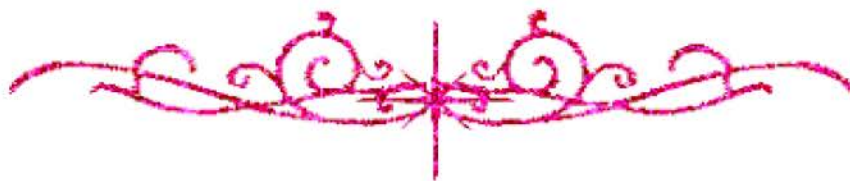


بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

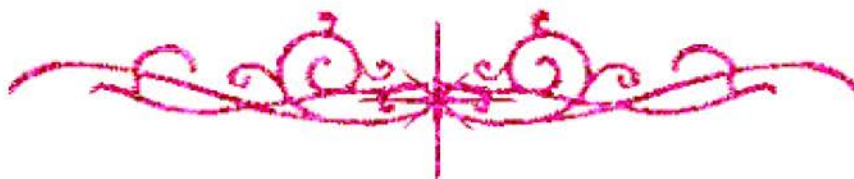
قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



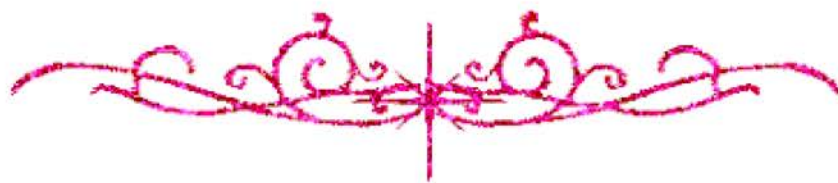
يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



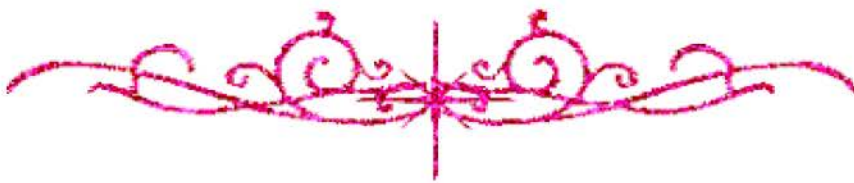


بالرسالة صفحات
لم ترد بالأصل





بعض الوثائق الأصلية تالفة



B 11109

BEHAVIOR OF R.C. BOX-SECTION UNDER COMBINED SHEAR AND TORSION FOR HIGH AND NORMAL STRENGTH CONCRETE

By

WALID AHMED EL KAFRAWY

M.Sc. of Civil Engineering 1991 – El Azhar University

B.Sc. of Civil Engineering 1983 – Cairo University

Thesis Submitted to the Faculty of Engineering
Cairo University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR of PHILOSOPHY

In CIVIL ENGINEERING

Under the supervision of

Prof. Dr. HAMDY HAMED



SHAHEEN

Prof. of R .C. Structures,

Reinforced Concrete Department,

Housing & Building Research Center

Prof. Dr. MOSTAFA FOUAD

EL KAFRAWY

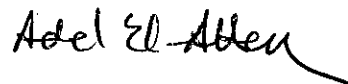


Prof. of R .C. Structures,

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Structural Engineering Department,

Faculty of Engineering, Cairo University.

FACULTY OF ENGINEERING, CAIRO UNIVERSITY

GIZA, EGYPT

2001

CAIRO UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENGINEERING DEPARTEMENT

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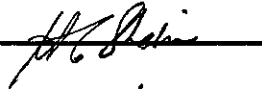
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Approved by the Examination Committee

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Prof. Dr. \ Moustafa Fouad El Kafrawy



Prof. Dr. \ Monier Mohamed Kamal



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To EmanTo Our Future

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ABSTRACT

The behavior of box-section normal and high strength reinforced concrete beams subjected to pure torsion or combined shear and torsion was investigated experimentally. Fourteen large-scale beams were examined and tested. They were designed according to the ACI 318-95. Both normal strength concrete and high strength concrete beams were tested under variable levels of shear forces combined with torsion. The study investigates the interaction between shear and torsion for both under and over reinforced box-section concrete beams. The effect of concrete compressive strength on the behavior of over reinforced box-section beams subjected to pure torsion or combined shear and torsion is also investigated. Details of the experimental program, test results, and evaluations of the effects of the test variables are presented.

The results of the experimental program were compared with the calculated values using different international codes of practice. The experimental results were also compared to those calculated using some theoretical models, which are presented in the literature review chapter. The validity of these models is verified through comparison with the available test results.

Tests conducted in this investigation were used to verify the torsional design provisions in the new Egyptian Code as well as some of the international codes of practice. The crushing criterion available in these codes were critically examined using the test results and those test results found in the literature.

General recommendations for both design and field practice are presented according to test results.

