

**THE SMALL STRAINS BEHAVIOUR
OF LATERITE SOIL**

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**A Report Submitted to the School of Civil Engineering
in Partial Fulfilment of the Requirement for the award
of a Degree in Bachelor of Engineering (Honours) (Civil)**

May 1997

Acknowledgement

In the name of **ALLAH**, the most Beneficent and merciful, Lord of the Universe, Alhamdulillah, with His help the author manage to complete his year project. Praise be to Prophet Muhammad, his companions and those who follow his path as what he preached upon, may Almighty Allah keep us in His blessing.

The author wishes to express deepest gratitude to my advisor, Dr. Ideris Zakaria for his valuable contribution, guidance, criticisms and suggestions towards the completion of this project.

Thanks are also due to laboratory assistant staffs Mr. Mohd. Hafiz for the his help in carrying out the experimental work described in this report.

Lastly the author also wishes to express special thanks to her beloved parents, her beloved husband Mr. Ishak Zachariah and my child Nik Muhammad Khairul Anwar for their encouragement, understanding, moral and financial support throughout the course of my study at MARA Institute of Technology, Shah Alam, Selangor Darul Ehsan.

Abstract

This study is primarily concerned with the measurement of small strains of soil. Experience has shown that the strain in the ground was actually very small. A programme of triaxial compression tests was conducted on re-constituted compacted soil samples taken from a site in Shah Alam, Selangor Darul Ehsan. The samples were prepared at a moisture content equivalent to it 95 % of its maximum dry density on the wet side of optimum water content. The samples were instrumented with local axial strain devices mounted directly on the soil.

Recent work has demonstrated that soils can be equally as brittle as rocks and that the understanding of their behaviour strains below 0.05 % is very important. Indeed, K-0 normally consolidated clays may reach peak strength at strains as low as 0.1 %. Even when the behaviour is not brittle, the strains prior to yielding are usually very small. From the study, the soil stiffness at small strains which is reflected the value of Young Modulus (E), is actually higher than the soil stiffness measured in the laboratory. This is followed that the value of E used in design should be based on the actual E value in small strains test.

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

The strains which occur in the ground are actually very small in the order of less than 0.0001 % (*Burland, 1989*). The conventional triaxial test used to measure strain of the soil normally underestimates the soil stiffness., because the strains are measured external to the sample. Systems compliance, creep and bedding errors also contribute this short-comings. This resulted in the lower estimate of the soil stiffness. The variation of soil stiffness with strain is shown in Figure 1.1.

It can be seen that the soil stiffness G is actually higher than it usually measured in the laboratory. Limitations of conventional triaxial tests :

- the effects of end restraint or stiffness on the stress and strain distribution in the specimen or both cause a departure from the right cylinder assumption
- compliance of the system, including an internal load cell, porous stones, filter paper, top cap, and other elements are included in the measurement.
- Problems of contact between the specimen and the end caps are covered by the term “Bedding Error” and may include the following :-