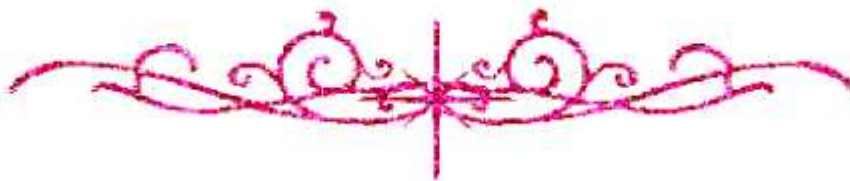


بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



جامعة عين شمس

التوثيق الإلكتروني والميكرو فيلم

قسم

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





ANALYSIS OF RC BEAMS WITH OPENINGS STRENGTHENED WITH CFRP

By

Yasser Mohamed Magdy Hassan Morsy

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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Under the Supervision of

Prof. Dr. Hany Ahmed Ali Abdalla

Professor of Concrete structures
Structural Engineering Department
Faculty of Engineering,
Cairo University, Egypt

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Approved by the
Examining Committee

Prof. Dr. Hany Ahmed Ali Abdalla, (Thesis Main Advisor)
Professor of Concrete Structures, Cairo University

Prof. Dr. Akram Mohamed Torkey, (Internal Examiner)
Professor of Concrete Structures, Cairo University

Prof. Dr. Ghada Daa Abd-Elhameed, (External Examiner)
Housing and Building National Research Center

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2021

Engineer's Name: Yasser Mohamed Magdy Hassan Morsy
Date of Birth: 14/7/1993
Nationality: Egyptian
E-mail: yasser_magdy@outlook.com
Phone: 01005002468
Address: Nasr City -Cairo -Egypt
Registration Date: 01/10/2018
Awarding Date:/....../2021
Degree: Master of Science
Department Structural Engineering
Supervisors:



Prof. Dr. Hany Ahmed Ali Abdalla

Examiners:

Prof. Dr. Hany Ahmed Ali Abdalla (Thesis main advisor)
Prof. Dr. Akram Mohamed Torkey (Internal examiner)
Prof. Dr. Ghada Daa Abd-Elhameed (External examiner)
Housing and Building National Research Center

Title of Thesis:

ANALYSIS OF RC BEAMS WITH OPENINGS STRENGTHENED
WITH CFRP

Key Words:

RC beams; web opening; CFRP sheets; strengthening; finite element

Summary:

Creating transvers web opening in existing reinforced concrete beams, to provide a convenient passage for utility ducts, causes local cracking around the opening region leading to a decrease in stiffness and load-carrying capacity of the beam. (ANSYS) software was used to investigate the effect of opening size and shape on simply supported RC beams under four-point loading. Also, the effectiveness of using carbon fiber reinforced polymer (CFRP) sheets, as strengthening around the opening, was studied. A total of 35 (FE) models were created, 10 of them were compared with experimental results to ensure the validity of the (FE) models. The results showed that, circular and rounded corner openings had less crack propagation around openings at early stages of loading and higher ultimate load than rectangular openings. Also, using (CFRP) sheets can prevent early cracking around the opening and retrieve most of the original strength of the solid RC beam depending on the opening size.

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:

Date:

Signature:

Acknowledgments

I would like to express my deepest gratitude to my supervisor **Prof. Dr. Hany Abdallah** for his guidance, advice and unlimited support I received from him. I also want to thank my family, friends and everyone who supported me throughout my path.

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