STUDY OF THE CAUSATIVE FACTORS FOR THE OCCURRENCE OF ILLUKPOTHA LANDSLIDE AT KALAWANA

CHAMINDI KUDAHETTY AND JAGATH GUNATILAKE

Department of Geology, Faculty of Science, University of Peradeniya

Extremely intense rainfall occurred on 17th May 2003 in the Ratnapura district of Sri Lanka triggered one of the worst natural disaster of the country in the recent past. As a result of the extreme rainfall, landslides and widespread slope failures took place in the hilly areas in the Ratnapura, Kalutara, Matara, Galle and Hambanthota districts. Total of 316 landslide have been reported in the Ratnapura district itself. Among these landslides, Illukpotha (Pothupitiya Kanda) landslide at Kalawana is the largest landslide occurred in the recent past. It covers approximately one square kilometers area and occurred as a debris flow, taking two paths along the existing valleys. This devastated landslide has been reported to be occurred on 17th May 2003 at 5.45 pm, killing 7 people and destroying 8 houses. This paper deals with the causative factors for occurrence of the Illukpotha landslide, which is located near the 21 km post on the Kalawana-Pothupitiya road in Ratnapura district.

The field investigation revealed that this debris flow occurred due to a combination of natural and man-made causes. The extensive precipitation of over 500mm per day (occurred within 7-8 hours of the day) has become the triggering factor of this landslide, which later converted into a devastative debris flow. Illukpotha landslide has been initiated due to the saturation of fault zones (N 70°- 80° E and N 40° W) at the crest of the landslide as a result of the extensive infiltration of this rainwater. The underlying geological formation (weathered garnatiferrous charnockitic gneiss with relatively thick clay bands and pegmatite), extensive joint systems (parallel to the above fault systems), fault planes with thin clay seams, slope angle (approximately 35°), and deeply weathered overburden (2-4m thick) were playing a major role.

The exposed bed rock along the slope shows the existence of complex folding structures associated with the axial area of the major Potupitiya antiform. General strike of the rocks (succession of charnockitic gneiss, granulitic gneiss, and biotite gneiss) is at East-West direction and except for the landslide initiation area, the whole debris flow is occurred along the dip slope. The landscape features identified on the pre-landslide aerial photographs provide evidences for the occurrence of historical landslide along the slope concerned. More over it was clear that the improper cultivation practices (cultivation of tea introducing horizontal drains in former forest land) on the steep hill slopes at this area, have further accelerated the infiltration rate. Therefore, it could be concluded that the fundamental causative factors for occurrence of the Illukpotha landslide were; continuous excessive precipitation within a short period of the day, existence of the faults, and prominent rectangular joint pattern, deeply weathered thick overburden and the change of land use from forest to tea cultivation.