



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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Cairo University

OPTIMIZING THE TYPES OF PERCENTAGE OF SUPER PLASTICIZER IN HYBRID NANO MATERIALS CONCRETE SUBJECTED TO CORROSION

By

Mahmoud Rashwan Ahmed Said Dwidar

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
GIZA, EGYPT
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Title of Thesis:

Optimizing the types OF Percentage of Super plasticizer In Hybrid Nano Materials
concrete subjected to corrosion

Key Words:

Nano Silica; Carbon Nanotubes; Corrosion Resistance; Bond Strength; Sonication.

Summary:

This research thesis presents the results of a study on the performance of concrete containing Nano silica (1%) and carbon nanotube (0.2%) exposed to severe conditions in order to evaluate the effect of exposure to extreme environmental loading like corrosion on the Mechanical and Physical properties of the hybrid (Nano silica - carbon Nano tubes) concrete subjected to water curing. The results confirmed the ability of Nano silica and carbon Nano tube to enhance the mentioned properties.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name:

Date:.././...

Signature:

Dedication

**To My Mum, Dad's soul & My Brothers,
My family that has a great effect on my life,
All my love to you for your care and support.**

Acknowledgments

IN THE NAME OF ALLAH, THE MOST GRACIOUS AND THE MOST MERCIFUL

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