the University of Oklahoma investigators served as consultants and additional tests were taken to further characterize the mixtures. Based on the results found in these investigations, conclusions and recommendations were made on the local materials and practices used in the HPC mixture.

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High Performance Concrete, Crack Free Decks, Shilstone method, Blended aggregates	No restrictions. This publication is available from the Planning & Research Division, Oklahoma DOT.

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