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Failure Analysis of Khaliqabad Landslide along Mangla Reservoir Rim

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Abstract : After the Mangla dam raising in 2010, the maximum reservoir impoundment level of 378.5 m SPD (Survey of Pakistan Datum) was achieved in September 2014. The reservoir drawdown was started on September 29, 2014 and a landslide occurred on Mirpur-Kotli Road near Khaliqabad on November 27, 2014. This landslide took place due to the failure of a slope along the reservoir rim. This study was undertaken to investigate the causative factors of Khaliqabad landslide. Site visits were carried out for recording the field observations and collection of the soil samples. The soil was subjected to different laboratory tests for the determination of index and engineering properties. The shear strength tests were performed at various levels of density and degrees of saturation. These soil parameters were used in an integrated SEEP-SLOPE/W analysis to obtain the drop in factor of safety with time and reservoir drawdown. The results showed the factor of safety dropped from 1.28 to 0.85 over a period of 60 days. The ultimate reduction in the shear strength of soil due to saturation with the simultaneous removal of the stabilizing effect of reservoir caused the disturbing forces to increase, and thus failure happened. The findings of this study can serve as a guideline for the modeling of the slopes experiencing rapid drawdown scenario with the consideration of more realistic distribution of soil moisture/ properties across the slope

Keywords : geotechnical investigation, landslide, reservoir drawdown, shear strength, slope stability
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