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

**BY :**

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## SYNOPSIS

It is commonly recognised that a change in soil moisture will be accompanied by 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 in 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 to actually measure the changes in 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.

This is done by indirect measurements of the soil permeability, soil moisture characteristics, insitu soil suction, soil classification and the shear strength of the soil. A computer model is made to determine the depth of soil saturated and the factor of safety (F.O.S) at different depth of slope. The results collected from the laboratory testings, field and computer model is then compared to show the correlation between them.

## 1.0 INTRODUCTION

### 1.1 General

The incidence of slope failure during periods of intense rainfall indicates the degree to which rainfall and the subsequent movement of groundwater affects the slope stability. A knowledge of groundwater conditions and the behaviour of water flowing through the unsaturated zone is needed for the analysis and design of slopes. Such knowledge would allow the designer to make better judgement on the stability of a slope.

Water affects the stability of slopes in the following ways:

- a) by generating pore pressures, both positive and negative, which alter stress conditions
- b) by changing the bulk density of the material forming the slope (especially in clay dominant soil)
- c) by both internal and external erosion and
- d) by changing the mineral constituents of the materials forming the slopes.