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# An analysis of the mechanism of a reactivated basaltic landslide site under varying rate of displacement in Mauritius, Offshore Africa

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During the past 20 years, the continuous weathering of the soil on sloping areas has greatly contributed to landslide-prone geo-environment in Mauritius. Consequently, the landslide areas became a matter of interest for the government of Mauritius. This research has been focused on an existing landslide area namely Chitrakoot in Mauritius which is 1.8 $km^2$ and was monitored by JICA (Japan International Cooperation Agency) and Ministry of Public Infrastructure and Land Transport of Government of Mauritius from 2012 to 2015. In 2005, 54 houses and infrastructures were affected with the activation of the landslide and which further reactivated in 2006 damaging another 14 houses. During the investigation conducted by JICA's Experts, a landslide block of 300 m by 150 m in a highly populated zone was found to be unstable. To monitor the behaviour of the landslide, two extensometers were installed together with piezometers. The extensometers revealed that the unstable block kept moving after the event with accelerating movement during and after a heavy rainfall and cyclonic conditions. Moreover, the piezometers concluded that the groundwater rises above the ground surface in the rainy season.

To examine the mechanism of the reactivated landslide, disturbed samples were taken from the shear zone and were tested in the laboratories of Niigata University, Japan. The borehole core logging data obtained from 6 boreholes showed that possible sliding surface was observed in the colluvium layer consisting of gravels and stiff silty-clays, at depths from 6 to 10 m below the ground surface. Atterberg limits test for the soil showed that the soil had a liquid limit of 67.0%, plastic limit of 27.4 % and plasticity index of 39.26. The soil being of low plasticity possesses few inter-particle contact points and hence low shear stresses. Ring shear test was conducted under dry condition, fully saturated drained and undrained condition to examine the shear behaviour of the soil. Under the dry condition, the residual friction angle ($\phi$) and the cohesion (c) were found to be $18.8^o$ and 8.0 kPa respectively whereas, under the fully saturated condition, the residual friction angle ($\phi$) and the cohesion (c) were found to be $12.0^o$ and 5.0 kPa respectively. Ring shear test was conducted under increasing shear speed from 0.01mm/min to 0.3 mm/min to determine the mechanism of the accelerating movement of the soil. The rate effect test concluded that the soils showed positive rate effect as the stress ratio under faster shear rate was higher than the one under slower rate. Thus, under a high degree of saturation, the landslide will continue to accelerate with the generation of excess pore water pressure while shear resistance will be recovered at high speeds. Intermittent movement will be repeated with this type of mechanism.