

Ground Improvement Techniques - Web course

COURSE OUTLINE

The term ground improvement and ground modification refer to the improvement in or modification to the Engineering properties of a soil that carried out at a site where the soil in the natural state doesn't possess properties that are acceptable to us for the proposed civil Engineering activities.

The improved or modified soil exhibits satisfactory performance when foundations, earth structures, earth retaining structures and under ground structures are constructed on, within or using the soil.

The topics cover Engineering properties of soft, weak and compressible deposits, principles of treatment-loading (static and Dynamic), Accelerated flow, Reinforcement, Vertical drains, Granular piles, soil nailing, Anchors.

This course material on ground improvement technique will be very useful to undergraduate students, post-graduate students, teachers and practitioners and gain competence in properly devising alternative solutions to difficult and earth construction problems and in evaluating their effectiveness before, during and after construction.

A study of the many different approaches to the ground modification broadens the mind of any Engineer and inspires creativity and innovation in Geotechnical Construction and related fields.

A number of chosen field oriented problems will be solved to illustrate the concepts clearly.

Contents:

Engineering properties of soft, weak and compressible deposits, principles of treatment-loading (static and Dynamic), Accelerated flow, Reinforcement, Drainage and filters, Injections, Thermal, electrical and Chemical Methods-Preloading, Dynamic Consolidation, Vertical drains, Granular piles, soil nailing, Anchors, Design Methods and Case histories.

COURSE DETAIL

Sl. No.	Topic	No. of Hours
1	INTRODUCTION: Different types of problematic soils and their geological formation principles of treatment-loading.	4
2	TREATMENT OF LOOSE SANDS Compaction piles, dynamic compaction, vibroflot technique, controlled blasting for compaction.	6
3	GROUTING TECHNIQUES Permeation grouting, Compaction technique, jet	6



NP-TEL

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Civil Engineering

Pre-requisites:

1. Soil Mechanics (Geotechnical Engg. I).
2. Foundation Engg (Geotechnical Engg. II).

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	grouting, different varieties of grout materials, grouting in difficult conditions.	
4	TREATMENT OF EXPANSIVE SOILS Lime treatment for expansive soils, injection method, lime-columns, chemical analysis.	6
5	ACCELERATED CONSOLIDATION METHODS FOR SOFT CLAY SOILS <ul style="list-style-type: none"> • Sand drains. • Pre-fabricated drains. • Stone columns. • Vacuum consolidation . 	10
6	IN SITU GROUND TREATMENT FOR SLOPES Different types of in situ soil stabilization like soil nails, anchoring, Pre-stressed anchors, etc. Design methods and construction techniques.	9
7	CASE STUDIES Case studies of different ground improvement projects in India.	3

References:

1. Hausmann, H.R. " Principles of Ground Modification", McGraw-Hill Book Company.
2. Ground Engineering - The Institute of Civil Engineers, London, 1970.
3. Gulati and Datta "Geotechnical Engineering", Tata Mc Graw Hill.