Abstract

Proper introduction of silica fume in concrete improves both the mechanical and durability characteristics of the concrete. The long-term compressive strength of silica-fume concrete has been recently questioned by some researchers. This paper reports the results of compressive strength data on 4- to 6-year-old cores obtained from well-documented field experiments where both silica-fume and non-silica fume concrete mixtures were used. The effectiveness of silica-fume concrete in resisting damage caused by corrosion of embedded steel has been investigated using an accelerated impressed voltage-testing setup. The physical properties of high strength silica fume concretes and their sensitivity to curing procedures were evaluated.
and compared with reference Portland cement concretes, having either the same concrete content as the silica fume concrete or the same water to cementitious materials ratio. The marked increase in the strength of the silica fume concrete over the two reference concretes, which was observed even at one day, was not accompanied by liberation of excessive heat. Moreover, the compressive strength results obtained on concrete cores taken after a 4-year period from an experimental column built with a very high-strength concrete also confirmed that there was no tendency for strength loss in silica-fume concretes. The experimental program comprised six levels of silica-fume contents (as partial replacement of cement by weight) at 0% (control mix), 5%, 10%, 15%, 20%, and 25%, with and without superplasticizer. It also included two mixes with 15% silica fume added to cement in normal concrete. Durability of silica-fume mortar was tested in chemical environments of sulphate compounds, ammonium nitrate, calcium chloride, and various kinds of acids. It was found that there was an optimal value of silica-fume content at which concrete strength improved significantly. This paper deals with a literature review on Characteristics of Silica Fume Concrete.

References

63-84.

Keywords
Silica; Cement; Concrete; Compressive Strength.