

Evaluation of the most causative factor for recent major landslides in Sri Lanka

G. G. S. Wathsala*, A. M. R. G. Athapaththu, T. D. P. Jayashan

*Department of Civil Engineering, Faculty of Engineering, University of Peradeniya,
Sri Lanka*

**shashiniwathsala387@gmail.com*

Landslides are found to be the major natural disasters mainly occurring after a heavy seasonal rainfall in Sri Lanka. According to the National Building Research Organization, 20% of the total land area of the country is often threatened by landslides. Therefore, it is of prominent importance to predict the areas vulnerable to failure and to minimize such risks. In this research, landslide prone areas such as Aranayaka, Bulathkohupitiya and Dehiowita were investigated. Slope stability analyses were conducted considering the geometrical and geotechnical data obtaining at field investigation and laboratory experiments, respectively. In this research, Analytical Hierarchical Process (AHP) was adopted to determine most causative factor and Slope/W software was used to analyse the stability of the slope. In this study, twelve factors were considered for AHP analysis. Based on the AHP modal, it was found that, slope angle is the major triggering factor for all landslide. The impact of the slope angle is 31.5%, 30.4% and 25.8% in weights for Aranayaka, Bulathkohupitiya and Dehiowita, respectively. There is significant effect from other factors like soil thickness and landform too. The stability analysis showed that FOS is less than 1 in most of the analyses conducted on the slopes before occurring of the landslide. It was also found that reactivation of these landslides are possible with the increase of water table. As a physical mitigation measure, the existing slopes were regraded and subjected to stability analysis. It was found that regrading itself won't stabilize the slope, but it is necessary to consider other factors too. From this study it was learnt that the existing slope is more vulnerable to failure with the heavy rainfall in Aranayaka and Dehiowita.

Key words: Slope failure, Shear strength parameters, Sensitivity analysis, Analytical Hierarchical Process (AHP), SLOPE/W software