

Final Year Project  
Advanced Diploma In Civil Engineering  
School of Engineering  
Mara Institute of Technology  
Shah Alam, Selangor

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**EFFECT OF RAINFALL INFILTRATION  
ON THE STABILITY  
OF  
RESIDUAL SOIL SLOPE**

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**MAY 1993**

## ACKNOWLEDGEMENT

I am indeed very thankful to the Department of Civil Engineering, MARA Institute of Technology for giving opportunity to undertake this research project.

My sincere thanks to all laboratory staff who kindly assisted me in various ways during my experimental research especially Mr. Mohd Sakdon, Mr. Mohd Hafiz, Mr Samsudin, Mr. Yusof, Mr. Razman and others.

Grateful thanks to the individuals and colleagues through whose generosity and assistance the preparation of this project report has been possible. In particular, I am grateful to Mr. Kamarazam Kamaruzaman and Mr. Nizam Ponikan for their inspiration and supports.

Last but not least, I would like to express my greatest thanks to my Project Advisors, Mr. Suhaimi Abdul Talib and Mr. Abd Rahman Mahamood for their guidance, inspiration, constructive critics and keen contribution in completing this project.

Thanks a lot.

## TABLE OF CONTENTS

-Acknowledgement	i
-Table of contents	ii
-List of illustrations	ix
-List of table	xiii
-Notations	xv
-Synopsis	xvii

CHAPTER	PAGE
Chapter 1	
<b>INTRODUCTION</b> ✓	
1.1 General	1
1.2 Objective	2
1.3 Scope of work	3
1.4 Geology of Malaysia	6
1.4.1 Residual soils	6
1.4.2 Soil profile in Malaysia	9
1.5 Rainfall	
1.5.1 General	11
1.5.2 Annual rainfall	12
1.5.3 Monthly rainfall	12
1.5.4 Rain-days	18
1.6 Slope movement	20

## SYNOPSIS

It is commonly recognized that when the amount of water present in soil is altered, there is a corresponding change in the characteristics of the soil. This fact lies at the root of every soils problem. The problem of slope stability has always been addressed to soils which are fully saturated. However, many slope failures occur in regions of unsaturated soil. Unfortunately, very little work in this country has been done in the field to actually measure the changes in soil suction and moisture content and incorporate these changes in slope stability analysis. This project proposes to look at the effects of rainwater infiltration into the ground and study the changes of soil properties which govern the strength of the soil and the stability of the slope. It involves laboratory test and field test (installation tensiometer). From the data obtained an analysis is being made and the computer programme is developed. By knowing the duration of the rain, the depth of saturated soil can be calculate, from which the factor of safety is determined.

## 1.0 INTRODUCTION

### 1.1 GENERAL

The problem of slope stability has always been analyzed in soils which is either dry or fully saturated. In reality, however, many slope failures occur in regions of unsaturated soil. To be able to understand how these failures takes place, the behavior of unsaturated soil must be studied in detail. A knowledge of groundwater condition and the behavior of water flowing through the unsaturated soil is one of important knowledge for the slope designer.

Bishop et. al (1960) started a series of testing procedures to determine the shear strength of unsaturated soils. This then led to a number of expressions proposed for shear strength of unsaturated soil.

Interesting development came from Jennings and Burland (1962) on the expression of effective stress for unsaturated sample.

These early works, even though has not been used widely in practices during the 1960s, has in a tremendous way contributed to the works of may recent researchers.

Fredlund (1977) introduced the concept of stress variable to incorporate the effect of pore-air pressure in shear strength testings for unsaturated sample.