"MECHANICAL PROPERTIES AND DURABILIYT ASPECTS OF GEOPOLYMER CONCRETE USING GROUND GRANULATED BLAST FURNACE SLAG"

By

Mostafa Mahmoud Boshra Elewa

A Thesis Submitted To The

Faculty of Engineering at Cairo University

In partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

In

Structural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY

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Title of Thesis:

"MECHANICAL PROPERTIES AND DURABILIYT ASPECTS Of GEOPOLYMER CONCRETE USING GROUND GRANULATED BLAST FURNACE SLAG"

Key Words:

Geopolymer concrete, Blast Furnace Slag, Mechanical properties, Durability, Sulfate Attack

Summary:

The current research aimed to produce a green concrete environmentally friendly without using ordinary Portland cement "Geopolymer concrete" using locally produced ground granulated blast furnace slag in Egypt. The physical and mechanical properties of fresh geopolymer concrete "slump test, setting time, plastic shrinkage" and hardened geopolymer concrete "compressive strength, splitting tensile strength, modulus of elasticity" were studied in this research. Also, durability aspects of geopolymer concrete using slag as water absorption test, water permeability test, resistance of sulfate attack, chloride ion penetration and dry shrinkage were studied in the current research. In addition, comparisons were carried out for the test results with the results of similar OPC concrete mixes.

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I wish to express my sincere gratitude and deep appreciation to **Prof.Dr Ahmed Mahmoud Ragab**, my advisor for accepting me as an MSc student and assistance throughout the development of this thesis.

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Dedication

I would like to dedicate this thesis to **my mother** for her support, endless love and continuous encouragement for me to success in my work. Also, I would like to dedicate this thesis to **my father, my wife, my brothers and my son** for their endless love and support.