AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENGINEERING DEPARTMENT

ANALYTICAL INVESTIGATION OF STATICALLY INDETERMINATE FLEXURAL RC MEMBERS STRENGTHENED BY PRESTRESSED STEEL AND FRP

A Thesis
Submitted in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE
In
CIVIL ENGINEERING (STRUCTURES)

By

OMAR GOUDA MOHAMMED MOHAMMED

Supervised By

Professor Dr. Amr Ali AbdelRahman
Professor of Concrete Structures,
Head of Structural Engineering Department,
Ain Shams University

Dr. Marwan M. Tarek Shedid
Associate Professor,
Structural Engineering Department,
Ain Shams University

Dr. Reham M. Galal El Tahawy
Assistant Professor,
Structural Engineering Department,
Ain Shams University

Cairo – 2018

AIN SHAMS UNIVERSITY FACULTY OF ENGINEERING
STRUCTURAL ENGINEERING DEPARTMENT

ANALYTICAL INVESTIGATION OF STATICALLY INDETERMINATE FLEXURAL RC MEMBERS STRENGTHENED BY PRESTRESSED STEEL AND FRP

By
OMAR GOUDA MOHAMED MOHAMED
B.Sc. (2014) with honor Civil
Engineering – Structural Department
Faculty of Engineering – Ain Shams
University

EXAMINERS COMMITTEE

Signature

Prof. Alaa Gamal Sherif
Professor of Concrete Structures ……………………..
Faculty of Engineering – Helwan University

Prof. Ahmed Sherif Essawy
Professor of Concrete Structures ……………………..
Faculty of Engineering – Ain Shams University

Prof. Amr Ali AbdelRahman
Professor of Concrete Structures ……………………..
Head of Structural Department
Faculty of Engineering – Ain Shams University

Date: 15 May 2018

STATEMENT

This thesis is submitted as partial fulfillment of the requirements for the degree of Master of Science in Civil Engineering (Structures), 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.

Date :

Name : **OMAR GOUDA MOHAMED MOHAMED**

Signature : **...............................**

AUTHOR

Name	:	Omar Gouda Mohamed Mohamed
Date of birth	:	20 December 1992
Place of birth	:	Cairo, Egypt
Academic Degree	:	B.Sc. in Civil Engineering
Major	:	Structural Engineering
University	:	Ain Shams University
Date	:	June 2014
Grade	:	Distinction with Honor
Current job	:	Teaching and Research Assistant
		Faculty of Engineering - Ain Shams University

ACKNOWLEDGEMENT

First of all, thanks to the great **ALLAH** and May His peace and blessings be upon our prophet Mohamed and all his prophets for granting me the chance and the ability to complete this study successfully.

I would like to express my deepest gratitude to **Prof. Amr AbdelRahman**, Professor of Concrete Structures, Head of Structural Department, Faculty of Engineering, Ain Shams University, for his genuine support, valuable advice, sincere comments, and deep encouragement through all phases of work that helped me to finish this study in appropriate shape. I'm also extremely thankful to **Doctor Marwan Shedid,** Associate Professor of Concrete Structures**, and Doctor Reham Galal,** Assistant Professor of Concrete Structures, Faculty of Engineering, Ain Shams University, for their guidance, great support, sincere comments and valuable suggestions.

I would like to thank sincerely my **mother** and **father** for their great support and encouragement to me all time and for what they had done to me in all my life, no words can express or fulfill their great right on me. I would like to thank my family; my brother and his wife, my sister and her husband for their support and encouragement to me all time.

Finally, I am particularly grateful to my lovely wife, **Nahla Salah**, for helping and assisting me in all the stages of this work, her support and encouragement in the days prior to submitting this study, her help in the accomplishment of this work. Without her endurance and extreme care, this study would never have been possible.

I can't forget by the way my lovely son **Hady,** who is just only two months old, wishing him the best in his life.

TABLE OF CONTENTS

LIST OF FIGURES