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

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

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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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I would not have been able to do all this hard work without you all.

DEDICATION

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

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