



Cairo University

INFLUENCE OF NANO-CLAY ON THE BEHAVIOR OF RECYCLED AGGREGATE CONCRETE

By

Ezzat Gazy Alhamad

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

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Under the Supervision of

Prof.Dr. Ahmed M. Ragab

Prof.Dr. Mohamed M. El-Attar

.....

.....

Professor of Strength of Materials
Structural Engineering Department
Faculty of Engineering, Cairo University

Professor of Strength of Materials
Structural Engineering Department
Faculty of Engineering, Cairo University

Dr. Dina M. Sadek

.....

Associate Professor
Building Materials and Quality Control Institute
Housing and Building National Research Center

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Approved by the
Examining Committee

Prof.Dr. **Ahmed M. Ragab**

(Thesis Main Advisor)

Prof.Dr. **Mohamed M. El-Attar**

(Advisor)

Dr. Dina M. Sadek

Housing and Building National Research Center

(Advisor)

Prof.Dr. **Osama A. Hodhod**

(Internal Examiner)

Prof.Dr. **Said A. Taher**

Housing and Building National Research Center

(External Examiner)

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2018

Engineer: Ezzat Gazy Alhamad
Date of Birth: 01/01/1988
Nationality: Syrian
E-mail: eng.ezzat.alhamad@hotmail.com
Phone: +201093253661
Address: Naser City, Cairo, Egypt
Registration Date: 01/03/2016
Awarding Date: / / 2018
Degree: Master of Science
Department: Structural Engineering
Supervisors: Prof. Ahmed M. Ragab
Prof. Mohamed M. El-Attar



Examiners: Prof.Dr. Ahmed M. (Thesis main advisor)
Prof.Dr. Mohamed M. El-Attar (Advisor)
Dr. Dina M. Sadek (Advisor)
Housing and Building National Research Center
Prof.Dr. Osama A. Hodhod (Internal examiner)
Prof.Dr. Said A. Taher (External examiner)
Housing and Building National Research Center

Title of Thesis:

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AGGREGATE CONCRETE**

Key Words: Recycled Aggregate Concrete; Nano-Clay; Mechanical Properties; Physical Properties; Scanning Electron Microscope.

Summary:

The present work addresses the influence of incorporation of nano-clay on the behavior of concrete containing coarse recycled concrete aggregate (RCA). The experimental work was divided into two phases. The first phase was carried out to select optimum mixes with the highest compressive strength. In this phase, four groups of concrete mixes were prepared. Each group includes of four mixes. In each group, coarse RCA was used to replace 0%-100% of natural coarse aggregate. Nano clay was used at 0, 1.5, 3 and 4.5% by weight of cement. The second phase was carried out to investigate the characteristics of concrete containing RCA and nano-clay. In this phase, five mixes with the highest compressive strength were selected from the first phase. The compressive strength, splitting tensile strength, flexural strength, water absorption and abrasion resistance were determined for the optimum concrete mixes in addition to their microstructure. The results indicated the enhancement in concrete behavior by using of nano-clay while a reduction in concrete performance by using recycled aggregate. So, nano-clay could be used to enhance the performance of concrete containing RCA. The optimum mix was that containing 3% nano-clay and 25% RCA.

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DEDICATION

To my parent, my brothers, my sisters and my friends

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