

Table of Contents

<i>SURAT PERLANTIKAN</i>	iii
<i>SURAT PENYERAHAN LAPORAN</i>	iv
PROJECT TEAM MEMBERS.....	v
PENGHARGAAN	vi
List of figures.....	xi
List of tables.....	xiv
Abstract.....	xv
Chapter One - INTRODUCTION.....	1
1.1 AN OVERVIEW	1
1.2 PROBLEM STATEMENT.....	1
1.3 OBJECTIVES.....	2
1.4 SCOPE OF STUDY.....	2
1.5 METHODOLOGY	3
Chapter Two - LITERATURE REVIEW	4
2.1 RESIDUAL SOILS.....	4
2.1.1 DISTRIBUTION OF TROPICAL RESIDUAL SOILS IN MALAYSIA AND STUDY AREA IN BALIK PULAU, PENANG, BALING, KEDAH AND GERIK, PERAK.	5
2.1.2 GEOLOGY OF BALING, KEDAH AND GERIK, PERAK	7

List of figures

Figure 1 : Distribution of tropical residual soils in Peninsular	7
Figure 2 : Geological Map of Penang, Baling, Kedah and Gerik, Perak Northern Peninsular Malaysia, based on 8th Edition Geological Map 1985	8
Figure 3 : Map of soil geology for Baling District, Kedah - study areas in sedimentary residual soils	9
Figure 4 : Geology map for Gerik, Perak - study areas in sedimentary residual soil.	10
Figure 5 : Geological map of Penang Island, based on 8th Edition Geological Map 1985.....	11
Figure 6 : Detail geology of the slope failure locations along Route 6 in Balik Pulau, Penang.....	12
Figure 7 : Falls mode	14
Figure 8 : Translational mode.....	15
Figure 9 : Rotational mode	15
Figure 10 : Flows mode	16
Figure 11 : Typical cross section of shear box (Whitlow, 2004).....	18
Figure 12 : Typical Shear Box Apparatus with samples under saturated condition (Head, 1980).....	18
Figure 13 : Typical Shear Box Apparatus consisting 2 pieces of metal boxes to be unscrewed before test is carried out (Head, 1980).....	19
Figure 14 : Relationship between shear stress and displacement in shear box test...	19

List of tables

Table 1 : Product of residual soil due to original mineralogical compositions of the parent rocks (after Huat et al, 2004).....	6
Table 2 : Geological description for Baling District, Kedah– along Baling to Pengkalan Hulu road.	9
Table 3 : Geological Description of soil for Gerik District, Perak -along Pengkalan Hulu to Gerik road.	10
Table 4 : Detail geology, slope failure locations and notations for Route 6, Penang	13
Table 5 : Typical values of drained shearing angle of friction for sands and silts (after Whitlow, 2004)	24
Table 6 : Slope failure locations and their notation in Baling District, Kedah.....	30
Table 7 : Slope failure locations and their notation in in Gerik District, Perak.....	31
Table 8 : Slope failure locations	33
Table 9 : Summary of the particle size distribution tests and soil classifications	61
Table 10 : Results of saturated peak shear box tests.....	66
Table 11 : Results of saturated peak shear box and particle size distribution tests ...	70
Table 12 : Results of saturated peak shear box and particle size distriution tests	77
Table 13 : Results of particle size distribution tests	78
Table 14 : Slope condition, soil type, cohesion and angle of shearing resistance.	78

Abstract

On the 11th December 1993, Highland Tower near Hulu Kelang, Selangor toppled due to slope failure causing 48 residents were killed. It became the worst nightmare to the all Malaysian especially to those who are the residents of the un-failed nearby tower as well as in the engineering lines. Since then, many more slope failures occurred in Malaysia yearly during the rainy seasons. Hence, slope failures ranked among the worst natural disaster occurring in Malaysia, studies on the slope failures are becoming important. Slope failure, also referred to as mass wasting, is the down slope movement of rock debris and soil in response to gravitational stresses. There are many factors affecting slope failures such as weaknesses in the composition or structure of the rock or soil; variation in conditions such as change in rainfall, unorganized drainage or surface stability (removal of vegetation). Among these factors, rainfall, earthquake and human activities are important starter factors that are causing slope failures to occur. This study is to determine the relationship between physical soil properties and soil shear strength under saturated condition. Hydrometer and sieve tests to determine the physical soil properties and saturated shear box tests were conducted to determine the shear strength for soil samples taken from slope failure locations. Slope failure locations selected were from slope failures tragic sites in Balik Pulau in Penang, Baling in Kedah and Gerik in Perak. From this research it can be concluded that gravelly silt has the largest range of angle of shearing resistance while silt has the smallest range of angle of shearing resistance. Gravelly silt has the largest range of cohesion while very silty sand has the smallest range of cohesion.