

**DURABILITY OF FLY ASH CONCRETE SYSTEM INCORPORATING HIGH-CALCIUM FLY ASH -
A REVIEW**

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ABSTRACT

This paper deals with the state-of-the-art information on high-calcium, ASTM Class C fly ash use in cement-based construction materials, such as high-performance concrete, ready-mixed concrete, etc. The major topics included are: properties of fly ash, effects of fly ash inclusion on fresh and hardened concrete, and future research needs. The fresh concrete properties include workability, water requirement, bleeding, segregation, air content, time of set, and temperature effect. The hardened concrete properties include primarily durability-related properties such as permeability, freezing and thawing resistance, abrasion resistance, salt scaling resistance, sulfate resistance, alkali-silica reaction, carbonation and corrosion of steel in concrete, and abrasion resistance.

Previous investigations have substantiated that high-performance concrete (HPC) containing significant amounts (up to 40% cement replacement levels) of Class C fly ash can be manufactured for compressive strength exceeding 100 MPa. Future research efforts should be directed towards use of high-lime fly ash in blended cements with minimum (less than 20%) portland cement in the blend. Keywords: Fly ash; concrete; strength; freezing and thawing durability; abrasion resistance; sulfate resistance; alkali-silica reaction; carbonation; corrosion; fatigue strength.