شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENGINEERING DEPARTMENT

Moment Redistribution in Continuous RC Elements Top Strengthened with CFRP and Steel Plates

A thesis submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in Civil Engineering (Structural)

by

Amr Mohamed Ibrahim Mostafa
Master of Science in Civil Engineering (Structural)
Faculty of Engineering, Ain Shams University, 2015

Supervised by

Prof. Dr. Ayman Hussein Hosny Khalil
Professor of Reinforced Concrete Structures
Ain Shams University

Dr. Mahmoud Mohamed Mahmoud El-kateb
Assistant Professor, Ain Shams University

Dr. Shady Hesham Abdel-Mohaimen Bakr Salem
Assistant Professor, The British University in Egypt

Cairo – (2020)

AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENGINEERING DEPARTMENT

Moment Redistribution in Continuous RC Elements Top Strengthened with CFRP and Steel Plates

by

Amr Mohamed Ibrahim Mostafa

Examiners' Committee:

Signature

Prof. Dr. Nabil Ahmed Fouad …………………

Professor of Reinforced Concrete Structures
Faculty of Engineering – Hannover University

Prof. Dr. Amr Hussein Abdel Azim Zaher …………………

Professor of Reinforced Concrete Structures
Faculty of Engineering – Ain Shams University

Prof. Dr. Ayman Hussein Hosny Khalil …………………

Professor of Reinforced Concrete Structures
Faculty of Engineering – Ain Shams University

Date: 07 October 2020

STATEMENT

This thesis is submitted to Ain Shams University, Cairo, Egypt, for the degree of Doctor of Philosophy in Civil Engineering (Structural).

The work included in this thesis was carried out by the author at the reinforced concrete lab, Structural Engineering department, Faculty of Engineering, Ain Shams University.

No part of this thesis has been submitted for a degree or qualification at any other University or Institute.

Date : 07 October 2020

Name: Amr Mohamed Ibrahim Mostafa

Signature: *Amr Ibrahim*

RESEARCHER DATA

Name	: Amr Mohamed Ibrahim Mostafa
Date of birth	: 22 September 1987
Place of birth	: Cairo, Egypt
Last academic degree	: Master of Science
Field of specialization	: Structural Engineering
University	: Ain Shams University
Date of issued degree	: February 2015
Current job	: Assistant Lecturer at the Civil Engineering Department, Faculty of Engineering, The British University in Egypt.

ACKNOWLEDGMENTS

*I would like to offer my deepest gratitude to my precious supervisor **Prof. Dr. Ayman Hussein Hosny Khalil**, for his kind supervision, valuable advice, endless cooperation, helpful instruction, support, revising the thesis, and concern about my progress.*

*My deepest thanks to **Dr. Mahmoud El-Kateb**, for his valuable advice, kind assistance, and supervision of this thesis.*

*My heartfelt appreciation, and gratitude to **Dr. Shady Salem** for his trust, belief, cooperation, and continuous support throughout the stages of this research.*

*I would also like to thank **Dr. Mostafa Shazly** and Eng. **Omar El-Meligy** for their valuable advice during conducting the numerical analysis. Their expertise and knowledge were truly helpful to me in this research.*

Amr Mohamed Ibrahim Mostafa

Dedication

I dedicate this thesis to my late father ***Mohamed Ibrahim****, for raising me on the value of insistence and determination, setting an example of whom I would be so proud to be and sacrificing his comfort to provide the perfect atmosphere for me and my brothers.*

I am heavily indebted to my loving ***mother****, for inundating me with her infinite love and care, motivating me to chase my dreams, her continuous help and praying for me to accomplish success in my life.*

I am deeply thankful to my wife, ***Haidy****, for her unequivocal support, endless care, her trust in me and unconditional love for which my mere expression of gratitude does not suffice. I would also like to acknowledge my son* ***Seif****, for only his presence in our life is such a blessing from god. His innocent smiles motivated me towards overcoming the exhaustion due to the long days of work.*

Amr Mohamed Ibrahim Mostafa

TABLE OF CONTENTS

LIST OF FIGURES