

APPLICATION OF HIGH-CALCIUM FLY ASH IN CONCRETE

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ABSTRACT

This chapter presents the state-of-the-art information on utilization of Class C fly ash in concrete. The effects of fly ash inclusion on fresh and hardened concrete properties are described. The fresh properties include water demand, bleeding, segregation, pumpability, air content, time of set, and temperature rise. The hardened properties included are strength, elastic modulus, creep and shrinkage, fatigue strength, permeability, freezing and thawing resistance, sulfate resistance, abrasion resistance, salt scaling resistance, alkali-silica reaction, and carbonation and corrosion resistance. Information on controlled low-strength materials made with Class C fly ash is included. Future research needs concerning Class C fly ash concretes are also outlined.

Data from large numbers of studies have shown that structural grade concrete can be proportioned to use high volumes of Class C fly ash (70% cement replacement by fly ash) without sacrificing performance with respect to strength and workability requirements. Investigations that are more recent have revealed that high strength concretes incorporating a significant amount of Class C fly ash and other pozzolanic materials can be proportioned to obtain strengths up to 100 MPa.