FIELD MONITORING AND NUMERICAL MODELING OF MECHANICALLY STABILIZED EARTH WALL

By

Mohamed Adel Marey Hammad

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
CIVIL ENGINEERING - PUBLIC WORKS

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Under the Supervision of

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Title of Thesis: Field Monitoring and Numerical modeling of Mechanically Stabilized Earth Wall

Key Words: Strain gauges, Field monitoring, Mechanically stabilized earth wall, Horizontal movement, Numerical modeling

Summary:

This research work included field monitoring of MSE wall, laboratory work performed on geogrid and backfill material, evaluation of different design approaches of MSE walls and developing verification finite element model for the test wall. Field monitoring of MSE wall was conducted through measuring of generated strains along geogrid layers using strain gauges and by surveying and monitoring of wall face lateral deformation using total station. Details on field instrumental techniques & analysis of results are provided. Different MSE walls design approaches are evaluated by comparing measured tensile forces in geogrids with those evaluated using well established design approaches. In addition a verification finite element model using (Plaxis 2D) was developed for the monitored wall. Finally, comparison was performed between FE results and measured strains and lateral deformations. Also, the measured tensile forces in geogrids are compared to those predicted using FE model & different design approaches reported in literature.

Acknowledgments

The author would like to express deep thanks and gratitude to Prof. Dr. Mohamed Amer for his guidance, supervision, support and precious comments. This research is enriched by Prof. Dr. Mohamed Amer wide knowledge and experience.

As well, this work could have never been produced without continuous direction and overlooking of such a motivated and enthusiastic advisor as Assistant Prof. Dr. Manal Salem. The author was blessed to work under supervision of Assistant Prof. Dr. Manal Salem. Her honest support and priceless comments are very important reasons for the accomplishment of this work. Moreover, what gained on a personal level.

The author owes deep gratitude to his employer "Formula Engineering", the author would like to specifically thanks to Eng. Adel Marey and Dr. Nasser Abd El-salam for giving him the time and providing resources to accomplish this work. Also, the author would like to express his gratitude to Prof. Dr. Mohamed Anwar, End. Reda Awad, and Eng. Rafaat wadee.

This work is a result of guidance and support of wonderful intellectual that the author would like to express his gratitude to Assistant Prof. Dr. Ramy El-sherbiny.

The author wants to thank his coworkers Ahmed Mounir, Ahmed Eissa, Ahmed Tohamy, Mohamed Salah, Mohamed Atef, Rania Allam, Hadeer Tohamy, Adel Samah, and Mostafa Mohamed.

To: My Parents, Wife, and Sisters

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