A Dissertation

On

NUMERICAL MODELING OF PILED RAFT FOUNDATION

Submitted in partial fulfillment of the requirement for

The award of Degree of

MASTER OF TECHNOLOGY

(Geotechnical Engineering)

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2012-2014

CERTIFICATE

This is to certify that the thesis work entitled "**NUMERICAL MODELING OF PILED RAFT FOUNDATION"**, being submitted by me, is a bonafide record of my own work carried by me under the guidance and supervision of associate professor Dr.A.K. Shrivastava in partial fulfillment of the requirements for the award of the **Degree of Master of Engineering** in **Geotechnical Engineering** in Civil Engineering.

The matter embodied in this project has not been submitted for the award of any other degree

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ACKNOWLEDGMENT

I take this opportunity to express my sincere gratitude to all those who have been instrumental in the successful completion of this project.

Dr. Amit Kumar Shrivastva , Associate Professor, Dept. Of Civil Engineering, Delhi Technological University, my project guide, has guided me for the successful completion of this project. It is worth mentioning that he always provided the necessary guidance and support. I sincerely thank him for his wholehearted guidance.

I would like to express my sincere thanks to our M.Tech coordinator**, Dr. A. K Sahu, Associate Professor, Dept. of Civil Engineering, Delhi Technological University.**

I am grateful for the help and cooperation of **HOD, Prof. A. Trivedi, Head Department of Civil Engineering, Delhi Technological University**, New Delhi, for providing the necessary lab facilities. And I wish to thank all faculty members whoever helped to finish my project in all aspects.

I would like to thank my beloved parents, who always give me strong inspirations, moral supports, and helpful suggestions. Without them, my study career would never have begun. It is only because of them, my life has always been full of abundant blessing.

I would like to thank **Krishna Institute of Engineering and Technology** for providing me lab facilities for my project work.

At last but not least I would like to express my vote of thanks to my friends for their support and encouragement.

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ABSTRACT

For a given geotechnical condition, when the raft foundation is not able to meet load requirement, in that case it is possible to enhance the performance of the raft by the adding piles beneath the raft. Strategically located number of piles may improve both the ultimate load capacity and the settlement of the raft. In recent years, combined piled raft foundation has been proved effective and appropriate method instead of conventional pile or raft foundation.

In present work, Bearing capacity and settlement of raft and pile group have been calculated from analytically and same is simulated by finite element based software PLAXIS 2D. Based on this simulation between analytically and numerical methods, piled raft foundation is analyzed in PLAXIS 2D. And Settlement behavior of piled raft is studied by varying different parameters of soil, raft and pile.

Foundations analysis and designing of raft and pile group have been carried out using STAAD.PRO and STAAD.FOUNDATION to calculate required steel and concrete area.

After carrying out analysis of piled-raft foundation in sandy soil, using PLAXIS 2D,it was observed that settlement reduces as the pile length and number of pile group increases. The settlement of the pile group decreases as spacing ratio(s/d) increases up to certain spacing. Raft thickness doesn't greatly influence the settlement. Settlement decreases as number of piles, pile length and modulus of elasticity of soil increases.

Cost comparisons have been done between raft and piled raft foundation which foundation is more effective and economical. After cost comparison it is found that raft foundation can provide sufficient load capacity, and can go upto certain storey. But for high rise building in same soil condition then piled raft could be effective and economical option then pile foundation.

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