A Major Project II

on

Comparative study of load deformation behaviour of silty clay bed reinforced with stone column of different depth and gradation

Submitted in partial fulfillment for the award of the degree of

MASTERS OF TECHNOLOGY

IN

CIVIL ENGINEERING

With Specialization in

GEOTECHNICAL ENGINEERING

By

Darin Baruah

(Roll No. 2K12/GTE/04)

Under The Guidance of

Prof. Anil Kumar Sahu

Department of Civil Engineering

Delhi Technological University, Delhi 110042

Department of Civil Engineering

DELHI TECHNOLOGICAL UNIVERSITY

CERTIFICATE

This is to certify that the major project report entitled "Comparative study of load deformation behaviour of silty clay bed reinforced with stone column of different depth and gradation" is a bonafide record of work carried out by Mr. Darin Baruah under my guidance and supervision, during the session 2013-14 in partial fulfillment of the requirement for the degree of Master of Technology (Geotechnical Engineering) from Delhi Technological University, Delhi.

Dr. Anil Kumar Sahu

Professor,

Department of Civil Engineering,

Delhi Technological University

Delhi - 42

DELHI TECHNOLOGICAL UNIVERSITY

ACKNOWLEDGEMENT

I wish to convey my sincere gratitude to Prof. Pankaj Jalote, Vice Chancellor, Delhi Technological University and Prof. A. Trivedi, Head, Department of Civil Engineering for providing me with the necessary facilities for conducting experiments.

I would like to express my deepest sense of gratitude and indebtedness to my guide and motivator Prof. Anil Kumar Sahu, Civil Engineering Department, Delhi Technological University for his valuable guidance and support in all the phases from conceptualization to experimentation and final completion of the project. I also thank all the faculty members of Civil Engineering Department, Delhi Technological University who have enlightened me during my project.

I am deeply thankful towards all the lab assistants of my university who have helped me to conduct the experiments and also my helper Mr Karan who has helped me in lifting all the heavy equipment.

I would also like to thank my parents for their encouragement and persistent support which has helped me to do better in all of my endeavours.

(Darin Baruah)

Roll No: 2K12/GTE/04

INDEX

List of Abbreviations

Sl. No.	Abbreviation	Full form
1	ASCE	American Society of Civil Engineers
2	BCIF	Bearing Capacity Improvement factor
3	BIS	Bureau of Indian Standard
4	Conf.	Conference
5	ESC	Encased stone column
6	Fig.	Figure
7	IS	Indian Standard
8	IGS	Indian Geotechnical Society
9	No.	Number
10	pp.	Page number
11	PVC	Poly Vinyl Chloride
12	SMFE	Soil Mechanics and Foundation engineering
13	Vol.	Volume
14	Wt.	Weight

LIST OF FIGURES

LIST OF TABLES

LIST OF PICTURES

LIST OF SYMBOLS

q_{ult} = ultimate bearing capacity

φ_s = angle of internal friction of soil

φ_{column} = angle of internal friction of column material

C_u = original undrained shear strength of clay

γ = unit weight of soil

Z = depth from surface of composite foundation

K_p = soil coefficient of passive earth pressure

σ_{r0} = initial radial stress along granular pile

S_t = settlement of composite foundation

m_v = modulus of volume compressibility

μ_c = reduction in stress coefficient of clay

σ_v = limiting vertical stress

D = diameter of stone column