WET-MIX SPRAY:

IMPROVEMENT ON ITS MIX PROPORTION USING GGBS

by

MOHAMAD ARIFFIN BIN ABDUL BASAR

OCTOBER 1997

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

ACKNOWLEDGEMENTS

I would like to convey my sincere gratitude to my Supervisor, Ir. Hj. Muhd Fadhil bin Nuruddin for his concerned and fruitful advices, suggestions, guidance and discussions in making this project a success.

My heartiest thanks to Mr. Shaifull, Mr. Hilmy and other staffs at Corroless (M) Sdn. Bhd. for providing GGBS and other relevant materials in this research.

My thanks also to Encik Mat Som bin Haji Marwi (Senior Technician) and Encik Kamaruddin (Technician), for providing technical and assistance in preparing and testing the samples.

Lastly, I would like to thank my beloved wife, Nurul, for accompanying me in carrying out the test.

Ariffin Basar
October 1997

TABLE OF CONTENTS

ABSTRACT

Shotcrete is an excellent placement method for repair of vertical and overhead surfaces. It is particularly cost effective for repair of large, shallow areas or where formwork is impractical.

Shotcrete also forms an excellent bond to the substrate, usually superior to the bond achieved with cast in situ concrete.

Ten (10) years ago, shotcrete admixtures were scarce. Many successful repairs have been, and still are, performed with shotcrete containing only sand, cement and water.

This project is to analyse the mix proportion and repair material used in concrete repair works. The method of interest is by wet-mix spray. GGBS as a partial replacement material to OPC is used and superlasticiser, bonding agent and accelerator are the ingredients utilized to make the concrete durable. The experimental program comprises of 6 levels of GGBS replacement to OPC namely 0, 30, 40, 50%, 60%, and 70%.

The strength development test is carried out on 100mm cube at 1 , 3, 7, 14, and 28 days and water curing is adopted.

CHAPTER 1

INTRODUCTION

1.1 Scope of Study

The scope of study in this experimental project is to study the strength development and durability of wet-mix spray with different content of GGBS. The concrete grade is 25. The content of GGBS used in term of percentage are 0%, 30%, 40%, 50%, 60%, and 70%. The testing carried out to determine the effect of chloride to the concrete is chloride ingress testing. Admixtures used are superplasticiser and bonding agent at the rates of 0.05 liter per 100 kg of cement and 0.25 liter per 100 kg of cement respectively. Free water/cement ratio is fixed at 0.45.

The study comprises of preparation and testing of crushing strength on 3 nos. of concrete cubes at 1 day, 3 days, 7 days, 14 days, and 28 days.