

MECHANICAL PROPERTIES OF HIGH-PERFORMANCE CLASS C FLY ASH CONCRETE SYSTEMS

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ABSTRACT

The influence of inclusion of Class C fly ash on strength and durability properties of high-performance concrete (HPC) was investigated. Concrete mixtures with and without fly ash were proportioned to attain 28-day compressive strength of 6000 psi. Fly ash mixtures were proportioned to have cement replacement of approximately 35, 45, and 55% by weight. One pound of cement was replaced with 1.2 lbs of fly ash (a replacement ratio of 1 to 1.2). Each concrete mixture was tested for compressive strength, splitting tensile strength, flexural strength, abrasion resistance, and chloride permeability. In general, the concrete mixtures up to 55% cement showed adequate performance with respect to all of these parameters for high-strength applications. However, the 35% fly ash mixture (i.e., flyash to cement plus fly ash ratio of 0.40) was found to be especially appropriate for manufacture of HPC.