Ain Shams University
Faculty of Engineering
Department of Structural Engineering

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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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.

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