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Faculty of Engineering
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Effect of Loading and Supporting Area on Shear behavior of Concrete Deep Beams

A Thesis Submitted in partial fulfillment for the requirements of
The Degree of
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By

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Disclaimer

This thesis is submitted as partial fulfillment of M.Sc degree in Civil Engineering, to Faculty of Engineering, Ain Shams University.

The work included in this thesis was carried out during the period from 2011 to 2017, and no part of it has been submitted for a degree or qualification at any other scientific entity.

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others

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Ahmed Mohamed Mostafa



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ABSTRACT

The objective of this thesis is to investigate the effect of loading and supporting area on shear behavior of concrete deep beams, examine the effect of this parameter on size effect of deep beams, and to Study of current design codes procedures and accuracy for predicting shear strength for concrete deep beams. This thesis is carried out with a focus on validating the theoretical data against actual experimental results. All results are compared together to reach a conclusion on how to predict accurately the shear strength of deep beams taking into consideration size effect phenomenon. The thesis is divided into seven chapters.

Chapter 1: Introduction

This chapter presents an overview of the research that includes introduction, problem statement and motivation. This chapter also provides a description of the main and sub-objectives of the research.

Chapter 2: Literature Review

The literature review is presented in Chapter 2. The review covers the basic shear theory in beams and deep beams, description of the size effect phenomenon, the main factors that effects shear behavior and size effect, and previous studies done by other researches.

Chapter 3: Experimental Work

Chapter 3 is describing the experimental program done in this research in details, from materials used, casting procedure to the specimen's details, and finally the testing procedure.

Chapter 4: Experimental Results

Chapter 4 focuses on showing the cracking patterns, load deflection relationship, cracking and ultimate loads, and failure modes of tested specimens.

Chapter 5: Discussion of Experimental Results

This chapter describes the results displayed in the previous chapter, and the comparison between the experimental results by classifying the tested beams in multiple groups to better understand the effect of the studied parameters.

Chapter 6: Theoretical Analysis

In chapter 6, the methods described in the Egyptian, American, and European codes are used to calculate the shear strength of the beams, computer software CAST is also used to obtain results from strut and tie models. All these result are then compared with the experimental results.

Chapter 7: Conclusion and Future Work

As the final chapter in this thesis, chapter 7 highlights the contributions and the conclusions reached from both analytical and experimental studies, it also suggests future work that can carried out to take into consideration other parameters that have not been the focus of this thesis.

TABLE OF CONTENT

Disclaimer	i
AKNOWLEDGMENTS	ii
Abstract.....	iii
Chapter 1: Intorduction.....	1
1.1 Introduction	1
1.2 Purpose of investigation	2
1.3 Thesis structure	3
Chapter 2: Litreture Review	4
2.1 Introduction	4
2.2 Basic shear theory in beams	4
2.3 Deep beams	9
2.4 Shear in deep beams	10
2.4.1 Compressive force path method	11
2.4.2 Strut and tie models	13
2.5 Factors affecting deep beams shear behaviour	18
2.5.1 Concrete compressive strength (F_{cu})	18
2.5.2 Beam width	20
2.5.3 Main tension steel.....	20
2.5.4 Web reinforcement.....	22
2.5.5 Span-depth ratio (led).....	25
2.5.6 Shear span-depth ratio (ad).....	26
2.5.7 Openings.....	28
2.5.8 Loading Pattern (top or bottom loaded)	30
2.5.9 Load application method and type of support	32
2.5.10 Dimension of supporting and loading plates	33
2.6 Size effect.....	34
2.6.1 Review of the size effect law	35

2.6.2	Size effect on shear behaviour of deep beams	36
2.6.3	Previous size effect investigations	37
2.6.4	Size effect mitigation	44
Chapter 3: Experimental Work		46
3.1	Introduction	46
3.2	Materials.....	46
3.2.1	Coarse Aggregate and Sand	47
3.2.2	Cement	47
3.2.3	Mixing Water	47
3.2.4	Steel Reinforcement	47
3.3	Concrete Mix.....	47
3.4	Preparation of Test Specimen	48
3.5	Properties of Concrete.....	51
3.6	Specimen Details.....	52
3.7	Instrumentation and Testing Procedure.....	58
Chapter 4: Experimental Results.....		61
4.1	Introduction	61
4.2	Experimental Results.....	63
4.2.1	Cracking Pattern.....	63
4.2.2	Load Deflection Relationship.....	75
4.2.3	Failure Modes.....	80
4.2.4	Cracking and Ultimate Loads.....	86
4.2.5	Reinforcement Strain Measurements	87
Chapter 5: Discussion of Experimental Results		93
5.1	Introduction	93
5.2	Discussion of Results of the Tested Beams.....	94
5.2.1	Effect of beam depth	94
5.2.2	Effect of loading and supporting plates.....	102
Chapter 6: Theoretical Analysis		111
6.1	Introduction	111
6.2	Different design approaches.....	111

6.2.1	Empirical Design Method	111
6.2.2	Strut-and-Tie Model.....	115
6.2.3	Computer based STM software (CAST).....	121
6.3	Comparison between Results	123
6.4	Size Effect Calculation.....	134
Chapter 7: Conclusion and Future Work.....		145
7.1	Introduction.....	145
7.2	Conclusions and Recommendations.....	146
7.3	Recommendations for Future Works	147
References		148

LIST OF FIGURES

Figure (2-1), Truss analogy for beams failing in shear	5
Figure (2-2), Shear stresses in an elastic beam	6
Figure (2-3), Normal, shear, and principal stresses in uncracked beam	8
Figure (2-4), Deformation patterns of slender beams and deep beams	10
Figure (2-5), Path of compressive force and corresponding outline of compressive stress trajectories for a typical deep beam. (Kong 2002)	11
Figure (2-6), Proposed models for deep beams under (a) single-point (b) two-point and/or uniform loading. (Kong 2002)	12
Figure (2-7), Components of STM	14
Figure (2-8), Example strut-and-tie model, an acceptable Model and Poor Model	15
Figure (2-9), Strut shapes	16
Figure (2-10), Singular and smeared nodes	17
Figure (2-11), Different types of nodes	18
Figure (2-12), Ultimate shear stress as function of f_c	19
Figure (2-13), Variation of total ultimate shear strength with ρ_t & a/d	21
Figure (2-14), Ultimate shear stress versus a/d	22
Figure (2-15), Ultimate shear stress versus vertical shear reinforcement ρ_v	23
Figure (2-16), Ultimate shear stress versus horizontal shear reinforcement ρ_h	24
Figure (2-17), Typical web reinforcement detail	25
Figure (2-18), Ultimate shear stresses versus effective span-depth ratio l/d	26
Figure (2-19), Ultimate and diagonal cracking stresses versus a/d	27
Figure (2-20), Nominal shear stress versus mid-span deflection	28
Figure (2-21), Beams geometry and dimensions	30
Figure (2-22), Typical arch mechanism of top and bottom loaded deep beams	31
Figure (2-23), Typical detail of bottom loaded beams	32
Figure (2-24), Detailing of typical specimen loaded and supported by columns	33
Figure (2-25), Relative strength (ultimate moment/flexural moment) vs. a/d ratio	38
Figure (2-26), Influence of member depth and aggregate size on shear stress at failure for tests carried out by Shioya 1989, (Ghannoum 1988)	40
Figure (2-27), Normalized ultimate stress and diagonal cracking stress versus overall height	42
Figure (2-28), Ultimate and cracking shear stress for $f_c' = 31.4 \text{ MPa}$	43

<i>Figure (2-29), Ultimate and cracking shear stress for $f_c' = 78.5 \text{ MPa}$</i>	43
<i>Figure (3-1), Steel forms</i>	49
<i>Figure (3-2), Preparing the tested specimens</i>	49
<i>Figure (3-3), Concrete casted in molds</i>	50
<i>Figure (3-4), Compression test for standard concrete cubes</i>	52
<i>Figure (3-5), Group one specimen dimensions</i>	54
<i>Figure (3-6), Group two specimen dimensions</i>	55
<i>Figure (3-7), Group three specimen dimensions</i>	56
<i>Figure (3-8), Typical reinforcement arrangement for specimens groups</i>	57
<i>Figure (3-9), Custom steel plates and supports</i>	58
<i>Figure (3-10), Typical test setup for small depth beams</i>	59
<i>Figure (3-11), Typical test setup for medium and large depth beams</i>	59
<i>Figure (3-12), Typical LVDT arrangement for specimens</i>	60
<i>Figure (3-13), Typical strain gauge layout for specimen</i>	60
<i>Figure (4-1), B1-400/60 & B2-400/60</i>	65
<i>Figure (4-2), B1-600/60</i>	65
<i>Figure (4-3), B1-900/60</i>	66
<i>Figure (4-4), Crack width propagation for B1-400/60 & B2-400/60</i>	66
<i>Figure (4-5), Crack width propagation for B1-600/60</i>	67
<i>Figure (4-6), Crack width propagation for B1-900/60</i>	67
<i>Figure (4-7), B2-600/90</i>	69
<i>Figure (4-8), B2-900/130</i>	69
<i>Figure (4-9), Crack width propagation for B2-600/90</i>	70
<i>Figure (4-10), Crack width propagation for B2-900/130</i>	70
<i>Figure (4-11), B3-400/80</i>	72
<i>Figure (4-12), B3-600/120</i>	72
<i>Figure (4-13), B3-900/180</i>	73
<i>Figure (4-14), Crack width propagation for B3-400/80</i>	73
<i>Figure (4-15), Crack width propagation for B3-600/120</i>	74
<i>Figure (4-16), Crack width propagation for B3-900/180</i>	74
<i>Figure (4-17), Load deflection curve for B1-400/60 & B2-400/60</i>	76
<i>Figure (4-18), Load deflection curve for B1-600/60</i>	76
<i>Figure (4-19), Load deflection curve for B1-900/60</i>	77
<i>Figure (4-20), Load deflection curve for B2-600/90</i>	77