

ENGINEERING PROPERTIES OF COARSE-GRAINED SOILS

**PROJECT REPORT SUBMITTED BY:
SAVVA CONSTANTINA &
ANTONIOU SIMOS**

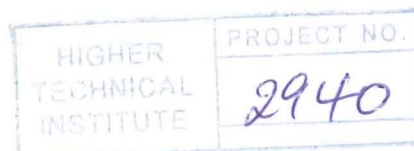
**IN PART SATISFACTION OF THE AWARD OF
DIPLOMA OF TECHNICAL ENGINEER IN
CIVIL ENGINEERING OF THE
HIGHER TECHNICAL INSTITUTE,
CYPRUS**

**PROJECT SUPERVISION: M. POULLAIDES
SENIOR LECTURER IN
CIVIL ENGINEERING, H.T.I.**

EXTERNAL ASSESSOR:

TYPE OF PROJECT: GROUP

JUNE, 1999



INTRODUCTION

The engineering definition of soil is considered to be any loose sedimentary deposit such as gravel , sand , silt , clay or a mixture of these materials . It should not be confused with the geological definition of soil , which is the weathered organic material on the surface , or topsoil . Topsoil is generally removed before any engineering projects are carried out .

According to the sizes and composition of the grains and the relative proportions of the various components , soils exhibit a very wide range of properties . At any one engineering site , the ground to be loaded by a structure will inevitably consist of a number of layers of different soil materials all exhibiting different properties .

It is the duty of the engineering to calculate the displacements , settlement , stresses and forces which will be caused in the soil mass by the proposed structure and to make sure that none of these exceed certain limits . If they do the , the structure may be distorted , exhibiting unsightly cracks or in extreme cases fail or collapse .

Soils classification and identification of their properties is very important and in order to identify this properties specific tests are required

For this scope samples from different areas of Nicosia were tested :

- (a) Makedonitissa
- (b) Lakatamia
- (c) Industrial area of Strovolos
- (d) Industrial area of Latsia
- (e) Kaimakli

To determine their performance we carried out the following tests

- (a) Determination of particle size distribution by sieving
- (b) Standard compaction test :Proctor test
- (c) Direct shear test

CONTENTS

ACKNOWLEDGEMENTS	I
INTRODUCTION	II
<u>CHAPTER 1: Determination of particle size analysis by sieving</u>	
Introduction.....	1
Particle-size distribution curve.....	3
Classification of coarse-grained soils.....	5
Apparatus.....	7
Procedure.....	8
Results.....	9
Calculations.....	19
Comments.....	23
<u>CHAPTER 2: Direct shear-box test</u>	
Introduction.....	24
Shearing strength.....	26
Volume changes.....	30
Friction angle.....	31
Drainage.....	32
Advantages & Disadvantages of the direct shear test.....	33
Apparatus.....	35
Procedure.....	36
Calculations.....	38
Results.....	39
Comments.....	56
<u>CHAPTER 3: Standard compaction test: Proctor test</u>	
Introduction.....	57
Compaction effort.....	60
Water content variation.....	61

Apparatus.....	62
Procedure.....	63
Calculations.....	65
Results-Calculations.....	66
Comments.....	78
REFERENCES.....	79