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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

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BEHAVIOR OF CONCRETE BEAMS REINFORCED WITH FRP COMPOSITE BARS

By

Saied Abd-El Hy Ghoneim
B.Sc. of Civil Engineering 1987-M.T.C

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
CIVIL ENGINEERING (STRUCTURAL ENG.)

FACULTY OF ENGINEERING
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ABSTRACT

The use of fiber reinforced polymers (FRP) in place of steel in reinforced concrete members has recently received a great attention in the civil engineering applications. However, the special properties of these materials such as their relatively low modulus of elasticity and their bond characteristics, result in different flexural behavior when compared to steel-reinforced concrete beams. The difference in behavior includes deflection, cracking, ultimate capacity and shear strength. In an attempt to provide insight into the response of FRP reinforced concrete beams, a parametric non-linear finite element study is carried out in this research. The results of the theoretical analysis are compared to those available from a comprehensive experimental program conducted by the first supervisor of this thesis. The theoretical results are also compared to the experimental results available in the literature. In the analytical study the nature of cracking in FRP reinforced concrete beams was taken into consideration in modeling the tension stiffening of such beams. Based on the experimental and the analytical results, design methods are proposed for estimating deflection, flexural capacity, and shear strength of concrete beams reinforced with FRP bars. The proposed methods could be very useful in establishing design guidelines and future code for such beams.

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Contents

	Page
Abstract	i
Acknowledgement	ii
Contents	iii
List of tables	v
List of figures	vi
1. Introduction	
1.1 General	1
1.2 Objective and scope	1
1.3 Thesis outline	2
2. Literature Review	
2.1 General	3
2.2 Material properties	4
2.3 Analysis and Design of FRP reinforced concrete members.	10
2.3.1 Nominal moment capacity	10
2.3.2 Nominal shear capacity	13
2.3.3 Serviceability requirements	16
2.3.3a Effective moment of inertia	16
2.3.3b crack width predicting	18
2.4 Behaviour of FRP reinforced concrete members	20
2.5 Durability, Fatigue and Long-Term behaviour of FRP	23
2.6 Special applications of composite materials	24
2.7 Strengthing and Repair using FRP	25
3. Finite Element Modeling	
3.1 General	38
3.2 Concrete modeling	39
3.2.1 Modeling of uncracked concrete under compression	39
3.2.2 Modeling of cracked concrete under compression	40
3.2.3 Modeling of uncracked concrete under tension	40
3.2.4 Modeling of cracked concrete under tension	41
3.2.5 Shear modulus of cracked concrete	44
3.3 Reinforcement representation	45
3.4 Concrete reinforcement interaction	45
3.5 Program construction	45
3.5.1 Solution of the nonlinear problem	46

3.5.2 The input and output data 47

4. Program Verification and Calibration

4.1 General 54
4.2 Finite element modeling of the tested beams 54
4.3 Comparison between finite element model and test results 55

5. Analysis and Results

5.1 General 110
5.2 Deflection 110
5.2.1 Deflection prediction models 112
5.2.1.1 ACI Committee 440 Model 112
5.2.1.2 Hall and Ghali Model 115
5.2.1.3 ISIS Canada Model 116
5.2.1.4 Proposed Method for estimating deflection 117
5.3 Cracking of FRP reinforced concrete members 119
5.3.1 Crack width 119
5.3.2 Crack spacing 123
5.4 Flexural behaviour of concrete beams reinforced with FRP 124
5.4.1 Balanced reinforcement ratio 125
5.4.2 Flexural strength 127
5.5 Shear strength of concrete beams reinforced with FRP 129
5.5.1 Code Models for concrete members reinforced with steel 129
5.5.2 Shear resistance components 130
5.5.3 Code Models for concrete members reinforced with FRP 131
5.5.3.1 ACI-440 design guidelines 131
5.5.3.2 Canadian Standards Association 132
5.5.3.3 Tottori and Wakui (Japanese Model) 133
5.5.3.4 Proposed equation for shear capacities 134

6. Summary and Conclusions

6.1Summary 156
6.2 Conclusions 156
6.3 Recommendations for future studies 157

REFRENCES 159

List of tables

	Pages
Table (2-1) Tensile properties of FRP C-Bar reinforcing rods.	26
Table (2-2) Results of pullout tests performed on FRP C-Bar.	26
Table (2-3) Designation of beams and characteristics of longitudinal reinforcement and concrete.	27
Table (2-4) d values in mm.	27
Table (2-5) Characteristics of the test-slabs.	29
Table (2-6) Condition of use of FRP tendons and primary reinforcement based on durability consideration.	29
Table (2-7) Summary of permitted uses of Fibre Reinforced Plastics.	29
Table (2-8) Reactivity of fibres and matrices.	31
Table (4-1) Summary of previous data on FRP.	61
Table (4-2) Summary of previous tests data on slabs reinforced by FRP.	62
Table (4-3) Properties of reinforcement used in tested beams.	63
Table (4-4) finite element modeling of tested beams.	67
Table (4-5) Comparison between experimental and theoretical results.	68
Table (5-1) Cracking results of the tested slabs.	134
Table (5-2) Load capacity values of the tested specimens.	136
Table (5-3) Shear capacity, V, of the tested specimens.	138

List of figures

Pages

Figure (2-1) Material characteristics of FRP and Steel reinforcement. 31
Figure (2-2) Creep and Fatigue test results. 31
Figure (2-3a) Inland exposure test condition. 32
Figure (2-3b) Marine exposure test condition. 32
Figure (2-4) Change in tensile strength of FRP rods immersed in NaoH solution. 32
Figure (2-5) Machined FRP rod in concrete 33
Figure (2-6) Shear stress G/V rod (5lugs). 33
Figure (2-7) Shear stress G/V rod with and without probes. 34
Figure (2-8) Shear stress G/V rod with and without probes. 34
Figure (2-9) Brittle ratio. 34
Figure (2-10) Changes in the first natural frequency due to fatigue loading. 35
Figure (2-11) Changes in prestressing force due to fatigue loading. 35
Figure (2-12) Load-Deflection response at mid span due to fatigue testing. 36
Figure (2-13) Crack patterns. 36
Figure (2-14) Dimension of the FRP building. 36
Figure (2-15) FRP wall module industrial joining. 37
Figure (2-16) Design details of FRP construction. 37
Figure (2-17) FRP wall and shear key. 37
Figure (3-1) Stress-Strain relation for uncracked concrete in compression. 48
Figure (3-2) The reduction in compressive strength for cracked concrete. 49
Figure (3-3) Adopted cracking criterion for concrete. 50
Figure (3-4) Stress distribution in a cracked R.C.element. 50
Figure (3-5) Tensile stress-strain relations for both unreinforced and reinforced Concrete. 51
Figure (3-6) Tensile stress strain relation for concrete reinforced with FRP 51
Figure (3-7) Material characteristics of FRP and steel reinforcement 52
Figure (3-8) Concrete stresses in principle tensile direction. 52
Figure (3-9) Degradation of the shear modulus with increasing crack width. 53
Figure (3-10) Adopted force-displacement and stress-strain relationship for steel element. 53
Figure (4-1) Finite element model of concrete tested by Abdalla [10] 73
Figure (4-2) Finite element model of concrete tested by Al-Salloum et al [37] 73
Figure (4-3) Finite element model of concrete tested by Al-Sayed et al [38] 73
Figure (4-4) Finite element model of concrete tested by Vijay et al [39] 73

Figure (4-5) Finite element model of concrete tested by Pecce et al [40] 74
Figure (4-6) Finite element model of concrete tested by Toutanji and Saafi [17] 74
Figure (4-7) Finite element model of concrete tested by Benmokrane and Masmoudi [9] 74
Figure (4-8) Finite element model of concrete tested by Maruyama and Zhao [41] 75
Figure (4-9) Finite element model of concrete tested by El-Badry et al [12] 75
Figure (4-10) Cracking shape of beam (I.4) 76
Figure (4-11) Cracking shape of beam (F1) 77
Figure (4-12) Cracking shape of beam (F3) 77
Figure (4-13) Cracking shape of beam (G.4) 78
Figure (4-14) Cracking shape of beam (C.4) 79
Figure (4-15) Deformed shape of FRP concrete beam I.4, [10] 80
Figure (4-16) Deformed shape of FRP concrete beams tested by Pecce et al [40] 80
Figure (4-17) Deformed shape of FRP concrete beams tested by El-Badry et al [12] 80
Figure (4-18) Load-Deflection relationship of beam (I.4), [10] 81
Figure (4-19) Load-Deflection relationship of beam (C.4), [10] 82
Figure (4-20) Load-Deflection relationship of beam (L.4), [10] 83
Figure (4-21) Load-Deflection relationship of group (I) of beams, [37] 84
Figure (4-22) Load-Deflection relationship of group (II) of beams, [37] 85
Figure (4-23) Load-Deflection relationship of group (III) of beams, [37] 86
Figure (4-24) Load-Deflection relationship of group (IV) of beams, [37] 87
Figure (4-25) Load-Deflection relationship of beam (S3), [39] 88
Figure (4-26) Deflection of beam (S5), [39] 89
Figure (4-27) Deflection of beam (S6), [39] 90
Figure (4-28) Load-Deflection relationship of beam (F1), [40] 91
Figure (4-29) Load-Deflection relationship of beam (F2), [40] 92
Figure (4-30) Load-Deflection relationship of beam (F3), [40] 93
Figure (4-31) Load-Deflection relationship of beam (1), [17] 94
Figure (4-32) Load-Deflection relationship of beam (2), [17] 95
Figure (4-33) Load-Deflection relationship of beam (3), [17] 96
Figure (4-34) Load-Deflection relationship of beam (1), [9] 97
Figure (4-35) Load-Deflection relationship of beam (2), [9] 98
Figure (4-36) Load-Deflection relationship of beam (3), [9] 99
Figure (4-37) Load-Deflection relationship of beam (4), [9] 100
Figure (4-38) Load-Deflection relationship of beam (24,26), [41] 101
Figure (4-39) Load-Deflection relationship of beam (28), [41] 102
Figure (4-40) Load-Deflection relationship of beam (29,30), [41] 103