

LONG-TERM PERFORMANCE OF HIGH-VOLUME FLY ASH CONCRETE PAVEMENTS

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Report No. CBU-2000-26

ABSTRACT

This investigation was performed to evaluate the long-term performance of concrete pavements made with high volumes of Class F and Class C fly ash (FA). Six different mixtures, three mixtures with Class C fly ash up to 70% cement replacement and three mixtures with Class F fly ash up to 60% cement replacement, were used. Long-term performance tests for all mixtures were conducted for compressive strength, resistance to chloride-ion penetration, and density using specimens from in-situ pavements. Long-term results revealed greater pozzolanic strength contribution of Class F fly ash relative to Class C fly ash. Generally, based upon long-term data, mixtures containing Class F fly ash exhibited higher resistance to chloride-ion penetration relative to mixtures containing Class C fly ash. Compressive strengths of core specimens taken from in-situ pavements ranged from 45 to 57 MPa (6,500 to 8,200 psi). The highest long-term compressive strength was achieved for the high-volume fly ash mixture incorporating 60% Class F fly ash at the age of 7 years. Visual observations (2000) revealed that the pavement sections containing high volumes of Class F fly ash (40 to 60% FA) performed well in the field with only minor surface scaling. All other pavement sections has experienced very little surface damage due to the scaling.