AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENGINEERING DEPARTMENT

Effect of Slab Thickness and Stirrup Shape on Shear Strength of Light Weight Concrete T – Beams

A Thesis
Submitted in partial fulfillment for the requirements of the Degree of

MASTER OF SCIENCE
In
CIVIL ENGINEERING (STRUCTURES)

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STATEMENT

This thesis is submitted to Ain Shams University, Cairo, Egypt, on march 2015 for the degree of Master of Science in Civil Engineering (Structural).

The work included in this thesis was carried out by the author at reinforced concrete unit lab in the facult of engineering in the Department of Civil Engineering (Structural Division), Ain Shams University.

No part of this thesis has been submitted for a degree or qualification at any other University or Institute.

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ACKNOWLGMENTS

First of all, I would like to thank God for every gift bestowed on me…

I would like to express my sincerest appreciation to my advisors, ***Assoc.Prof. Dr. Amr hussein zaher and Dr.Wael montaser and Dr. Marwan shedid*** *for their guidance, continuous, valuable guidance, and the investments, giving me the opportunity to be involved in such interesting research.*

I would like to thank the Concrete Research Laboratory staff, Ain Shames University for supporting me during my research. I would like to thank those who helped and improved the means of casting and testing the samples. I am also grateful to those unmentioned others for contributing in countless ways to my writing and being interested in my research. To all of those contributors, I am most grateful..

I believe that I have given my utmost effort in developing this research as accurately and truthfully as possible. Moreover, I am surely personally responsible for the conclusions and opinions expressed here.

Finally, I'd like to dedicate this work to ***my Father, Mother, Brothers, my Sister , my Uncle and my Family*** *for their continuous encouragement ,support and fruitful care.*

Special thanks are given to ***my Wife*** *for her encouragement, support and patience without which, I wouldn't have been able to continue my research.and a very special thanks for my lovely sons* ***Alia*** *and* ***Ali .***

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Abstract of the M.Sc. Thesis Submitted by:

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Title of the thesis

Effect of Slab Thickness and Stirrup Shape on Shear Strength of Light Weight Concrete T – Beams

ABSTRACT

This research work was conducted to study the general deformational behavior and shear resistance of light weight concrete T-beams under the effect of two concentrated loads. Ten full scale beams simply supported were tested, all specimens had length equal to 3000 mm and with cross-section of (100 x 300 mm.) and T-sections having width of slab 700 mm with varying slab thicknesses (40, 60 and 80 mm).

The T-beams represent three groups with different stirrups reinforcement. The beams were constructed without stirrups, with ordinary stirrups and with slab enclosed by stirrups reinforcement.

Each of first and second group consists of four T-beams with slab thicknesses (zero, 40, 60 and 80 mm), and the third group consists of two T-beams (60 and 80 mm.). The main reinforcement of all T-beams was kept constant and equal to $4\phi16$ and the characteristic cubic strength for light weight -reinforced concrete was about 25 MPa.

The main variables of this study were the shape of section, slab thickness and shape of stirrups. The general deformational behavior of the tested beams was examined and reported (crack patterns, deformations, strain of concrete and steel).

Theoretical study used to predict the shear behavior of concrete beams and the results were compared with the results of the experimental study.

The results were combined with available information to formulate some recommendations for designers and researchers concerning the analysis, design and construction of light weight concrete elements. The observed behavior of the light weight concrete specimens up to failure greatly encourages the use of light weight concrete in structural elements.

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