Cairo University

BEHAVIOR OF COUPLED WALLS WITH HIGH PERFORMANCE FIBER REINFORCED CONCRETE COUPLING BEAMS

By

Mostafa Hassan Fathi Abdel-Hafeez

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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Under the Supervision of

Prof. Dr. Hamed M. Salem

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FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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2020

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Title of Thesis:

BEHAVIOR OF COUPLED WALLS WITH HIGH PERFORMANCE FIBER REINFORCED CONCRETE COUPLING BEAMS.

Key Words:

High performance fiber; coupled walls; coupling beams; lateral loads; AEM

Summary:

High rise buildings subjected to lateral loads such as earthquake must have systems that can resist the shear forces and bending moments generated by earthquake. There are a lot of systems as shear walls and it was found that shear walls can develop lateral stiffness and strength if they are connected by coupling beams. Therefore, coupling beam must be rigid and ductile to produce required strength and dissipate energy. The aim of this thesis is to study the effect of using high performance fiber reinforced concrete to construct coupling beams due to its strain hardening behavior. Therefore, mid-rise reinforced concrete multi storey coupled walls with high performance fiber reinforced concrete coupling beams were modeled. A parametric study was carried out to study the effect of various parameters that could influence the behavior of high performance fiber reinforced coupling beams including (1) material type, (2) longitudinal reinforcement ratio of coupling beams, (3) high performance fiber reinforced concrete embedment inside the coupled walls, (4) presence of diagonal reinforcement with and without confining stirrups, (5) coupling beam's aspect ratio, and (6) different high performance fiber reinforced concrete mixtures.

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: Mostafa Abdel-Hafeez   Date:

Signature:

Dedication

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

Acknowledgement

Thanks to ALLAH for helping me finish this work.
Thanks to Prof. Dr. Hamed Salem for his
guidance, help, motivation, and support.

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