BEHAVIOR OF NARROW MECHANICALLY STABILIZED EARTH WALLS UNDER EARTHQUAKE LOADING

By

Ahmed Saad Rabei Mahmoud

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSHPHY

in
CIVIL ENGINEERING - PUBLIC WORKS

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

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Key Words:

Narrow Wall, Earthquake, Shaking Table, Digital Image, Smartphone

Summary

The construction of Narrow Mechanically Stabilized Earth Walls (NMSE) of aspect ratio (ratio of reinforcement length, L, to wall height, H) below 0.70 is expanded, recently, in urban areas in limited space. When NMSE walls constructed in active seismically zone, these walls are subjected to seismic ground motion. A Series of 11 shaking table tests are performed on reduced scale NMSE wall model (1/8 of the prototype model) considering the ground motion characteristics, wall aspect ratios, facing rigidity and wall configuration. The modelled walls display that NMSE walls behave as rigid body until yield occurs at input base acceleration ranging for 0.15g to 0.44g and these accelerations is the critical accelerations which corresponding to 0.5 % top wall displacement ratio. Then, excessive deformations are observed. In addition to the traditional shaking table test instrumentations, an advanced approach is adopted using computer vision to determine the wall facing displacement and acceleration amplification of NMSE wall. The aim of using computer vision is to verify its ability to capture the wall displacement and input acceleration amplification, which can be used for more complicated experiments such investigation the reinforcement strains and the strain field.

Disclaimer

I hereby declare that this thesis is my 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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Signature :

Acknowledgement

I would like to thank my supervisor Dr. Mohamed I. Amer for sharing his experience and guiding me through this research program at every stage. Without his experience, encouragement and personal support this thesis would not have been possible. I am also grateful to Dr. Rami M. El-Sherbiny for his encouragement to carry out research in geotechnical earthquake engineering and for much valuable advice over the course of my career. All thanks to Dr. Omar Ezzeldine for the many valuable discussions particularly in reviewing this thesis. Special thanks to Dr. Hazem ElAnwar, structural engineering department, Cairo University. He was very useful in performing digital image analysis using smartphone for seismic analysis. The physical experimental work reported in this thesis would not have been possible without the staff technical support at soil mechanics and foundation research laboratory, Cairo University.

I would also like to acknowledge the projects funding and grant unit at Beni Suef University for their financial support. Special thanks for Prof. Dr. Mohie Elmashd, head of construction research institute at national water research center for his cooperation in the characterization of reinforcement material.

Words are not enough to thank my family for the support they have given me during this long and sometimes difficult times. My wife Marwa has kept my life in balance with her patience, encouragement and love. Without her support this thesis would not have been possible. Though they may not realize it yet, Icel and Abd Elrahman are sources of great joy that sustain me and help keep life in perspective. Finally, I would like to thank my parents for their love and support, and for instilling in me the value of learning and hard work, and providing me with the opportunities to advance my life. Special thanks go to my brother and sisters who are always in my heart and dreams.

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