بسم اللّه الرحمن الرحيم

شبكة المعلومات الجامعية

سامية محمد مصطفى

شبكة المعلومات الجامعية
التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

سامية محمد مصطفى

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

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سامية محمد مصطفى

بالرسالة صفحات

لم ترد بالأصل

FRACTURE BEHAVIOR OF REINFORCED CONCRETE FLANGED BEAMS UNDER FOUR POINT BENDING IN DISPLACEMENT CONTROLLED ENVIRONMENT

By
Noran Mohamed Magdy Mohamed Abd El-Wahab

B.S.C. in Civil Engineering(Honors)-Cairo University-2004

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

Supervised by

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FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2006

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Approved by the Examining Committee:

Prof Dr.	Nabil A.B. Yehia	Advisor	N. Yehia
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FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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ABSTRACT

A four point bend test in a displacement controlled environment is used to investigate the fracture behavior of the T- shaped reinforced concrete beams. Two parameters were investigated: the ratio of flange width to web width (B/b) and the ratio of flange thickness to beam's height (t_s/h). The testing program comprises 12 beams; 3 having rectangular section and 9 having T-section. All beams are 1400 mm in length with a mid span height of 300 mm and a mid span notch of 90 mm. The beams are classified into 3 groups. In the first group, the tested beams have variable flange width to web thickness (B/b):1, 1.5, 2, 2.5, constant ratio of flange thickness to beam height (t_s/h) =0.2 and a reinforcement ratio=0.6%. The second group of beams has variable flange width to web thickness (B/b):1, 1.5, 2, 2.5, constant ratio of flange thickness to beam height (t_s/h) =0.15 and a reinforcement ratio 0.48%. The third group of beams has variable flange thickness to beam height (t_s/h):0, 0.1, 0.15, 0.2, constant ratio of flange width to web thickness (B/b) =1.5 and a reinforcement ratio 0.73%. Measurements included load, steel strain, concrete strain and deflection. Tracking for the mid span crack at each load increment was carried out. The analytical model proposed by Baluch et al. was employed. The experimental results were checked against the new fracture mechanics approach. Also, the experimental results were compared to the results of a finite element program. However, the experimental program revealed that the ratio of flange width to web width (B/b) is more effective than the ratio of flange thickness to beam's height (t_s/h). In addition to that, both the fracture mechanics

approach and the finite element program are in a good agreement with the experimental results.

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