



Cairo University

BEHAVIOR OF NORMAL AND HIGH STRENGTH CONCRETE BEAMS UNDER FLEXURE AND SHEAR

By

Ehab Nabil Saad Balat
B.SC. Civil Engineering 2011

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**

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Under the Supervision of

Prof. Dr. Mohamed El-said Issa

**Ass. Prof. Dr. Naser Fekry Hasan
EL Shafey**

.....
Professor of Concrete structures
Structural Engineering Department
Faculty of Engineering, Cairo University

.....
Associated professor
Structural Engineering Department
Faculty of Engineering, Cairo University

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Approved by the examining Committee:

Prof. Dr. First S. Name, External Examiner

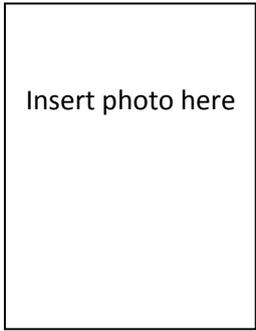
Prof. Dr. Second E. Name, Internal Examiner

Prof. Dr. Third E. Name, Thesis Main Advisor

Prof. Dr. Third E. Name, Member

FACULTY OF ENGINEERING
CAIRO UNIVERSITY
GIZA, EGYPT
2017

Engineer's Name: Ehab Nabil Saad Balat
Date of Birth: 26 / 06 / 1989
Nationality: Egyptian
E-mail: Ehab_-88@hotmail.com
Phone: 01068687181
Address:
Registration Date:/...../.....
Awarding Date:/...../.....
Degree: Master of Science
Department: Structural Engineering



Supervisors:

Prof.
Prof.
Dr.

Examiners:

Prof. (External examiner)
Prof. (Internal examiner)
Porf. (Thesis main advisor)
Porf. (Member)

Title of Thesis:

Behavior of normal and high strength concrete beams under flexure and shear

Key Words:

Normal and High strength concrete beams; shear span to depth ratio; web reinforcement ratio; longitudinal reinforcement ratio; Anon-linear static analysis; finite elements, ANSYS (14) software.

Summary:

To understand the behavior of all beams designed by; a case study we assumed. This case study leads to investigate flexural and shear behavior of reinforced concrete beams. This case study contain 90 beams made of (N.S.C) and)H.S.C) ,with dimension (150*250)mm , clear span 2000mm , length all beams equal 2300mm ,shear span to depth ratio (a/d) ranged from (1 to 2 to 3) , compressive strength concrete (f_c') ranged from (30 ,60, 75)Mpa, web reinforcement ratio (ρ_v) ranged from (0.14%,0 .28%, 0.25%, 0.50%), and longitudinal reinforcement ratio (ρ) for reinforced concrete beams ranged from (0.67%, 1.19%, 1.5%, 2.38%, 3.0%). Finite element program "ANSYS 14" was used to calculate the final straining actions and effect variables on first flexural crack load (p_{cr}), flexural shear crack load (p_v), Ultimate failure load (p_u), Defflection, tensile and yield stresses for longitudinal reinforcement and web reinforcement , stages for principle stresses and vector mode principle stresses ,and modes of failures for all beams designed.

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TABLE OF CONTENTS

AKNOWLEDGMENTS.....	I
TABLE OF CONTENTS.....	II
LIST OF FIGURES.....	V
LIST OF TABLES.....	XX
ABSTRACT.....	XXI
CHAPTER (1) INTRODUCTION.....	1
1.1 Background	1
1.2 Research objective and scope.....	3
1.3 Thesis organization.....	3
CHAPTER (2): LITERATURE REVIEW.....	5
2.1 Introduction	5
High strength concrete	5
2.2.1. Definition of high strength concrete(HSC).....	5
2.2.2. Mechanical properties of HSC.....	6
2.2.2.1. Compressive strength.....	6
2.2.2.2. Tensile strength.....	6
2.2.2.3 Static Modulus of Elasticity.....	7
2.2.2.4. Modulus of Rupture.....	8
2.2.2.5. Splitting Tensile Strength.....	8
2.3 Shear Response of Reinforced Concrete Beam.....	9
2.3.1. Introduction.....	9
2.3.2 Shear Stresses Prior to Cracking.....	10
2.3.3. Diagonal Tension Cracking due to Shear.....	11
2.3.4 Crack Patterns due to Shear Stresses.....	12
2.3.5 Modes of Shear Failure.....	12
2.3.5.1. Diagonal Tension Failure.....	16
2.3.5.2. Shear-Tension Failure.....	16
2.3.5.3. Shear-Compression Failure.....	18
2.3.6 Basic Mechanisms of Shear Resistance.....	18
2.3.7 FACTORS AFFECTING BEAM SHEAR STRENGTH.....	21
2.3.7.1 Concrete Strength.....	21
2.3.7.2 Shear Span/depth Ratio.....	24
2.3.7.3 Shear Reinforcement Ratio.....	26
2.3.7.4 Longitudinal Steel Ratio.....	27
2.3.7.5 Aggregate Interlock.....	29
2.4 Review of code provisions to evaluate the shear strength of reinforced concrete beam.....	30

2.4.1	Egyptian Code, ECP 2007 [59].....	30.
2.4.2	American Code, ACI 318-14 [61].....	31
2.4.3	AASHTO’S LRFD BRIDGE DESIGN SPECIFICATION.....	32
CHAPTER (3) NON-LINEAR FINITE ELEMENT ANALYSIS.....		35
3.1	Introduction	35
3.2	Nonlinear Finite element analysis.....	35
3.2.1	General	35
3.2.2	Finite element model	35
3.2.2.1	Element type	36
3.2.2.1.1	Solid65	36
3.2.2.1.2	Link 8-3D	37
3.2.2.2	Material Models	39
3.2.2.2.1	Concrete in compression	43
3.2.2.2.2	Concrete in Tension	44
3.2.2.2.3	Reinforcement in Tension	44
3.2.2.2.4	Bond between Concrete and Reinforcement	45
3.2.2.3	Solution planning	45
3.2.2.3.1	Automatic Time Stepping	46
3.2.2.3.2	Loading.....	46
3.2.2.3.3	Newton-Raphson method for Analysis	47
3.3	verification Beams.....	48
3.4	ANSYS Finite Element Model.....	51
3.4.1	Element Types.....	51
3.4.2	Real Constants.....	51
3.4.3	Material Properties.....	52
3.4.4	Modeling.....	54
3.4.5	Meshing.....	56
3.4.6	Numbering Controls.....	56
3.4.7	Loads and Boundary Conditions.....	56
3.4.8	Analysis Type.....	58
3.4.9	Analysis Process for the Finite Element Model.....	59
3.5	Results.....	60
3.5.1	Behavior of Cracking.....	61
3.5.2	Strength Limit State.....	63
3.6	Case Study.....	64
3.6.1	Designed beams.....	64
3.7	Designed beams variables.....	65
3.8	Dimensions And Parameters.....	67
CHAPTER (4) PARAMETRIC STUDY.....		74

4.1. Introduction	74
4.2. Finite Element Results.....	74
4.2.1. Designed beams results.....	74
4.2.2. Results of Designed beams.....	77
4.2.2.1 Group one result.....	78
4.2.2.1.1 Beam (2) results.....	78
4.2.2.1.2 Beam (8) results.....	83
4.2.2.1.3 Beam (10) results.....	87
4.2.2.1.4 Beam (12) results.....	91
4.2.2.1.5 Beam (15) results.....	95
4.2.2.1.6 Beam (17) results.....	99
4.2.2.1.7 Beam (21) results.....	103
4.2.2.1.8 Beam (25) results.....	107
4.2.2.1.9 Beam (26) results.....	111
4.2.2.1.10 Beam (27) results.....	115
4.2.2.1.11 Beam (28) results.....	119
4.2.2.1.12 Beam (30) results.....	123
4.2.2.2 Group two result.....	127
4.2.2.2.1 Beam (35) results.....	127
4.2.2.2.2 Beam (39) results.....	131
4.2.2.2.3 Beam (46) results.....	135
4.2.2.2.4 Beam (53) results.....	139
4.2.2.2.5 Beam (55) results.....	143
4.2.2.2.6 Beam (65) results.....	147
4.2.2.2.7 Beam (76) results.....	151
4.2.2.2.8 Beam (85) results.....	155
CHAPTER (5) RESULTS AND DISCUSSIONS.....	159
Introduction	159
5.1 Normal Strength concrete.....	159
5.1.1 Effect of shear span to depth ratio (a/d).....	160
5.1.2 Effect of web reinforcement ratio (ρ_v).....	160
5.1.3 Effect of longitudinal steel reinforcement ratio (ρ).....	160
5.1.4 MODES OF FAILURES.....	161
5.2 High Strength concrete.....	176
5.2.1 Effect of shear span to depth ratio (a/d).....	176
5.2.2 Effect of web reinforcement ratio (ρ_v).....	177
5.2.3 Effect of longitudinal steel reinforcement ratio (ρ).....	177
5.2.4 MODES OF FAILURES.....	178

CHAPTER (6) SUMMARY AND CONCLUSION.....	190
6.1 Introduction	190
6.2 Summary.....	190
6.3 Conclusion.....	191
6.3.1 NORMAL STRENGTH CONCRETE (N.S.C).....	191
6.3.2 HIGH STRENGTH CONCRETE (H.S.C).....	191
6.3.3 Effect of increasing compressive strength (N.S.C to H.S.C).....	192
6.4 Future works	
REFERENCES.....	193

LIST OF FIGURES

Figure 1.1: Types of inclined cracks.....	1
Figure 1.2: Beam before and after cracking in laboratory in Montenegro (2015).....	2
Figure 1.3: Diagonal tension failure.....	2
Fig 1.4: Modes of shear failure in short beams	2
Figure: 2.1 Cracks appeared when vertical load is applied at the mid span of a beam	9
Figure 2.2: Beam subjected to combined shear and bending. Enlarged view of section dx along beam axis shows different level of details with regard to the internal forces.....	10
Figure 2.3: Principal tensile stress trajectories in an un-cracked reinforced concrete beam....	11
Figure 2.4: The two important types of diagonal (inclined) shear cracks (a) Flexural-shear cracking, and (b) web shear cracking.....	12
Figure 2.5: Plane stress state of one point and stress Mohr's circle.....	13
Figure 2.6: Types of inclined cracks.....	13
Figure 2.7: Effect of (a/d) on shear strength of beams without stirrups.	14
Figure 2.8: Diagonal tension failure in slender beams.....	15
Fig 2.9: Modes of shear failure in short beams.....	15
Figure 2.10: Modes of shear failure in very short beams (Deep beams)	16
Figure 2.11: Modes of shear failure Of I-beams	16
Figure 2.12: Beam Loaded in a Four-Point bending configuration showing the definition of shear-span. Enlarged detail of the shear span highlights the components of shear resistance.....	17
Figure 2.13: Internal forces after inclined cracking in a reinforced concrete beam with shear reinforcement	18
Figure 2.14: Effect of compressive strength on measured/calculated diagonal cracking shear, from pca tests	22
Figure 2.15: Effect of compressive strength on shear strength with varying (a/d) rstios, from morrow tests	22
Figure 2.16: Effect of concrete strength on beam shear, from van Der berg tests	23

Figure 2.17: Variation in shear capacity with (a/d) for rectangular beams	25
Figure 2.18: (a) Effect of (a/d) ratio, (b) Effect of f_c' , on relationship between ultimate shear strength and web reinforcement ratio	27.
Figure 2.19: Relative beam strength (Multimate / Mflexure), versus shear span to depth ratio (a/d) and longitudinal reinforcement ratio (ρ_l)	28...
Figure 3.1: “SOLID65” 3-D reinforced Concrete solid element.....	37
Figure 3.2: “SOLID65” 3-D stress output.....	37
Figure 3.3: “LINK8-3D” element bars.....	37
Figure 3.4: Models for reinforcement in reinforced concrete elements.....	38
Figure 3.5: Multi-linear isotropic stress-strain curve for concrete In compression (EPC code 203-2007 [3]).....	41
Figure 3.6: Multi-linear isotropic stress-strain curve for concrete in compression (ACI-Code).....	42
Figure 3.7: Typical stress-strain curves for concrete in compression.....	43
Figure 3.8: Idealized stress-strain curve for concrete in compression.....	44
Figure 3.9: Idealized stress-strain curve for steel.....	45
Figure 3.10: Load steps, sub-steps, and time.....	46
Figure 3.11: Incremental “Newton-Raphson” procedure.....	47.
Figure 3.12: Traditional “Newton-Raphson” method vs. arc-length method.....	48
Figure 3.13: Overview of few experimental models with disposition of strain gauges and transducers.....	48.
Figure 3.14: One of the tested beams before and after cracking (H24-2.4).....	49
Figure 3.15: Failure in Shear (H24-2.4).....	50
Figure 3.16: Volumes Created in ANSYS.....	54
Figure 3.17: Mesh of the Concrete, Steel Plate, and Steel Support.....	55
Figure 3.18: Reinforcement Configuration.....	55
Figure 3.13 - Boundary Condition for Support.....	57
Figure 3.14: Boundary Conditions at the Loading Plate.....	57
Figure 3.15: Cracking at Ultimate Load	61
Figure 3.16: Failure in Shear (H24-2.4).....	61
Figure 3.17: Yielding Tension Reinforcement at Ultimate Load.....	62
Figure 3.18: Yielding Stirrups at Ultimate Load.....	62
Figure 3.19: Shear Load at Ultimate Load	63
Figure 3.20: Dimension Model of beam for Case study.....	64
Figure 3.21: Shape of main reinforcement and stirrups for beams.....	66
Figure 3.22: Shape of main reinforcement and stirrups for beams.....	66
Figure 4.1(a): Stages of principle stresses for beam (2).....	79.
Figure 4.1(b): forming of expected first plastic hinge for beam (2).....	79
Figure 4.1(c): yielding for Main RFT at Failure Load for beam (2).....	80
Figure 4.1(d): Stages of yielding of main reinforcement for beam (2).....	80

Figure 4.1(e): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks, and Diagonal Crack for beam (2).....	81.
Figure 4.1(f): Stages for Vector plot of principle stresses for beam (2).....	81
Figure 4.1(g): load-deflection curve at top point for beam (2).....	82.
Figure 4.2(a): forming of expected first plastic hinge for beam (8).....	84
Figure 4.2(b): yielding for Main RFT at Failure Load for beam (8). Figure 4.2(c): Stages for Vector plot of principle stresses for beam (8).....	84
Figure 4.2(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (8).....	85
Figure 4.2(e): Stages of principle stresses for beam (8).....	85
Figure 4.2(f): Stages of yielding of main reinforcement for beam (8).....	85
Figure 4.2(g): load-deflection curve at Bottom point for beam (8).....	86
Figure 4.3(a): Stages of principle stresses for beam (10).....	88
Figure 4.3(b): yielding for Main RFT at Failure Load for beam (10).....	88.
Figure 4.3(c): Stages for Vector plot of principle stresses for beam (10).....	88.
Figure 4.3(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (10).....	88
Figure 4.3(e): Stages of yielding of stirrups for beam (10).....	89
Figure 4.3(f): Stages of yielding of main reinforcement for beam (10).....	89.
Figure 4.3(g): load-deflection curve at Bottom point for beam (10).....	90
Figure 4.4(a): forming of expected first plastic hinge for beam (12).....	92
Figure 4.4 (b): yielding for Main RFT at Failure Load for beam (12).....	92
Figure 4.4 (c): Stages for Vector plot of principle stresses for beam (12).....	92.
Figure 4.4 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (12).....	92
Figure 4.4 (e): Stages of principle stresses for beam (12).....	93
Figure 4.4 (f): Stages of yielding of main reinforcement for beam (12).....	93
Figure 4.4 (g): load-deflection curve at top point for beam (12).....	94.
Figure 4.5(a): forming of expected first plastic hinge for beam (15).....	96
Figure 4.5(b): yielding for Main RFT at Failure Load for beam (15).....	96
Figure 4.5(c): Stages for Vector plot of principle stresses for beam (15).....	96
Figure 4.5(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (15).....	96
Figure 4.5(e): Stages of principle stresses for beam (15).....	97
Figure 4.5(f): Stages of yielding of main reinforcement for beam (15).....	97
Figure 4.5(g): load-deflection curve at top point for beam (15).....	98
Figure 4.6(a): Stages of principle stresses for beam (17).....	100
Figure 4.6(b): yielding for Main RFT at Failure Load for beam (17).....	100
Figure 4.6(c): Stages for Vector plot of principle stresses for beam (17).....	100

Figure 4.6(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (17).....	100
Figure 4.6(e): Stages of yielding of stirrups for beam (17).....	101
Figure 4.6(f): Stages of yielding of main reinforcement for beam (17).....	101
Figure 4.6(g): load-deflection curve at Bottom point for beam (17).....	102
Figure 4.7(a): forming of expected first plastic hinge for beam (21).....	104
Figure 4.7(b): yielding for Main RFT at Failure Load for beam (21).....	104
Figure 4.7(c): Stages for Vector plot of principle stresses for beam (21).....	104
Figure 4.7(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (21).....	104
Figure 4.7(e): Stages of principle stresses for beam (21).....	105
Figure 4.7(f): Stages of yielding of main reinforcement for beam (21).....	105
Figure 4.7(g): load-deflection curve at Bottom point for beam (21).....	106
Figure 4.8(a): forming of expected first plastic hinge for beam (25).....	108
Figure 4.8(b): yielding for Main RFT at Failure Load for beam (25).....	108
Figure 4.8(c): Stages for Vector plot of principle stresses for beam (25).....	108
Figure 4.8(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (25).....	108.
Figure 4.8(e): Stages of principle stresses for beam (25).....	109.
Figure 4.8(f): Stages of yielding of main reinforcement for beam (25).....	109
Figure 4.8(g): load-deflection curve at Bottom point for beam (25).....	110
Figure 4.9(a): forming of expected first plastic hinge for beam (26).....	112
Figure 4.9(b): yielding for Main RFT at Failure Load for beam (26).....	112.
Figure 4.9(c): Stages for Vector plot of principle stresses for beam (26).....	112
Figure 4.9(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (26).....	112
Figure 4.9(e): Stages of principle stresses for beam (26).....	113.
Figure 4.9(f): Stages of yielding of main reinforcement for beam (26).....	113.
Figure 4.9(g): load-deflection curve at Bottom point for beam (26).....	114.
Figure 4.10(a): Stages of principle stresses for sample (27).....	116
Figure 4.10(b): yielding for Main RFT at Failure Load for sample (27).....	116
Figure 4.10(c): Stages for Vector plot of principle stresses for sample (27).....	116
Figure 4.10(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for sample (27).....	116
Figure 4.10(e): Stages of yielding of stirrups for sample (27).....	117
Figure 4.10(f): Stages of yielding of main reinforcement for sample (27).....	117.
Figure 5.1.2(g): Effect of web reinforcement ratio on Deflection.....	169
Figure 5.1.2(h): Effect of web reinforcement ratio on load ratio (P_{cr}/P_u).....	179
Figure 5.1.2(i): Effect of web reinforcement ratio on load ratio (P_v/P_u).....	170.

Figure 5.1.3(a): Effect of Longitudinal reinforcement ratio on First Flexural load (P_{cr})...	170.
Figure 5.1.3(b): Effect of Longitudinal reinforcement ratio on First Flexural load (P_{cr})...	171
Figure 5.1.3(c): Effect of Longitudinal reinforcement ratio on Flexural shear load (PV)...	171.
Figure 5.1.3(d): Effect of Longitudinal reinforcement ratio on Flexural shear load (PV)...	172
Figure 5.1.3(e): Effect of Longitudinal reinforcement ratio on Ultimate load (P_u).....	172
Figure 5.1.3(f): Effect of Longitudinal reinforcement ratio on Ultimate load (P_u).....	173
Figure 5.1.3(g): Effect of Longitudinal reinforcement ratio on Deflection.....	173
Figure 5.1.3(h): Effect of Longitudinal reinforcement ratio on Deflection.....	174
Figure 5.1.3(i): Effect of Longitudinal reinforcement ratio on load ratio (P_v/P_u).....	174
Figure 5.1.3(j): Effect of Longitudinal reinforcement ratio on load ratio (P_v/P_u).....	175
Figure 5.1.3(k): Effect of Longitudinal reinforcement ratio on load ratio (P_{cr}/P_u).....	175
Figure 5.1.3(L): Effect of Longitudinal reinforcement ratio on load ratio (P_{cr}/P_u).....	176
Figure 4.11(g): load-deflection curve at Bottom point for beam (28).....	120
Figure 4.12(a): Stages of principle stresses for beam (30).....	124
Figure 4.12(b): yielding for Main RFT at Failure Load for beam (30).....	124
Figure 4.12(c): Stages for Vector plot of principle stresses for beam (30).....	124
Figure 4.12(d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (30).....	124.
Figure 4.12(e): Stages of yielding of stirrups for beam (30).....	125
Figure 4.12(f): Stages of yielding of main reinforcement for beam (30).....	125
Figure 4.12(g): load-deflection curve at Bottom point for beam (30).....	126
Figure 4.13 (a): forming of expected first plastic hinge for beam (35).....	128.
Figure 4.13 (b): yielding for Main RFT at Failure Load for beam (35).....	128
Figure 4.13 (c): Stages for Vector plot of principle stresses for beam (35).....	128
Figure 4.13 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (35).....	128
Figure 4.13 (e): Stages of principle stresses for beam (35).....	129
Figure 4.13 (f): Stages of yielding of main reinforcement for beam (35).....	129.
Figure 4.13 (g): load-deflection curve at Bottom point for beam (35).....	130.
Figure 4.14 (a): Stages of principle stresses for beam (39).....	132.
Figure 4.14 (b): yielding for Main RFT at Failure Load for beam (39).....	132
Figure 4.14 (c): Stages for Vector plot of principle stresses for beam (39).....	132.
Figure 4.14 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (39).....	132.
Figure 4.14 (e): Stages of yielding of stirrups for beam (39).....	133.
Figure 4.14 (f): Stages of yielding of main reinforcement for beam (39).....	133
Figure 4.14 (g): load-deflection curve at Bottom point for beam (39).....	134
Figure 4.15 (a): forming of expected first plastic hinge for beam (46).....	136

Figure 4.15 (b): yielding for Main RFT at Failure Load for beam (46).....	136
Figure 4.15 (c): Stages for Vector plot of principle stresses for beam (46).....	136.
Figure 4.15 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (46).....	136.
Figure 4.15 (e): Stages of principle stresses for beam (46).....	137
Figure 4.15 (f): Stages of yielding of main reinforcement for beam (46).....	137.
Figure 4.15 (g): load-deflection curve at Bottom point for beam (46).....	138.
Figure 4.16 (a): forming of expected first plastic hinge for beam (53).....	140
Figure 4.16 (b): yielding for Main RFT at Failure Load for beam (53).....	140
Figure 4.16 (c): Stages for Vector plot of principle stresses for beam (53).....	140
Figure 4.16 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (53).....	140
Figure 4.16 (e): Stages of principle stresses for beam (53).....	141
Figure 4.16 (f): Stages of yielding of main reinforcement for beam (53).....	141
Figure 4.16 (g): load-deflection curve at Bottom point for sample (53).....	142
Figure 4.17 (a): forming of expected first plastic hinge for beam (55).....	144
Figure 4.17 (c): Stages for Vector plot of principle stresses for beam (55).....	144
Figure 4.17 (b): yielding for Main RFT at Failure Load for beam (55).....	144
Figure 4.17 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (55).....	144
Figure 4.17 (e): Stages of principle stresses for beam (55).....	145
Figure 4.17 (f): Stages of yielding of main reinforcement for beam (55).....	145
Figure 4.17 (g): load-deflection curve at Bottom point for beam (55).....	146
Figure 4.18 (a): forming of expected first plastic hinge for beam (65).....	148
Figure 4.18 (b): yielding for Main RFT at Failure Load for beam (65).....	148
Figure 4.18 (c): Stages for Vector plot of principle stresses for beam (65).....	148
Figure 4.18 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (65).....	148
Figure 4.18 (e): Stages of principle stresses for beam (65).....	149
Figure 4.18 (f): Stages of yielding of main reinforcement for beam (65).....	149
Figure 4.18 (g): load-deflection curve at Bottom point for beam (65).....	150
Figure 4.19 (a): forming of expected first plastic hinge for beam (76).....	152
Figure 4.19 (b): yielding for Main RFT at Failure Load for beam (76).....	152
Figure 4.19 (c): Stages for Vector plot of principle stresses for beam (76).....	152
Figure 4.19 (d): Stages of crack pattern at beginning of cracks, propagation of flexural, first shear cracks and Diagonal Crack for beam (76).....	152
Figure 4.19 (e): Stages of principle stresses for beam (76).....	153
Figure 4.19 (f): Stages of yielding of main reinforcement for beam (76).....	153
Figure 4.19 (g): load-deflection curve at Bottom point for beam (76).....	154