



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

FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
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Title of Thesis: Field Monitoring and Numerical modeling of  
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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.

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*To: My Parents, Wife, and Sisters*

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