شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

Ain Shams University
Faculty of Engineering
Structural Engineering

Structural Behaviour of Edge and Corner Columns Strengthened by multi-storey Non-Symmetric Concrete Jackets

A Thesis submitted in partial fulfilment of the requirements of the degree of Doctor of Philosophy in Civil Engineering (Structural Engineering)

by

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Master of Science in Civil Engineering (Structural Engineering)
Faculty of Engineering, Ain Shams University, 2015

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Cairo - 2021

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Date: 13 November. 2021

Dedication

This work took years from my life. I wish to dedicate it to those who suffered to educate, prepare, and help me to be as I am,

TO MY MOTHER AND THE SOUL OF MY FATHER

I wish to dedicate my thesis.

TO MY BROTHER Dr. NASR EID NASR AND MY WIFE

for their encouragement and help to complete this work.

TO EVERYONE WHO MEETS ME ANYTIME AND ANYWHERE

Statement

This thesis is submitted as partial fulfillment of Doctor of Philosophy in Civil Engineering Engineering, 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.

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Thesis Summary

The strengthening of columns using concrete jackets depends on friction at the interface between them. So, strengthening of edge and corner columns in only one story needs a large cross-section area due to the shortage of friction length which leads to architectural issues. This research aims to study strengthening the edge and corner columns using a concrete Jacket in more than one story which increases the friction area between the Jacket and the original column. As a result, the load transferred from the original column to the jacket will be increased. Thirteen models were done using the ANSYS program to study the effect of various factors on the Jacket capacity such as the number of strengthened floors, the Jacket type (two sides or three sides), and whether there were shear connectors or not. The results showed that in the case of the edge and corner columns, it is preferable to strengthen the column by making a concrete Jacket in at least two or three floors to increase the surface area, which leads to increase the friction and thus increases the capacity of the strengthened column by an acceptable percentage. The results of ANSYS models were compared with the Indian code IS 15988 (2013) and the results were shown differently because the code equations depend on the presence of a full bond between the concrete column and the Jacket, which does not occur, but rather the load is transferred by friction between the Jacket and the original column.

Keywords:

Repair, Strengthening, non-symmetric jacket, ANSYS, multi-story jacket.