

**COMPARISON BETWEEN MANUAL AND FINITE ELEMENT  
ANALYSIS OF RC WALL IN VARIOUS LENGTH TO HEIGHT  
RATIO**

By

**MOHD SHAHRUL AZHARY BIN MOHAMAD**

Report is submitted as  
the requirement for the degree of

**Bachelor Engineering (Hons) (Civil)**

**MARA UNIVERSITY OF TECHNOLOGY  
MAY 2007**



## ACKNOWLEDGEMENT

I would like to grab this opportunity to express my utmost sincere gratitude to God the most highest for His blessing and for giving me the strength to complete this proposal without any difficulties along the way.

A special note of thanks goes to my supervisor Mr. Zaini bin Endut for his effort, patience, guidance, trust, support, and sincerity in assisting me during the preparation of this report.

I would like to thank my beloved family who has been there for me when I am in need of support and help and giving me the encouragement to overcome my ups and downs through my years as a student.

Finally I would like to thank all of those who have contributed directly or indirectly in the finalization of this research proposal but did not mention their names for their help and understanding.

## ABSTRACT

RC walls is an element of the building that shows a different behavior of stress, strain and crack pattern compared with other element such as beam and column. Reinforced concrete (RC) walls are commonly used today and most efficient when they align vertically and are supported on foundation walls or footings. When shear walls do not align, other parts of the building will need additional strengthening. This study is carried out to interpret the behavior and characteristic of the RC wall. The study are focus on the design and analysis of the RC wall by using three method, manual calculation using Euro Code system, and Finite Element method in linear and non linear analysis and laboratory work. The RC walls with web reinforcement will built in the same size with wire mesh. Deform bars having yield strength 250 N/mm<sup>2</sup> for diameter 6mm. Ordinary Portland cement with sand and aggregate are used for concrete mix to RC wall structure. The characteristic strength concrete use for develop RC wall in the laboratories are 30N/mm<sup>2</sup>. The load are applied in point load and uniform distributed load to the specimen until the specimen fail in strength. With different type of loading applied to the specimen, the characteristic and behavior of RC wall are study according to the mode of failure, crack pattern, ultimate load and stress field method. The results are compared with Finite Element Method using LUSAS software and continue using simulation to determine the effect of length to height ratio for RC wall. From comparison between laboratory work and simulation, according to mode of failure and crack pattern, there are three type of failure occur to the RC wall, failure at support, failure at loading transfer and failure according to real failure that proposed by Leonhardt and Wather. Beside that, using three point testing give higher ultimate load than using four point testing. By changing the length to height ratio, the result in ultimate load and displacement of RC wall are increases according increasing the height of RC wall.

## TABLE OF CONTENTS

<b>CONTENT</b>	<b>PAGE</b>
Declaration of Candidates	-
Table of Content	i
List of Figure	vi
List of Table	x
Acknowledgement	xi
Abstract	xii

### **CHAPTER**

#### **1.0 INTRODUCTION**

1.1	Background of Study	1
1.2	Problem Statement	2
1.3	Objective of Study	2
1.4	Significance of Research	3
1.5	Scope of the Research	3

#### **2.0 LITERATURE REVIEW**

2.1	Introduction	4
2.2	Wall definition	4
2.3	Types of Walls	5
2.4	Tilt up wall	6
2.5	Stress and Strain	6