Behavior of Reinforced concrete wide Beams Made of Recycled Aggregates

By

Marwan Saad Al Azzawi

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
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In
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Wide-Shallow Beams, Beams Made of Recycled Aggregates, Longitudinal Reinforcement, Stirrups Reinforcement, Width to depth ratio.

Summary:

Wide beams are frequently used as transfer elements where the total structural depth. The objective of this research was to study the influence of the Recycled concrete Aggregate, volume ratio of longitudinal reinforcement, stirrups reinforcement and width - to- effective depth ratio on the shear behavior of reinforced concrete wide beams. Also the research aimed to check the adequacy of the procedures of the current codes provisions for design of reinforced concrete wide beams. An experimental program including 10 specimens was conducted. The reported results include the relation between load and deflection, strain in the longitudinal steel and strain in the stirrups.

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.

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ABSTRACT

One of the main reasons to use RCA in structural concrete is to make construction more ‘‘green’’ and environmentally friendly. The composite replacement of recycled concrete aggregate is 0%, 50% and 100%. A new source of raw material that local batching plants considered in this research that is the Recycled.

Most research to date has consisted only of the evaluation of the material strength and durability of recycled aggregate concrete (RCA) mixtures, while only a limited number of studies have implemented full-scale testing of specimens constructed with RCA to determine its potential use in the industry. For this research, a laboratory-testing program was developed to investigate the Effect of shear force on wide beams by using recycled-aggregate

. The experimental program consisted of ten tests performed on full-scale RC beams. The principal parameters investigated were: (1) Using of different percentages of recycled aggregates, (2) Changing the ratio of width over depth from 1.75 to 2.25, effect of increasing longitudinal reinforcement, and increasing stirrups reinforcement. The cracking, yielding, and ultimate capacities of the beams were compared with existing design code provisions.

A numerical method was studied by finite element program (ANSYS v.10) to identify the effect of all parameters on the shear strength of wide beams by using recycled-aggregate.

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