شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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HANAA ALY

Cairo University

USE OF MODEL CALIBRATION TECHNIQUE TO DERIVE ACCURATE FRAGILITY CURVES

By

Omar Khaled Wahba Metwally Omar

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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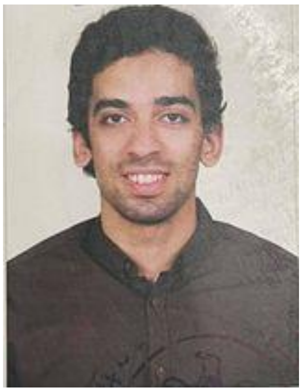

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Title of Thesis:

Use of Model Calibration Technique to Drive Accurate Fragility Curves

Key Words:
Fragility analysis, Multiple Stripes Analysis, Model Updating, Finite Element Modeling, Buckling Restrained Bracing

Summary:

Finite Element Analysis (FEA) has been used extensively for modeling of structures. However, the details and accuracy of FE models may be limited due to computational demand particularly, for problems requiring extensive iterations such as fragility analysis. Fragility analysis, defined as the conditional probability of reaching a performance limit state as a function of intensity measure, is an essential component in seismic risk analysis of building and infrastructure. Therefore, developing accurate fragility functions is critical for proper seismic risk assessment. In this research we propose a two stage framework to evaluate accurate fragility curves using nonlinear dynamic analysis without the expensive computational cost. First, we reduce the discrepancies between a detailed model and simplified model in order to reduce the computational expenses as much as possible while approximating the results of the simplified model to the detailed model. Then we calculate the fragility curves utilizing a nonlinear dynamic analysis without cumbersome run time. The framework is then applied to a four-story buckling restrained frame building to assess its feasibility.

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: Omar Khaled Wahba Metwally Date: ../../2022

Signature:

Dedication

I wish to dedicate this thesis to my passed mother who always believed in me. I would have never achieved anything in my life without her support.

Acknowledgments

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