



DELHI TECHNOLOGICAL UNIVERSITY, DELHI

CERTIFICATE

This is to certify that the project report entitled “**Consolidation of thin clay lamina in sand**” is a bona fide record of work carried out by **Sakshi Sharma (Roll No. 2K12/GTE/15)** under my guidance and supervision, during the session 2014 in partial fulfilment of the requirement for the degree of Master of Technology (Geotechnical Engineering) from Delhi Technological University, Delhi.

The work embodied in this major project has not been submitted for the award of any other degree to the best of our knowledge.

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ABSTRACT

The main objective of this work is to evaluate the consolidation characteristics of a multi-layered soil system and implement the analytical and numerical solutions for comparative study with the experimental results. Ground is heterogeneous always constituting various kinds of soils in layers. Thus, study of the multi-layered soils is essential for accurate analysis of the settlement of ground. For a layered soil, the solution can be approximated using finite difference techniques in which different properties are assigned to different layers. Analytical solutions for multi-layered soils are complex whereas numerical techniques are easier to implement. In case of clay-sand layers used in this study, sand possesses high permeability whereas clay used is of low permeability. Thus the low permeability of clay slows down the settlement of the sand layer lying underneath. Also clay layer prevents percolation of fluids to the sandy soil beneath which is useful in lining and containments.

This work estimates the consolidation behaviour of the layered soil system as a whole. Experimental results are thus used to validate the analytical and numerical solutions for the one dimensional consolidation of soils.

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LIST OF SYMBOLS

S.NO.	SYMBOL	NOMENCLATURE
1	u	Pore water pressure
2	C_v	Coefficient of consolidation
3	α	Constant equivalent to coefficient of consolidation
4	$\Delta\sigma$	Effective pressure increment
5	$\Delta\rho$	Settlement
6	H	Depth of soil strata
7	m_v	Coefficient of volume compressibility
8	U	Degree of consolidation
9	T_v	Time factor
10	x	Depth variable
11	t	Variable time
12	u_0	Initial pore pressure
13	G	Specific gravity
14	k	Coefficient of permeability
15	ε	Compression strain
16	ρ_f	Final settlement
17	\bar{u}	Pore pressure at any time t
18	t_c	Thickness of clay layer
19	t_s	Thickness of sand layer

Dedication

I dedicate this thesis to

My family, teachers and friends