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LANDSLIDE ANALYSIS - A CASE STUDY FROM NAWALAPITIYA

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A reactivated landslide in Nawalapitiya was investigated for its stability. Tensional cracks appeared in this area in 2014 indicating a creep, threatening to cause a landslide. In case, if this landslide happens, people inhabiting in the crown region are at a greater risk whereas it could also cause flooding if the displaced mass obstructs the flow of Mahaweli River.

Since October 2014, systematic monitoring of the landslide movement has started using three inclinometers, three piezometers, three extensometers and one pipe strain gauge installed at the affected area. Data obtained were monitored for eight months and extensometers and the pipe strain gauge data indicate that the slope failure occurs at the depth of 15.5 m from the surface in a circular path. Using, the obtained, fully specified slip surface, a slope stability analysis with a combination of back analysis and landslide modelling were carried out using the Morgenstern-Price method. Different landslide modeling scenarios were carried out for back analysis in order to determine shear strength parameters of the soil. Factor of safety for the landslide was determined under extreme pore water conditions. Triggering factors of the landslide site were determined comparing the displacement rate of the landslide masses, cumulative rainfall of 2 day, 3 day, 7 day and 30 day and pore water conditions.

Using the data obtained from the extensometers and pipe strain gauge, a fully specified slip surface was obtained and the moving rate of the landslide mass was determined. When considering the moving rate of the landslide mass, it can be categorized under extremely slow moving class and can be currently considered to be inactive and abandoned stage. The moving mass of the landslide can be divided into three regions; each with different displacement rates. Rainfall and the corresponding rise of the pore water pressure could be main triggering factors as the threshold rainfall of 150 mm for a 7 day rainfall event triggered the landslide. Therefore, reducing the water infiltration and lowering the groundwater level to arrest the movement by increasing the Factor of Safety is recommended.