



AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

**EFFECT OF AXIAL COMPRESSION STRESS ON THE SHEAR
BEHAVIOR OF HIGH STRENGTH FIBER REINFORCED
CONCRETE T-BEAMS**

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A Thesis
Submitted in partial fulfillment for the requirements of the
Degree of Master of Science in civil engineering (Structural)

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STATEMENT

This thesis is submitted to Ain Shams University, Cairo, Egypt, on March 2008 for the degree of Master of Science in Civil Engineering (Structural).

The work included in this thesis was carried out by the author in the Department of Civil Engineering (Structural Division), Cairo University, from November 2006 to February 2007.

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

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FACULTY OF ENGINEERING

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Thesis Title : EFFECT OF AXIAL COMPRESSION STRESS ON THE
SHEAR BEHAVIOR OF HIGH STRENGTH FIBER
REINFORCED CONCRETE T-BEAMS

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ACKNOWLEDGMENTS

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

Next, I would like to extend my warmest heartfelt gratitude to all my family especially my parents who stood by me and supported me in every step of my life. I would like to deeply thank them and convey my sincere appreciation for their assistance, encouragement, support, understanding, and patience.

Moreover, I would like to express my sincerest appreciation to my advisors, Prof. Dr. Omar El-Nawawy and Prof. Dr. Ibrahim Shaaban for their guidance, continuous, valuable guidance, and the investments, giving me the opportunity to be involved in such interesting research.

I would like to extend sincere thanks to my advisor, Dr. Ahmed Ghalab for providing the guidance necessary to complete this research and also for his constant encouragement, support, and friendship which was the motivating force that kept work on my thesis in force until completion. I would like to express my admiration and thanks for his loyalty and trustfulness.

I would like to thank the Concrete Research Laboratory, Cairo 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 beloved grandfather as a taken of appreciation... I would like to extend my warmest heartfelt gratitude to such an honored...I was really fortunate to receive the benefit of his spirit and intelligence.

Omar Assem Abdelalim

Abstract of the M.Sc. Thesis Submitted by

Eng. / Omar Assem Abdelalim

Title of the thesis:

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ABSTRACT

The effect of axial compression stress on the shear behavior of High Strength Steel Fiber Reinforced Concrete T-beams was experimentally and theoretically evaluated in this study. The main studied factors were the volume ratio of the steel fiber, the stirrups ratio and the flange width of the T-beam section. Ten samples of high strength fiber reinforced concrete beams with clear span of 1.5m and with cross-section of 10x17cm while the flange width changed between 30 and 40cm. All the tested beams were over-designed in flexure and compression in order to ensure shear failure. The studied beams were tested under two third point loads.

The results showed that taking the axial compression stress into consideration changes the behavior of the concrete beams to shear. This axial compression stress reduced the cracks width and crack propagation. The addition of fiber to the beams without stirrups increased the stiffness of the beams and increased the cracking and the ultimate strength of the studied beams. For the beams with stirrups, the effect of increasing the fiber volume ratio to 2% was less than that of 1%. Also, it was found that the effect of adding stirrups on the beam properties decreases as the fiber volume ratio in the beam increases. Increasing the flange width didn't affect the shear behavior of the studied beams.

Equations proposed by Codes were used to evaluate the experimental results obtained while the equations proposed by previous studies were examined and modified to predict the shear ultimate strength of High strength Concrete under axial compression restrains. The modified equations showed a good prediction for the shear strength of the HSFRC beams.

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Chapter 1

INTRODUCTION