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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Abstract of the M.Sc. Thesis Submitted by

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

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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