AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

Flexural Behavior Of Reinforced Light Weight Concrete Beams Provided With Tension Bar Splices

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A Thesis
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STATEMENT

This thesis is submitted to Ain Shams University, Cairo, Egypt,on march 2014 for the degree of Master of Science in Civil Engineering (Structural).

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Title of the thesis

Flexural Behavior Of Reinforced Light Weight Concrete Beams Provided With Tension Bar Splices

ABSTRACT

The flexural behavior of reinforced light-weight concrete beams was tested experimentally and theoretically evaluated in this study. The objectives of this research work could be summarized in the following points: Background for light weight concrete, the flexural behavior of reinforced light-weight concrete beams. LWRC was obtained through the use of polystyrene foam as a partial aggregate's replacement to reduce the concrete dry unit weight from 23.0 KN/m^3 to 18.0 KN/m^3. Eight LWRC beams were prepared, casted and tested under four point loading up to failure. The main studied factors were; 1) the percentage of spliced reinforcement in the beams, (25%, 50 % and 100% of spliced reinforcement in maximum bending moment). ; 2) the effect of vertical stirrups in splice zones (no stirrups , 5 Ø8/m and 10 Ø 8/m) and 3) finally the effect of changing diameter of steel reinforcement bars (12mm bar diameter and 16 mm bar diameter). Seven light weight reinforced beams and one normal weight reinforced beam. Tested Beams with clear span of 3.0m and with a cross-section 20x40cm were casted and tested at Reinforced Concrete laboratory, Ain Shames University, the behavior of tested beams during loading up to failure and the tests results including the cracks pattern, the load deflection relation, and the mode of failure are presented and discussed. The obtained results show that tested beams with increasing percentage of splices reinforcement caused decreasing the deflection, steel strain and concrete strain increasing the failure load. Increasing percentage of stirrups caused decreasing the deflection and concrete strain and

increasing the failure load and steel strain. Increasing diameter bar caused decreasing the deflection, concrete strain and failure load and increasing the steel strain

. The thesis include eight beams was tested theoretically by Ansys program eight beams same the experimentally beams and one light weight concrete beam no splice in main reinforcement and another normal beam no splice in main reinforcement this two beams as a control beams. The results show that good acceptance by experimentally and theoretically study.

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