

# PROBABILISTIC ANALYSIS OF SHALLOW TRANSLATIONAL SLIDES



Thesis submitted in partial fulfillment of the requirements for the Degree  
of Master of Engineering in Geotechnical Engineering



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## ABSTRACT

Slope instability is a major environmental hazard, which is widely researched by Geotechnical engineers in the world. In general, there is a vast range of different mechanisms of slope failures. Shallow translational mode of slope failure is one such important mode.

This thesis concentrates on shallow translational form of slope failures. Analysis of shallow translational form of failure is carried out deterministically as well as probabilistically. The probabilistic analysis gives due consideration to the uncertainty of soil strength parameters and pore water pressures.

Analysis are carried out under both saturated soil mechanics theories and unsaturated soil mechanics theories. Two hypothetical examples representative of natural lateritic slopes in Sri Lanka are analysed deterministically and probabilistically.

Finally, the influence of rainfall and wetting front propagation are analysed. The corresponding changes of the probability of failure of the previously unsaturated slope is highlighted. The transition of slope from unsaturated situation to saturated situation with the propagation of wetting band thickness, and the resulting changes in the factor of safety and probability of failure are discussed.

A method of evaluating the overall probability of failure is suggested for further research.

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# CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	i
<b>ACKNOWLEDGMENT</b>	ii
<b>CONTENTS</b>	iii
<b>List of Figures</b>	v
<b>List of Tables</b>	ix
<b>1.0 INTRODUCTION</b>	
1.1 Background	1
1.2 Modes of Slope Instability	2
1.3 Computation Factor of Safety	4
1.4 Computation of Probability of Failure	6
1.5 Shallow Translational Slides	7
1.6 Rainfall-Induced Shallow Translational Slides	8
1.7 Scope of the Research	9
1.8 Outline of the Thesis	10
<b>2.0 DETERMINISTIC EVALUATION OF SHALLOW TRANSLATIONAL SLIDES</b>	
2.1 General	11
2.2 Shallow Translational Slides with Saturated Soil Mechanics Theories	12
2.3 Analysis of Shallow Translational Slides with Unsaturated Soil Mechanics Theories	17
2.3.1 Introduction	17
2.3.2 Theory of Unsaturated Soil Mechanics	18
2.3.3 Applications of Unsaturated Soil Mechanics Theories in Slope Stability Analysis	22
2.4 Illustrative Examples on Deterministic Methods of Evaluation of shallow Translational slides	27
2.4.1 Illustrative Examples with Saturated Soil Mechanics Theories	27
2.4.2 Concluding comments on the results of the analysis with saturated soil parameters	35
2.4.3 Illustrative Examples with Unsaturated Soil Mechanics Theories	36
2.4.4 Concluding comments on Unsaturated Analysis	47



<b>3.0</b>	<b>PROBABILISTIC APPROACH IN THE EVALUATION OF SHALLOW TRANSLATIONAL SLIDES</b>	
3.1	Introduction	48
3.2	Assignment of Uncertainty	48
3.3	Development of the Probabilistic Model for Shallow Translational Slides-Saturated Analysis	49
3.3.1	Development of the Spread Sheet	52
3.3.2	Probabilistic Analysis of Shallow Translational Land Slide- saturated Analysis	53
3.3.3	Results from Analysis of a Hypothetical example – Saturated Analysis	55
3.4	Development of the Probabilistic Model for Shallow Translational Slide- Unsaturated Analysis	61
3.4.1	Formulation of the Analysis	61
3.4.2	Analysis with Unsaturated Parameters	63
3.4.3	Results from the Analysis of the Hypothetical example – Unsaturated Analysis	64
<b>4.0</b>	<b>INFLUENCE OF RAINFALL ON SLOPE STABILITY</b>	
4.1	Introduction	74
4.2	Runoff, Infiltration and Groundwater Recharge	74
4.3	Other Factors Affecting Groundwater condition	77
4.4	Level of the Water Table for Slope Stability	78
4.4.1	Introduction	78
4.4.2	Wetting Band Approach	80
4.4.3	Limitations in the Wetting Band approach	83
4.4.4	Analysis with Wetting Band Approach	84
4.4.5	Results from the Analysis of slope stability with Wetting Band Approach	87
4.5	The overall probability of failure	91
<b>5.0</b>	<b>CONCLUSIONS</b>	92
	<b>REFERENCES</b>	94

## LIST OF FIGURES

		Page
Figure 1.1:	Classification of Landslides.(From Skempton and Hutchison, 1969)	3
Figure 1.2:	Representative Cross- Section (After Anderson,M.G. and Richards, K.S.)	4
Figure 1.3:	Failure Envelop for soil	5
Figure 2.1:	Shallow Translational Slide - Water Table is below the Ground Surface	12
Figure 2.2:	Shallow Translational Slide-Water table coinciding with the ground surface	15
Figure 2.3:	Shallow translational slide in a dry slope	16
Figure 2.4:	Planar surface representing the shear strength equation for an unsaturated soil (After Fredlund et al.,1978)	20
Figure 2.5:	Failure Envelop for Unsaturated soils (After Fredlund et al.,1978)	20
Figure 2.6:	Failure surfaces for an unsaturated soil viewed parallel to the ( $U_a$ - $U_w$ ) (Fredlund, 1981a).	21
Figure 2.7:	The increase in shear strength (cohesion) with matric suction when ( $\sigma_n$ - $u_a$ ) is zero (Fredlund, 1981a).	21
Figure 2.8:	Basic Unsaturated Condition for shallow Translational analysis	24
Figure 2.9:	Typical changes in water table, Degree of Saturation(s) and Pore water pressure (U) Due to Rainfall. ( After guide to Geotechnical Manual for slopes)	26
Figure 2.10:	Hypothetical slope for saturated case study	28
Figure 2.11:	Variation of FOS with water table level : Parameter set 1- Trial failure surface at 1.0m depth	30
Figure 2.12:	Variation of FOS with water table level : Parameter set 1- Trial failure surface at 2.0m depth	30
Figure 2.13:	Variation of FOS with water table level : Parameter set 1- Trial failure surface at 3.0m depth	31
Figure 2.14:	Variation of FOS with water table level : Parameter set 1- Trial failure surface at 4.0m depth	31
Figure 2.15:	Variation of FOS with water table level : Parameter set 2- Trial failure surface at 1.0m depth	32
Figure 2.16:	Variation of FOS with water table level : Parameter set 2- Trial failure surface at 2.0m depth	32
Figure 2.17:	Variation of FOS with water table level : Parameter set 2- Trial failure surface at 3.0m depth	33



Figure 2.18:	Variation of FOS with water table level : Parameter set 2- Trial failure surface at 4.0m depth	33
Figure 2.19:	Variation of FOS with soil strength properties for different trial failure surfaces (m=0:Dry slope)	34
Figure 2.20:	Variation of FOS with soil strength properties for different trial failure surfaces (m=1:Saturated slope with water table at ground level)	34
Figure 2.21:	Hypothetical slope for the saturated case	36
Figure 2.22:	Hypothetical unsaturated slope with H=1.0m; parameter set 1	38
Figure 2.23:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 1.0m depth: parameter set 1	38
Figure 2.24:	Hypothetical unsaturated slope with H=2.0m; parameter set 1	38
Figure 2.25:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 2.0m depth: parameter set 1	39
Figure 2.26:	Hypothetical unsaturated slope with H=3.0m; parameter set 1	39
Figure 2.27:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 3.0m depth: parameter set 1	40
Figure 2.28:	Hypothetical unsaturated slope with H=4.0m; parameter set 1	41
Figure 2.29:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 4.0m depth: parameter set 1	41
Figure 2.30:	Hypothetical unsaturated slope with H=1.0m; parameter set 2	42
Figure 2.31:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 1.0m depth: parameter set 2	42
Figure 2.32:	Hypothetical unsaturated slope with H=2.0m; parameter set 2	43
Figure 2.33:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 2.0m depth: parameter set 2	43
Figure 2.34:	Hypothetical unsaturated slope with H=3.0m; parameter set 2	44
Figure 2.35:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 3.0m depth: : parameter set 2	44
Figure 2.36:	Hypothetical unsaturated slope with H=4.0m; parameter set 2	45
Figure 2.37:	Variation of FOS with the depth to the water table and suction profile: Trial failure surface at 4.0m depth: parameter set 2	45
Figure 2.38:	Variation of FOS with soil parameters for different water table levels from trial failure surface(p=20%)	46
Figure 2.39:	Variation of FOS with soil parameters for different water table levels from trial failure surface(p=100%)	46
Figure 3.1:	Basic Slope Condition Saturated Analysis	49
Figure 3.2:	Basic Slope Condition Saturated Analysis	53
Figure 3.3:	Variation of FOS and probability of failure for H=1.0m: Parameter set 1	57
Figure 3.4:	Variation of FOS and probability of failure for H=2.0m: Parameter set 1	57



Figure 3.5:	Variation of FOS and probability of failure for H=3.0m: Parameter set 1	58
Figure 3.6:	Variation of FOS and probability of failure for H=4.0m: Parameter set 1	58
Figure 3.7:	Variation of FOS and probability of failure for H=1.0m: Parameter set 2	59
Figure 3.8:	Variation of FOS and probability of failure for H=2.0m: Parameter set 2	59
Figure 3.9:	Variation of FOS and probability of failure for H=3.0m: Parameter set 2	60
Figure 3.10:	Variation of FOS and probability of failure for H=4.0m: Parameter set 2	60
Figure 3.11:	Basic Slope Condition: Unsaturated Analysis	61
Figure 3.12:	Unsaturated analysis of shallow translational slide : H=1.0m:parameter set1 : p=20%	66
Figure 3.13:	Unsaturated analysis of shallow translational slide : H=1.0m:parameter set1 : p=60%	66
Figure 3.14:	Unsaturated analysis of shallow translational slide : H=1.0m:parameter set1 : p=100%	66
Figure 3.15:	Unsaturated analysis of shallow translational slide : H=2.0m:parameter set1 : p=20%	67
Figure 3.16:	Unsaturated analysis of shallow translational slide : H=2.0m:parameter set1 : p=60%	67
Figure 3.17:	Unsaturated analysis of shallow translational slide : H=2.0m:parameter set1 : p=100%	67
Figure 3.18:	Unsaturated analysis of shallow translational slide : H=3.0m:parameter set1 : p=20%	68
Figure 3.19:	Unsaturated analysis of shallow translational slide : H=3.0m:parameter set1 : p=60%	68
Figure 3.20:	Unsaturated analysis of shallow translational slide : H=3.0m:parameter set1 : p=100%	68
Figure 3.21:	Unsaturated analysis of shallow translational slide : H=4.0m:parameter set1 : p=20%	69
Figure 3.22:	Unsaturated analysis of shallow translational slide : H=4.0m:parameter set1 : p=60%	69
Figure 3.23:	Unsaturated analysis of shallow translational slide : H=4.0m:parameter set1 : p=100%	69
Figure 3.24:	Unsaturated analysis of shallow translational slide : H=1.0m:parameter Set2 : p=20%	70
Figure 3.25:	Unsaturated analysis of shallow translational slide : H=1.0m:parameter Set2 : p=60%	70
Figure 3.26:	Unsaturated analysis of shallow translational slide : H=1.0m:parameter Set2 : p=100%	70
Figure 3.27:	Unsaturated analysis of shallow translational slide : H=2.0m:parameter Set2 : p=20%	71



Figure 3.28:	Unsaturated analysis of shallow translational slide : H=2.0m;parameter Set2 : p=60%	71
Figure 3.29:	Unsaturated analysis of shallow translational slide : H=2.0m;parameter Set2 : p=100%	71
Figure 3.30:	Unsaturated analysis of shallow translational slide : H=3.0m;parameter Set2 : p=20%	72
Figure 3.31:	Unsaturated analysis of shallow translational slide : H=3.0m;parameter Set2 : p=60%	72
Figure 3.32:	Unsaturated analysis of shallow translational slide : H=3.0m;parameter Set2 : p=100%	72
Figure 3.33:	Unsaturated analysis of shallow translational slide : H=4.0m;parameter Set2 : p=20%	73
Figure 3.34:	Unsaturated analysis of shallow translational slide : H=4.0m;parameter Set2 : p=60%	73
Figure 3.35:	Unsaturated analysis of shallow translational slide : H=4.0m;parameter Set2 : p=100%	73
Figure 4.1:	Simplified Representation of the Hydrolic cycle	75
Figure 4.2:	Effect of permeability and degree of saturation on Wetting band thickness for a Ten- year return period rainfall Event ( After Geotechnical Manual for Slopes)	82
Figure 4.3:	Basic Slope Condition: Unsaturated Analysis	85



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## LIST OF TABLES

	Page
Table 2.1: Parameters for the study of saturated slope	28
Table 2.2: Sample results sheet of shallow translational slide analysis	29
Table 2.3: Parameters for the study of unsaturated slope	37
Table 2.4: Unsaturated deterministic analysis results for H=1.0m and Parameter set 1	38
Table 2.5: Unsaturated Deterministic analysis results for H=2.0m and Parameter set1	39
Table 2.6: Unsaturated Deterministic analysis results fo H=3.0m and Parameter set1	40
Table 2.7: Unsaturated Deterministic analysis results for H=4.0m and Parameter set1	41
Table 2.8: Unsaturated Deterministic analysis results for H=1.0m and Parameter set2	42
Table 2.9: Unsaturated Deterministic analysis results for H=2.0m and Parameter set2	43
Table 2.10: Unsaturated Deterministic analysis results for H=3.0m and Parameter set2	44
Table 2.11: Unsaturated Deterministic analysis results for H=4.0m and Parameter set2	45
Table 3.1: Properties of Saturated Soil	53
Table 3.2: Values of standard deviations of variable soil properties	54
Table 3.3: Depth to the Trial Failure Surface	54
Table 3.4: Variation of m in meters	54
Table 3.5: Basic form of the spread sheet program for probabilistic analysis(saturated)	56
Table 3.6: Basic form of the spread sheet program for probabilistic analysis(unsaturated)	65
Table 4.1: Properties of Soil and slope considered for the wetting band analysis	85
Table 4.2: Parameters substituted for the wetting band equation	86
Table 4.3: Wetting band thickness for different rainfall durations	86
Table 4.4: Stability indicators after one day rainfall	88
Table 4.5: Stability indicators after two day rainfall	88
Table 4.6: Stability indicators after three day rainfall	88
Table 4.7: Stability indicators after four day rainfall	89
Table 4.8: Stability indicators for unsaturated state: Parameter set 1	90
Table 4.9: Stability indicators for unsaturated state: Parameter set 2	90