BEHAVIOR OF NORMAL AND HIGH STRENGTH CONCRETE BEAMS UNDER FLEXURE AND SHEAR

By

Ehab Nabil Saad Balat

B.SC. Civil Engineering 2011

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
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FACULTY OF ENGINEERING
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Title of Thesis:

Behavior of normal and high strength concrete beams under flexure and shear

Key Words:

Normal and High strength concrete beams; shear span to depth ratio; web reinforcement ratio; longitudinal reinforcement ratio; Anon-linear static analysis; finite elements, ANSYS (14) software.

Summary:

To understand the behavior of all beams designed by; a case study we assumed. This case study leads to investigate flexural and shear behavior of reinforced concrete beams. This case study contain 90 beams made of (N.S.C) and)H.S.C) ,with dimension (150*250)mm , clear span 2000mm , length all beams equal 2300mm ,shear span to depth ratio (a/d) ranged from (1 to 2 to 3) , compressive strength concrete (fc´) ranged from (30 ,60, 75)Mpa, web reinforcement ratio (ρ_v) ranged from (0.14%,0 .28%, 0.25%, 0.50%), and longitudinal reinforcement ratio (ρ) for reinforced concrete beams ranged from (0.67%, 1.19%, 1.5%, 2.38%, 3.0%). Finite element program "ANSYS 14" was used to calculate the final straining actions and effect variables on first flexural crack load (p_{cr}), flexural shear crack load (p_v), Ultimate failure load (p_u), Defflection, tensile and yield stresses for longitudinal reinforcement and web reinforcement , stages for principle stresses and vector mode principle stresses ,and modes of failures for all beams designed.

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Ehab Nabil Saad Balat
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