

Anatomy of the Niyandigala Landslide, Belihuloya and Residents' Perception of Landslides

R. P. A. R. Gunathilaka^{a*}, L. V. Ranaweera^a, E. P. N. Udayakumara^a, Srimal Samansiri^b

^a*Department of Natural Resources, Sabaragamuwa University of Sri Lanka,
P.O. Box 02, Belihuloya 70140, Sri Lanka.*

^b*Disaster Management Centre, Sri Lanka.*

*Correspondence: rpargunathilka@gmail.com

Many landslide incidents in Sri Lanka have been reported during or subsequent to an intense rainfall. A landslide occurred in Niyandigala, Belihuloya on 3rd May 2016 after a consecutive rainfall of few days. The debris of the landslide transported along Panniloya which crosses Badulla-Colombo (A5) main road between 162-163 km posts. In the event, Niyandigala temple (Arannaya) was completely destroyed while one fatality was reported. Investigation of landslides in this part is essential as there are considerable human settlements around this area including the Sabaragamuwa University of Sri Lanka. In this study, the anatomy of the Niyandigala landslide and peoples' perception of landslides were investigated with the participation of nearby residents of the landslide. Field investigations were conducted to demarcate the spatial distribution of the landslide, collect physical data such as transported material and measure attitude of planer structures of the bedrock. Catchment boundary of the Panniloya was delineated using GIS software. A Fracture lineament map of the landslide and surrounding area was prepared based on field data and aerial photo interpretation. Fracture lineament distribution of the Panniloya catchment and landslide direction were analyzed using Geo rose software. Rainfall received in Belihuloya area during the year was plotted and analyzed. A feedback questionnaire survey was conducted among fifty nearby residents of the landslide. The landslide initiated at an upper reach of the Panniloya catchment at an elevation of nearly 1250m (MSL). The axis of the landslide extends to 1.9 km in length. The main scarp is about 40m in length, and consists of highly weathered bed rock. Its depth varies about 15m-20m. Crown cracks were visible above the crown region. The width of the upper part of the body is 10-15m in width, and has a deeper slip surface. Width of the middle region of the body is 20-30m. Large sizes of rock boulders (2m-7m in diameter) were dammed closed to the Arannaya. This area is the widest (40 m-50m) place of the landslide and represents the lower region of the body. Toe is 0.6 km in length and 10m-15m in width. Toe consists with fine particles of debris. Belihuloya received 63.3 mm precipitation in the event day over 24 hours starting from 8.30 am. Fracture lineaments are mainly located towards the N150 E to N 300 E. Nearby residents of the landslide area show no proper knowledge about landslides risk. The landslide axis closely followed the direction of the lineaments. Niyandigala landslide is a debris flow which is slim, elongated and fracture controlled. The body of the landslide can be divided into three distinct upper, middle and lower regions. The 63.3 mm rainfall cannot be considered as the level of landslide triggering rainfall as those rainfall data fall outside the Panniloya catchment. The bridge on the Badulla-Colombo main road which crosses the debris path could have been damaged if the early damming of boulders did not occur. People's awareness should be developed by introducing an applicable disaster management plan.

Keywords: Debris, Fracture, Landslide, Rainfall, Soil