THREE-DIMENSIONAL FINITE ELEMENT ANALYSIS OF DIAPHRAGM WALL CONSTRUCTION STAGES IN SAND

By

Rowyda Adel Abdelrahman

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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Under the Supervision of

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Title of Thesis:

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Key Words:
Diaphragm Wall, Horizontal Stress, Vertical Soil Movement, Horizontal Soil Movement.

Summary:
The aim of this study is to investigate the effect of construction of diaphragm wall and the effect of excavation in front of wall panels on the horizontal stresses, vertical soil movements, and horizontal soil movements of surrounding soil. Three dimensional finite element analysis have been performed for diaphragm wall consist of three adjacent panel constructed in sandy soil. Finite element program, Plaxis 3D/2D, has been utilized for the analysis. The diaphragm wall construction process is simulated using WIM and WIP methods. Every panel is supported by bentonite slurry during excavating which are followed by concreting then hardening. Several parameters have been studied: Diaphragm wall dimensions which is panel length and panel width; soil relative density; ground water table existence; and surcharge load behind the wall.

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Hoping this thesis would be a step towards a better understanding of our current needs and better development of our country.

Table of Contents

Page

Page

List of Tables

Page

List of Figures

Page

Page

Page

Page

Page