بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / سلوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

EVALUATION OF SEISMIC BEHAVIOR FOR CONCRETE STRUCTURES REINFORCED WITH CFRP AND GFRP BARS USING APPLIED ELEMENT METHOD

By

EL-Saeed Ahmed EL-Saeed Zyadah

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
GIZA, EGYPT
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Prof. Dr. Hamed M. Salem

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Title of Thesis:

Evaluation of seismic behavior for concrete structures reinforced with CFRP and GFRP bars using applied element method

Key Words:

FRP reinforced concrete structures, Carbon fiber, Glass fiber, Ductility, AEM.

Summary:

Using fiber-reinforced polymers (FRP) rebar in structural applications worldwide has been getting attention recently due to the advantages it offers over steel bars reinforcement (e.g. magnetic resistance, light weight, and durability). An application of FRP rebar reinforcement is using in multi-storey structural frames. However, current detailing criteria and design standards for beam-column joints, that were established in the 1970's, may be considered unsuitable for FRP rebar reinforcement due to its different mechanical properties. During recent earthquakes, many buildings collapses were caused by beam-column joint failures. There are no complete seismic standards for using FRP rebars as reinforcement in concrete structures. Consequently, more researches are needed in this field to gain more understanding of FRP materials' behavior and their interaction with traditional materials in that application to implement their use on solid grounds. The thesis objective is to evaluate the seismic behavior for a mid-rise (ten-storey) concrete structure reinforced with CFRP bars and GFRP bars using lateral loads resisting system consisting of moment resisting frame. The seismic behavior of the two buildings is compared with the seismic behavior of steel bars reinforced concrete building having the same configuration. Three-dimensional dynamic nonlinear analysis based on the Applied Element Method was carried out. A parametric study was conducted to study different parameters effect such as (1) peak ground acceleration (PGA), (2) concrete compressive strength (fc'), (3) CFRP bars reinforcement, (4) GFRP bars reinforcement, and (5) steel bars reinforcement.

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

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Date: / / 2022

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Thanks to ALLAH for helping me finish this work.
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DEDICATION

I dedicate this work to my father, mother, sister, wife and colleagues for their continuous help, encouragement, and support.

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