INVESTIGATING THE EFFICIENCY OF USING THE CARBON FIBER POLYMER ON BEAM –COLUMN CONNECTION

By

Mahmoud Mohamdean Youssef Eldeeb

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
STRUCTURE ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

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Title of Thesis:

Investigating the efficiency of using the Carbon Fiber Polymer on beam-column connection

Key Words:
CRFP sheet, Beam-column connection, ANSYS Model, Deformation Efficiency, Ductility, Brittle, Capacity.

Summary:

Earth quakes (EQ) represent one of the most important natural factors which affect buildings. EQ result from the movement in earth layers, which have source of power that affect the building. Most EQ effects on buildings depend on the distance of the building from the source of EQ energy, so we have to design buildings to resist this force by using shear wall , cores or framings but some of old buildings doesn't structure element to resist this force , design in pervious codes , didn't consider that 4 storey buildings need structure element to resist EQ force so, we will study The behavior of beam column connections without CFRP and with CFRP on concentrated load at free end of cantilever beam is investigated in this thesis, we focus on developing best recommendations for using CFRP in retrofit beam- column connection. In addition to complement the published data, finite element model using the computer package ANSYS was used. The additional beam-column connections in this study are classified in 4-Groups (A,B,C,D) depending on $\%A_{sb}$ bottom (0.025%-1%) ,each group will classified from $\%A_s$ top (0.039%-2.45%) ,we investigate the influence of boundary condition, columns as hinged supports finally, we concluded the efficiency of using CFRP sheet if its improve or decrease efficiency of beam column connection depending on $\%A_s$ on beam .

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Dedication

To my parents,my dear brothers ,sisters ,my fiancée and my friends with love

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