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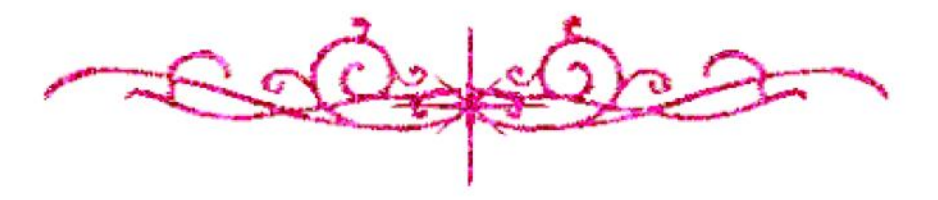

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ANALYTICAL STUDY ON FLEXURAL BEHAVIOR OF REINFORCED CONCRETE BEAMS STRENGHTENED WITH FRP

By

Sayed Samir Elsayed Abdallah

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
In
Structural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis: **Analytical Study on Flexural Behavior of Reinforced Concrete Beams Strengthened with FRP**

Key Words:

RC beams – preloaded beams – FRP – carbon fiber sheets

Summary:

One of the techniques developed during the last decade for flexural strengthening of reinforced concrete RC beams was the use of fiber reinforced polymer FRP plate externally bonded to the tension face. With the addition of FRP reinforcement, beams exhibit several unique failure modes under flexural loading: rupture of a FRP plate, concrete cover separation and plate end and intermediate interfacial de-bonding of a FRP plate. Flexural strengthening of reinforced concrete beams using the carbon fiber reinforced polymer (CFRP) material has been examined by many researchers and it was shown to be an effective means of strengthening. Using different types of carbon fiber with different length to support preloaded beams was shown rarely in researches so the research shows the different in using different types of carbon fiber with different length.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university o institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Sayed Samir elsayed Abdallah

Signature:

Date:

Dedication

To my Family, my wife, my brother, my sons, my leaders, and all my friends.

Acknowledgments

I would like to show my gratitude for my supervisors (Prof**. Dr. Hany Abdallah, Dr. Khaled El Kashif and Dr. Ahmed M. Anwar)** for their guidance, advices, support and valuable discussions, review and editing during my Master, and their great efforts to achieve my objectives.

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