



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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Ain Shams University
Faculty of Engineering
Structural Engineering

**THE RELIABILITY OF CAPACITY
DESIGNED COMPONENTS IN SEISMIC
RESISTANT SYSTEMS**

A Thesis submitted in partial fulfilment of the requirements
of the degree of

Master of Science in Civil Engineering
(Structural Engineering)

By

GILANE ABDEL HADY REFAAT ABDEL AZIZ

Bachelor of Science in Civil Engineering

Faculty of Engineering, AIN SHAMS University, 2013

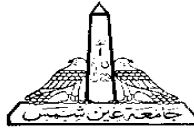
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Ain Shams University
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Structural Engineering

**THE RELIABILITY OF CAPACITY DESIGNED
COMPONENTS IN SEISMIC RESISTANT
SYSTEMS**

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STATEMENT

This thesis is submitted as a partial fulfilment of Master of Science in Civil Engineering, Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Dedication

This thesis is lovingly dedicated to all the close, special and beautiful people in my life.

A special dedication to

My cheerful supportive husband
and my loving mother

and specially to

Dr. Amín Saleh Aly my
extremely supportive professor

*for encouraging me to complete this work and
for always being there for me.*

ACKNOWLEDGEMENT

First, thanks are all direct to Allah, for blessing this work until it has reached its end, as a part of generous help throughout my life.

*It is with immense gratitude that I acknowledge the support and help of **Prof. Dr. Amin Saleh Aly**, Professor of Structural Engineering, Faculty of Engineering, Ain Shams University. This thesis wouldn't have been possible unless his great efforts, meticulous revision, scientific guidance and tremendous support.*

*I would like to express my deepest gratitude and gratefulness to **Prof. Dr. Amr Hussein Zaher**, Professor of Structural Engineering, Faculty of Engineering, Ain Shams University. I am so honored by his supervision on my thesis.*

Thank you....

ABSTRACT

After the 1992 devastating earthquake that struck Cairo causing destructive damages ranging from repairable damage to total collapse, significant attention has been paid to evaluate how RC structure perform during and after earthquake.

This study investigates the importance of the understanding of the capacity design approach in the design of RC structure building subjected to earthquakes. Capacity design principles are recently employed in seismic design codes to help ensure ductile response and energy dissipation in seismic resisting systems using the strong column-weak beam as a concept. The aim of this study is to be taken as a reference on how capacity design can be applied in analysis using the pushover analysis method based on the Performance Based Design procedure, and to be used a recommendation for the Egyptian code of practice to implement these methods to improve the design of the RC structures in the future.

The performance Based Design (PDB) is considered as one of the emerging fields in seismic design which is still in the realm of research and academics. A simple explanation was made for PBD method using the pushover analysis (PA) demonstrating how progressive failure in buildings really occurs, also showing the incapability of the traditional methods in the seismic design, to verdict the behavior of the building during and after earthquake. In this research an example was made through numerical simulations for a 12 and 20 storeys height concrete building located in Cairo. The analysis was first performed for the code response spectrum analysis to make the design as

preliminary level and then Non-linear static analysis (PA) was derived following the ATC procedure to check the building performance, using ETABS software.

Keywords: Earthquake, Energy dissipation, Pushover Analysis, Performance based design, Plastic hinges formation, performance point.

TABLE OF CONTENTS

STATEMENT	II
RESEARCHER DATA.....	IV
ACKNOWLEDGEMENT	V
ABSTRACT.....	VI
TABLE OF CONTENTS.....	IX
LIST OF TABLES	XVI
Chapter 1	1
Introduction.....	1
1.1 General	1
1.2 Outline of the Thesis	1
Chapter 2	1
Background on the Capacity Design Concept	1
2.1 Introduction.....	1
2.2 Capacity Design Definition and Current Role	1
2.3 Views of the main protagonists with their own contribution in the development of the capacity design	1
2.3.1 The 1961 Blume- Newmark- Corning book and Mete Sozen's role	1
2.3.2. A term and rationale for the new design approach are developed in New Zealand.....	1
2.3.3. Tom Paulay spreads the word.....	1
Chapter 3	2
Illustration for Egyptian code methodology in seismic design and the capacity design approach	2
3.1 Introduction.....	2

3.2 Different approaches to seismic design	2
3.2.1 Direct Design	2
3.2.2 Capacity Design.....	2
3.3 Methods of calculation of the earthquake effect in the Egyptian code.....	3
3.3.1 Simplified Modal Response Spectrum (Equivalent Static Analysis).....	3
3.3.2 Time history analysis	3
3.3.3 Multi-Modal Response Spectrum (Response Spectrum Analysis).....	3
3.4 Capacity Design approach	4
3.4.1. The concept of Energy stored and Energy Dissipation:	4
3.4.2 Strong Column-Weak Beam mechanism.....	4
3.5 Performance Based Design	4
3.5.1 Pushover Analysis (PA).....	4
3.5.2 Pushover Static Curve.....	4
3.5.3 Demand curve	5
3.5.4 Performance Point.....	5
3.5.5 Acceptance Criteria of the plastic hinges (Performance level).....	6
3.5.6 Pushover Analysis in computer software guidance:	6
3.5.7 Response modification Factor (R)	7
Chapter 4	7