



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY



Cairo University

LOAD DISPLACEMENT RESPONSE OF PILES UNDER DIFFERENT LOADING CONDITIONS

By

Ahmed Mahmoud El-Saied Nasr

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:

LOAD DISPLACEMENT RESPONSE OF PILES UNDER DIFFERENT
LOADING CONDITIONS

Key Words:

Deep Foundation; Numerical Modelling; Undrained Shear Strength; Burrulus; Small Strain Soil Modulus

Summary:

Deep foundations are commonly used in large civil engineering structures. Deep foundations transfer the loads from the superstructure to more stable ground layers taking into consideration the allowable displacement and ultimate capacity. A good characterization of soil parameters plays an essential role in pile design. Thus, new site-specific correlations are developed between the clay strength obtained from tests performed on high-quality Shelby tube specimens and in-situ test results. In the current research, the load-displacement results from full-scale pile load tests performed in Al-Burrulus are analyzed. The ultimate pile capacities are back-calculated from the load tests under the different loading conditions (compression, tension, and lateral) and compared with capacities obtained from the analytical method. Moreover, the field load-displacement curves of axially loaded piles in compression are compared with the theoretical load-displacement response provided by (ECP 202). Additionally, the current study presents the back analysis of field pile load tests using the finite element method program "Plaxis 3D" using the Mohr-Coulomb model. The analysis aims to back-calculate operational soil stiffness through using the small strain shear modulus G_{max} as the initial value for soil modulus. New modulus degradation curves are developed for bored piles under compression, tension, and lateral loading. Finally, the relations between the back-calculated soil modulus and depth ratio are presented.

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: Ahmed Mahmoud El-Saied Nasr

Date: .../.../2021

Signature:

Dedication

This work is dedicated to my small and big families: my father, mother, wife, daughter, brothers, and uncles.

Acknowledgments

First and foremost, I would like to thank **Allah** for giving me the opportunity to expand my knowledge and complete my master's degree.

I would like to express sincere thanks to **Prof. Amr Elhakim** for all his guidance through my research. In fact, this research couldn't have been accomplished without his continuous support and encouragement. I would also like to thank **Prof. Mohamed Amer** for all his advice and comments that were essential for the completion of this research. I would also thank my committee members: **Prof. Hessien Elmamlouk** and **Prof. Sayed Mohamed** for their time and effort.

I would like to thank my close friends and work colleagues for their help in different ways during my study.

I would like to express my deep gratitude to my great father, my great mother, my brothers, and my uncles for providing me with constant support and encouragement throughout my years of study. Special thanks to my lovely wife, Esraa, and my beautiful daughter, Hala, and apologies for all the time I spent away from them because of my work. This work wouldn't have been in reality without them. Thank you.

I am sure I have forgotten to mention many people so I would like to extend my thanks to all of them.

Table of Contents

DISCLAIMER.....	I
DEDICATION.....	II
ACKNOWLEDGMENTS	III
TABLE OF CONTENTS.....	IV
LIST OF TABLES	VII
LIST OF FIGURES	VIII
NOMENCLATURE	XIII
ABSTRACT	XV
CHAPTER 1 INTRODUCTION	1
1.1. BACKGROUND	1
1.2. MAIN OBJECTIVES	2
1.3. THESIS OUTLINE	3
CHAPTER 2 SITE CHARACTERIZATION OF AL-BURRULLUS FORMATIONS.....	4
2.1. INTRODUCTION	4
2.2. PROJECT SITE LOCATION / GEOLOGY.....	4
2.3. SUBSURFACE GROUND PROFILE	5
2.4. LABORATORY TESTS ON SOIL SPECIMENS	13
2.4.1. Index Properties	13
2.4.2. Stress History	14
2.4.3. Undrained Shear Strength	15
2.4.4. Effective Friction Angle of Sand	20
2.4.4.1. Effect of Sample Disturbance	21
2.5. UNDRAINED SHEAR STRENGTH SITE-SPECIFIC CORRELATIONS.....	22
CHAPTER 3 LITERATURE REVIEW OF SOIL STIFFNESS ASSESSMENT .25	
3.1. INTRODUCTION	25
3.2. SOIL STIFFNESS AT THE SMALL STRAIN LEVEL.....	26
3.3. SOIL STIFFNESS ASSESSMENT	28
3.3.1. Correlations between Drained Modulus and SPT Number for Cohesionless Soils.....	30
3.3.2. Correlations between the Undrained Modulus and Undrained Shear Strength for Cohesive Soils	31
3.3.3. Back-figured Soil Stiffness from Full-Scale Load Tests	32
3.3.3.1. Undrained Back-Figured Soil Modulus	32
3.3.3.2. Drained Back-Figured Soil Modulus.....	33

3.4. MODULUS REDUCTION WITH STRAIN LEVEL	35
3.4.1. Modulus Reduction Formulas	39
3.5. VERTICAL SUBGRADE REACTION	40
3.6. HORIZONTAL SUBGRADE REACTION	41
CHAPTER 4 CAPACITY OF PILES UNDER DIFFERENT LOADING	
CONDITIONS	43
4.1. INTRODUCTION	43
4.2. DATABASE OF STATIC PILE LOAD TESTS	43
4.3. DEFINITION OF ULTIMATE PILE CAPACITY	47
4.4. AXIAL PILE CAPACITY	47
4.4.1. Compressive Pile Capacity	48
4.4.1.1. Shaft Pile Capacity (Q_s)	49
4.4.1.2. Tip Pile Capacity (Q_b)	49
4.4.2. Tensile Pile Capacity	50
4.4.3. Load-Displacement Response of Axially Loaded Piles in Compression	50
4.5. LATERAL PILE CAPACITY	53
4.6. INTERPRETATION METHODS OF PILE LOAD TESTS	55
4.6.1. 90% Criterion, Brinch Hansen	55
4.6.2. Chin Method	57
4.6.3. Davisson Method	57
4.7. ASSESSMENT OF INTERPRETATION METHODS	58
CHAPTER 5 NUMERICAL MODELLING	62
5.1. INTRODUCTION	62
5.2. CONSTITUTIVE MODEL	62
5.2.1. Linear Elastic-Plastic Behavior	63
5.2.2. Yield and Potential Functions	63
5.3. FINITE ELEMENT MESH	65
5.3.1. Effect of Mesh Coarseness	66
5.4. INTERFACE	67
5.4.1. Interface Properties	67
5.4.2. Interface at Corner Nodes	68
5.4.3. Effect of Interface	70
5.5. PILE LOAD TESTS MODELING	71
CHAPTER 6 BACK ANALYSIS OF SOIL STIFFNESS	76
6.1. INTRODUCTION	76
6.2. DATABASE OF PILE LOAD TESTS	77
6.2.1. Subsurface Site Characterization	78
6.2.2. Simulation of Load-Displacement Response	78
6.2.3. Calculation of Operational Soil Modulus	78
6.3. BACK-ANALYSIS OF PILE LOAD TEST RESULTS	79
6.3.1. Compression Pile Load Tests	82

6.3.2. Tension Pile Load Tests	83
6.3.3. Lateral Pile Load Tests	84
6.4. ESTIMATED AND BACK-FIGURED SOIL STIFFNESS	86
6.5. UNDRAINED SOIL STIFFNESS IN CLAYEY SOILS	86
6.6. DRAINED SOIL MODULUS IN COHESIONLESS SOILS	89
6.7. CORRELATION BETWEEN DRAINED MODULUS AND SPT NUMBER	90
CHAPTER 7 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY	92
7.1. SUMMARY AND CONCLUSIONS	92
7.2. RECOMMENDATIONS FOR FURTHER STUDY	94
REFERENCES	95
APPENDIX A: CALCULATIONS OF LARGE DIAMETER PILE VERTICAL CAPACITY	103
APPENDIX B: INTERPRETATION OF ULTIMATE PILE CAPACITY FROM PILE LOAD TESTS	117
APPENDIX C: IN-SITU MEASUREMENTS AND SOIL PROPERTIES FOR THE DIFFERENT PILE LOAD TESTS	135

List of Tables

Table 2.1: Correlations for Calculating Undrained Shear Strength	16
Table 2.2: Ratios of Predicted to Measured Value of the Undrained Shear Strength	19
Table 2.3: List of selected Φ' Correlations, based on SPT data	20
Table 2.4: List of selected Φ' Correlations, based on CPT data	20
Table 2.5: Ratios of Predicted to Measured Value of Φ'	21
Table 3.1: Factors Affecting on Small Strain Stiffness [23]	27
Table 3.2: Relations between Elastic Modulus and SPT Number	31
Table 3.3: Typical Values of (n) for Cohesive Soil [9]	42
Table 3.4: Typical Values of (n) for Cohesionless Soil [9]	42
Table 3.5: Typical Values of (n) for Cohesive Soil	42
Table 4.1: Number of Pile Load Tests	43
Table 4.2: Results Summary of Pile Load Tests	44
Table 4.3: Theoretical Axial Pile Capacities according to ECP 202	51
Table 4.4: Lateral Pile Capacity	55
Table 4.5: The Interpreted Capacities using Several Approaches	59
Table 5.1: Volume Pile Material Properties	73
Table 6.1: Summary of Results for Compression Tests	83
Table 6.2: Summary of Results for Tension Tests	84
Table 6.3: Summary of Results for Lateral Tests	85
Table C.1 CP-01 Soil Data Set Parameters	159
Table C.2 CP-02 Soil Data Set Parameters	159
Table C.3 CP-03 Soil Data Set Parameters	159
Table C.4 CP-04 Soil Data Set Parameters	160
Table C.5 CPW-01 Soil Data Set Parameters	160
Table C.6 CPW-02 Soil Data Set Parameters	160
Table C.7 CPW-03 Soil Data Set Parameters	161
Table C.8 CPW-04 Soil Data Set Parameters	161
Table C.9 CPW-05 Soil Data Set Parameters	161
Table C.10 TP-01 Soil Data Set Parameters	162
Table C.11 TP-02 Soil Data Set Parameters	162
Table C.12 TPW-01 Soil Data Set Parameters	162
Table C.13 TPW-02 Soil Data Set Parameters	163
Table C.14 LP-01 Soil Data Set Parameters	163
Table C.15 LP-02 Soil Data Set Parameters	163
Table C.16 LP-03 Soil Data Set Parameters	164
Table C.17 LP-04 Soil Data Set Parameters	164

List of Figures

Figure 1.1: Schematic Diagram Demonstrating the Proposed Method for Simulating Load-Displacement Pile Foundation Response.....	2
Figure 2.1: The Site Location Map (Access date: 6 June 2020, Source: Google Maps www.google.com/map)	4
Figure 2.2: Geological Map of North Delta Basin (Access date: 13 May 2018, Source: Google Images www.google.com/search/images)	5
Figure 2.3: Soil Lithology Log for Study Zone.....	6
Figure 2.4: (a) Piezocone Tip Resistance, (b) Piezocone Side Friction, (c) Piezocone Pore Water Pressure (d) SPT-N Value (e) Shear Wave Velocity of Module (1) Zone (A)	7
Figure 2.5: (a) Piezocone Tip Resistance, (b) Piezocone Side Friction, (c) Piezocone Pore Water Pressure (d) SPT-N Value (e) Shear Wave Velocity of Module (1) Zone (B)	8
Figure 2.6: (a) Piezocone Tip Resistance, (b) Piezocone Side Friction, (c) Piezocone Pore Water Pressure (d) SPT-N Value (e) Shear Wave Velocity of Module (1) Zone (C)	9
Figure 2.7: (a) Piezocone Tip Resistance, (b) Piezocone Side Friction, (c) Piezocone Pore Water Pressure (d) SPT-N Value (e) Shear Wave Velocity of Module (4) Zone (A)	10
Figure 2.8: (a) Piezocone Tip Resistance, (b) Piezocone Side Friction, (c) Piezocone Pore Water Pressure (d) SPT-N Value (e) Shear Wave Velocity of Module (4) Zone (B)	11
Figure 2.9: (a) Piezocone Tip Resistance, (b) Piezocone Side Friction, (c) Piezocone Pore Water Pressure (d) SPT-N Value (e) Shear Wave Velocity of Module (4) Zone (C)	12
Figure 2.10: Index Properties of Modules 1&4.....	13
Figure 2.11: Predicted Versus Measured OCR with an Elevation of Module 1	14
Figure 2.12: Predicted Versus Measured OCR with an Elevation of Module 4	15
Figure 2.13: Predicted Versus Measured Undrained Shear Strength with Depth of Zones A, B, and C in Module 1	17
Figure 2.14: Predicted Versus Measured Undrained Shear Strength with Depth of Zones A, B, and C in Module 4.....	18
Figure 2.15: Predicted Versus Measured Undrained Shear Strength Values	19
Figure 2.16: Correlation between Undrained Shear Strength and Shear Wave Velocity	23
Figure 2.17: Correlation between Undrained Shear Strength and Over Consolidation Ratio	23
Figure 2.18: Correlation between Undrained Shear Strength and Net Cone Resistance.....	24
Figure 3.1: Soil Stiffness Types In Term of Shear Modulus G [22]	26
Figure 3.2: Elastic Moduli Definitions with Applied Boundary Condition [59]	28
Figure 3.3: The Ideal Stress Strain Curve and Stiffness Corresponding to Different In-Situ Tests with Strain Levels [59]	29
Figure 3.4: Variation of Shear Modulus from very Small Strain to Intermediate Strain and Large Strain under Static Loading and Corresponding Select In-Situ Tests [59] ...	30
Figure 3.5: Relationship between Rigidity Index and Plasticity Index for Normally Consolidated Clay [64].....	31