

HIGHER TECHNICAL INSTITUTE

CIVIL ENGINEERING DEPARTMENT

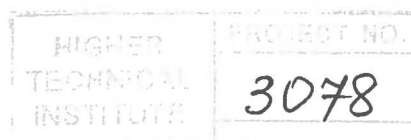
MICROSILICA AND ITS EFFECT ON CONCRETE PROPERTIES

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JUNE 2000



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By

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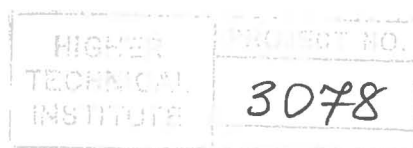
PROJECT REPORT SUBMITTED TO
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II. SUMMARY:

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The work accomplished in this project dialed with the use of a concrete additive, Microsilica, and its use in the concrete industry, conserning the effects that it has in altering the way that concrete works. This project investigates the main properties of microsilica, its uses in some actual projects and the values achieved with its use, in testing, compared to ordinary concrete. Microsilica changes and enhances all the properties of concrete, in the almost full range of them in a good manner. All the major properties of concrete that microsilica affects are discussed in the project.

The project was performed using materials made in Cyprus, except for the microsilica, which is imported and the importing company provided us with everything we needed. A complete pathway was followed in preparing the samples, including sieving and separation of the raw materials(aggregates). The experimental work took place in the Institute and the results came close to the ones expected. Microsilica concrete gave excellent results in the permeability test which is its main attribute in concrete. It also showed approximately the expected results in compressive strength but there was a deviation in the quality of the aggregates, which was inferior for the microsilica concrete samples (a different quality was brought by another team working alongside us).

Microsilica is a product that gives concrete all the properties that cement lacks to provide or is inadequate to resist certain problems that may occur. It is a very important material and its use is valuable in rough conditions.

III. INTRODUCTION:

Microsilica is a concrete additive that resulted from the need to enhance or supplement the properties of regular concrete, mainly in cases of extreme conditions. Concrete in many cases may prove to be inadequate to perform as required, because of outside factors that may influence its durability or capacity to resist any form of destructing agents.

As the technology increases, there is need for a lot of special structures in order to cope with the increasing demands for transportation, housing, industries and so on. Constructions such as sub-sea tunnels, bridges connecting islands, multiple highways, dams at cold climates (where the water freezes), sky-scrapers, for chemical storage, or at any rough climatic conditions all need the use of microsilica to achieve gain of strength and durability.

Microsilica is a product that has exceptional properties without being of a complicated chemical consistency and is mainly a product which relies on its' physical properties (small size of particles) in achieving its requirements. It enhances the concrete properties and gives to it all the benefits that cement isn't capable of providing. Mainly microsilica enhances the durability of concrete, by reducing its permeability and resistance to chemical and sulphate attacks. It also gives more compressive strength and ease of workability by reducing bleeding and settlement of the aggregates. Microsilica saves time and money and improves the quality of concrete in every conceivable aspect. Microsilica finds worldwide uses and it has been used in many massive projects that faced lots of severe drawbacks in their construction, because of their use and environment. Microsilica is a concrete additive that supplements cement and provides safety and assurance in all concrete structures.