بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية
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MONA MAGHRABY

Cairo University

ANALYSIS OF LOW STRENGTH RC BEAMS STRENGTHENED WITH FRP SHEETS

By

Abdul Rahman Mamoun Ali Mohamed

A Thesis submitted to the
Faculty of Engineering, 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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Under the Supervision of

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Title of Thesis:

Analysis of low strength RC beams strengthened with FRP sheets

Key Words:

Shear behavior; flexural behavior; low strength concrete; CFRP sheets; finite element method by ANSYS

Summary:

Carbon Fiber Reinforced Polymers (CFRP) sheets offer an attractive solution to enhance shear and flexural capacities of RC beams. The main objective of this research is to analyze the behavior of low strength concrete beams strengthened with CFRP. The nonlinear finite element program ANSYS was used to conduct the analysis of this research. The results of the program were verified against experimental results available in the literature. The parameters considered in this study include concrete strength, number of CFRP layers, and angle of inclination of the strips on the longitudinal axis of the beam. The results show that CFRP strips could effectively enhance the flexural and shear behavior of RC beams depending on their initial condition. The concrete strength was found to be a dominant factor affecting the improving rate of shear and flexural capacities of strengthened beams. The results of this study are compared to those estimated according to the Egyptian and American codes for advanced composite materials.

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 or institute.

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

Name: Abdul Rahman Mamoun Ali Date: / / 2021

Signature:

Dedication

To my parents, my brother, my sisters, and all my friends.

Acknowledgments

I sincerely thank my advisor Prof .Dr. Hany Ahmed Abdalla as he positively believed in my work. It would not be possible for me to accomplish any of my research goals without his constructive and helpful pieces of advice and academic support.

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