BEHAVIOR OF HEAVILY REINFORCED CONCRETE SECTIONS SUBJECTED TO BIAXIAL BENDING

By

HANY AHMED AHMED DAHISH

A Thesis Submitted to the
Faculty of Engineering, Cairo University,
Fayoum Branch in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF SCIENCE

In

Civil Engineering (Structures)

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FAYOUM BRANCH, EGYPT
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ملخص رسالة الماجستير

عنوان الرسالة:

Behavior of Heavily Reinforced Concrete Sections Subjected to Biaxial Bending

سلوك القطاعات الخرسانية ذات التسليح الثقيل المعرضة لعزوم مزدوجة

In order to investigate the behaviour of square normal and high strength concrete columns subjected to axial load with biaxial bending especially heavy reinforced Twelve specimens sections, a three-dimensional finite element model is developed. were analyzed using a reinforced concrete model of a general purpose finite element code. Solid elements and Link elements represent concrete and steel bars respectively. Parameters involved in the numerical study are reinforcement ratio, eccentricity, A comparison was made concrete compressive strength, and distribution of steel bars. with results obtained from testes specimens. The comparisons between numerical results and tests data are made in terms of concrete and steel strains, ultimate load As confirmed by experimental capacity, and lateral displacement for these specimens. results, finite elements analysis (FEA) can effectively simulate the behaviour of square reinforced concrete columns when the proper numerical model is adopted. Based on the tests and FEA, the strain distributions and the load strain curves are obtained. This provides theoretical understanding for establishing the stress-strain An extension to this model was used to study the behaviour of thirty curve model. reinforced concrete columns with different reinforcement ratios and distributions divided into three groups (small eccentricity, medium eccentricity and large eccentricity). Concrete, steel strains, ultimate load, failure mode were obtained. From this study, it is found that using steel reinforcement in the core of the column increase the capacity of it and also, it was concluded that the best distribution of steel is at the outer perimeter of the column.