Thesis Title : A STUDY OF PROPERTIES OF PORTLAND CEMENT CONTAINING MICROSILICA

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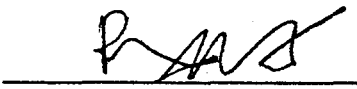
Thesis Advisory Committee



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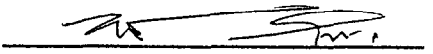

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ABSTRACT

The objective of this research was to study the properties of microsilica as partial replacement for portland cement using superplasticizer (sulphonate naphalene formaldehyde condensate) and accelerator (calcium choride) as admixtures. The physical properties of microsilica were tested. Compressive strength test was carried test was carried out to find the optimum superplasticizer content. Tests were also carried out on the cement pase and mortar made from Portland cement containing microsilica, optimum superplasticizer content and 0-3% of calcium choride.

From the physical properties tests, it was found that the specific gravity of microsilica was 2.02 ; and the fineness measured by air permeability method was 189,700 cm^2/gm. and from the test for opitmum superplasticizer content, it was found that excessive amount of superplasticizer resulted in marginal increase

in the compression strength. The optimum superplasticizer content was found to be 3% by weight of cement.

From the tests of cement and mortar it was found that an increase in the microsilica contents resulted in higher normal consistency and incoperation of superplasticizer resulted in lower normal consistency. An addition of calcium cholride resulted in a small increase in normal consistency. Incoperation of both microsilica and superplasticizer had small affect the setting time. However incoperation of 1% calcium chloride delayed the setting time and incoperation of 2 and 3% calcium chloride greatly accelerated the setting time. For compressive strength the incorperation of microsilica, 3% superplasticizer and 1-3% calcium chloride resulted in an increase in the compressive strength expecially the 3 and 7 days strength. The use of 1% calcium chloride gave maximum compressive strength.

Furthermore, it was found that the incoperation of microsilica, superplasticizer and calcium chloride increased the tensile strength corresponding to the increase in compressive strength and decreased swelling and drying shrinkage.