

HIGH VOLUME FLY ASH CONCRETE TECHNOLOGY DEVELOPMENT

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ABSTRACT

A research project is being carried out at the Center for By-Products Utilization, UW-Milwaukee on structural grade concrete containing low cement and high volumes of fly ash. This report is primarily concerned with the literature information on high-volume fly ash concrete. An extensive literature search was completed about technologies involving high volume uses of fly ash in concrete for structural applications. The information collected has been compiled into two parts. Part 1 of this report presents state-of-the-art information and Part 2 of the report presents annotated abstracts pertaining to the high-volume fly ash use technologies.

Information regarding mixture proportioning techniques, fresh concrete properties, mechanical and durability properties of hardened concrete, etc. were reviewed. The properties of fresh concrete included workability, pumpability, cohesiveness, bleeding, water demand, time of set, etc. The mechanical properties of concrete reviewed were compressive strength, splitting tensile strength, flexural strength, modulus of elasticity, shrinkage, creep, fatigue strength, etc. The concrete durability related properties studied were permeability, abrasion resistance, freeze-thaw resistance, and fatigue strength.

In general, past investigations showed performance of high-volume fly ash concrete either similar to or better than that for no-fly ash concrete with respect to compressive strength, flexural strength, modulus of elasticity, shrinkage, creep, freeze-thaw durability, etc. Data on long-term properties of high-volume fly ash concretes is lacking. Therefore, additional research efforts are required to generate data on strength and durability properties of concrete with a view to optimizing mixture proportions for such concretes.