AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF STRUCTURAL ENGINEERING

PERFORMANCE OF POST TENSIONED RAFT FOUNDATION

A Thesis Submitted In Partial Fulfillment for the
Requirement of the Degree of
Master of Science in Civil Engineering (Structural)

By

Eng. Mohammad Ahmad Salem Alnawafleh

Bachelor Degree in Civil Engineering
Mutah University - Jordan, 2008

Supervisors

Prof. Dr. Omar A. El-Nawawy
Professor of Structural Engineering
Department of Structural Engineering
Faculty of Engineering
Ain Shams University

Prof. Dr. Yasser M. El-Mossallamy
Professor of Geotechnical Engineering
Department of Structural Engineering
Faculty of Engineering
Ain Shams University

Cairo – 2014

APPROVAL SHEET

PERFORMANCE OF POST TENSIONED RAFT FOUNDATION

By

Eng. Mohammad Ahmad Salem Alnawafleh

Bachelor Degree in Civil Engineering

Mutah University - Jordan. 2008

A Thesis Submitted In Partial Fulfillment for the Requirement
for Degree of Master of Science in Civil Engineering (Structural)

Examiners Committee:

Prof. Dr. Osman M.O. Ramadan O. Ramadan
Professor of Structural Engineering
Department of Structural Engineering
Faculty of Engineering - Cairo University

Prof. Dr. Amin Saleh Aly A. S. Aly
Professor of Structural Engineering
Department of Structural Engineering
Faculty of Engineering - Ain Shams University

Prof. Dr. Omar A. El-Nawawy El Nawawy
Professor of Structural Engineering
Department of Structural Engineering
Faculty of Engineering - Ain Shams University

Prof. Dr. Yasser M. El-Mossallamy Y. El mass.
Professor of Geotechnical Engineering
Department of Structural Engineering
Faculty of Engineering - Ain Shams University

Date: 11/01 /2014

INFORMATION ABOUT THE RESEARCHER

Name	**: Mohammad Ahmad Salem Alnawafleh**
Date of Birth	**: February 27, 1985**
Place of Birth	**: Ma'an, Jordan**
Academic degree	**: Bachelor degree in Civil engineering**
Field of specialization degree	**: Structural Engineering**
University issued the degree	**: Mutah University, Jordan**
Date of issued degree	**: January 2008**
Current job	**: Post-Tension Design Engineer**

STATEMENT

This thesis is submitted as partial fulfillment of MSc Degree in Civil Engineering (Structural), Faculty of Engineering, Ain Shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or qualification at any other scientific entity.

Date: / /

Name: Eng. Mohammad Ahmad S. Alnawafleh

Signature:

ACKNOWLEDGMENTS

First of all, I would like to thank God for every gift bestowed on me.

Next, I would like to thanks my advisers ***Prof. Dr. Omar El-Nawawy*** *and* ***Prof. Dr. Yasser El-Mossallamy*** *for the opportunity to conduct this research, providing me endless insight on the nature of the problem, and for being always available for assistance and for queries.*

Special thanks go to my ***parents*** *for their endless support, encouragement, and believing and helping me to believe that I can succeed at anything.*

I would like to extend sincere thanks to my seniors at work who supported me and taught me post-tensioning technology, especially ***Dr. Musa Alawneh*** *and* ***Eng. Mohammad Badran.***

Finally, I would like to thank all of my friends, past and present for all the good times we've had and all the good times yet to have. I would especially like to thank all my friends and colleagues in Cairo for their kindness and hospitality.

DEDICATION

This thesis is lovingly dedicated to my dear ***mother****. Appreciated her support, encouragement, and constant love have sustained me throughout my life.*

ABSTRACT of MSc THESIS

Thesis Title: **Performance of Post Tensioned Raft Foundation**

Prepared by: **Eng. Mohammad Ahmad Salem Alnawafleh**

Bachelor Degree in Civil Engineering - Mutah University, Jordan, 2008

Supervisors: **Prof. Dr. Omar A. El-Nawawy**

Prof. Dr. Yasser M. El-Mossallamy

ABSTRACT

This thesis contains numerical and analytical studies to investigate the performance of post-tensioned raft foundation to prove it as a better alternative to the conventional R.C system, especially for foundation in sever exposure conditions.

The numerical analysis includes calculations of selected case study using the Finite Element Method for which a parametric study has been carried out to investigate the influence of different variables on the behavior of the post tensioned raft foundation. In order to evaluate the proposed alternative system efficiency, it was necessary to compare the PT raft design and results against conventional RC raft. The design was carried out for most widespread code ACI318, and extent to compare the design requirements and the design results with BS8110 and ECP203.

A high performance of the post tensioned raft foundation is noticed for the Serviceability Limit States and Ultimate Limit States, in addition to profitable saving in the quantities especially for foundations of low rise buildings.

KEY WORDS:

Post tensioned, Post tensioned raft, Post tensioned mat, Raft foundations

TABLE OF CONTENTS

LIST OF FIGURES