TO STUDY THE EFFECT OF CONDENSED SILICA FUMES ADDITION ON HIGH STRENGTH MASCRETE CONCRETE GRADE 60 IN TERMS OF COMPRESSIVE STRENGTH AND DURABILITY

by

ROSLAN BIN MAJID

A Report Submitted to the Faculty of Civil Engineering in Partial Fulfilment of the Requirements for the award of a Degree in Bachelor of Engineering (Honours) (Civil)

October, 1997

TABLE OF CONTENT

Acknowledgement

I would like to thank MARA Institute of Technology especially the Civil Engineering Department, Faculty of Engineering for providing me all the facilities toward making the thesis a success.

I also take this opportunity to express my sincere gratitude to my project advisor, **Ir. Mohd Ali Jelani**, for his supervision and guidance whilst the thesis was on progress.

Furthermore, I would like to thank the technicians of Civil Engineering Laboratory and also to others who have helped me in completing the thesis.

Once again, thank you.

MARA Institute of Technology,

Shah Alam, SELANGOR D.E.

October, 1997.

ROSLAN BIN MAJID

Synopsis

The main objective of this project is to study the water absorptivity and strength characteristics of High Strength Concrete of grade 60 incorporating blended cement (Mascrete) and Condensed Silica Fumes (CSF) added at 4%,8%, 12%,16% and 20% to weight of mascrete.

The strength development test are carried out at 1,3,7,28, and 60 days whilst the durability test at 28 and 60 days. The strength development test are done on 100mm cube while permeation tests are done on 150mm cubes respectively.

Initial Surface Absorption Test (ISAT) apparatus is used to measure the water absorption of the concrete surface. Water curing at a temperature of 23°C is employed for all specimens.

From this limited study, it was found that:

- dosage of CSF addition has a significant influence in mascrete concrete strength and permeation development.
- higher dosage of CSF causes retarding effect on the mascrete concrete strength and permeation development.
- dosage of PFA replacement has a significant influence in OPC concrete strength and permeation development

CHAPTER ONE

INTRODUCTION

1.1 Abstract

The use of high strength concrete (HSC) in structures is increasing worldwide and has begun to make an impact in Malaysia. While 30 Mpa is still the norm, in many recent projects particularly in high rise construction 50, 60, and even 70 Mpa concrete has been specified particularly for load bearing columns. The most significant breakthrough in the use of high strength concrete in Malaysia is of course the Petronas Twin Tower project currently being developed by the Kuala Lumpur City Center Berhad. The project is part of a massive real estate development where two adjacent towers rising 450m above street level, are being constructed with 80 Mpa (characteristic cube strength) concrete for the lower level columns.

1.2 Definition of High Strength Concrete

High strength concrete is not fundamentally different from normal strength concrete, it is different only in its level of strength and associated properties. Being usually rich and /or of very low workability, this concrete exhibits behavior which is not clearly defined in normal regions of cement content and workability.

In this discussion, high-strength concrete refers to concrete obtained through using Mascrete, a blended cement containing 80 % of OPC and 20% of PFA and conventional aggregates cured at normal temperature.