Establishment of Landslide Warning System Using Surface or Sub-Surface Sensors Data

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Abstract : The study illustrates the results of an integrated study done on Tangni landslide located on NH-58 at Chamoli, Uttarakhand. Geological, geo-morphological and geotechnical investigations were carried out to understand the mechanism of landslide and to plan further investigation and monitoring. At any rate, the movements were favored by continuous rainfall water infiltration from the zones where the phyllites/slates and Dolomites outcrop. The site investigations were carried out including the monitoring of landslide movements and of the water level fluctuations due to rainfall give us a better understanding of landslide dynamics that have been causing in time soil instability at Tangni landslide site. The Early Warning System (EWS) installed different types of sensors and all sensors were directly connected to data logger and raw data transfer to the Defence Terrain Research Laboratory (DTRL) server room with the help of File Transfer Protocol (FTP). The slip surfaces were found at depths ranging from 8 to 10 m from Geophysical survey and hence sensors were installed to the depth of 15m at various locations of landslide. Rainfall is the main triggering factor of landslide. In this study, the developed model of unsaturated soil slope stability is carried out. The analysis of sensors data available for one year, indicated the sliding surface of landslide at depth between 6 to 12m with total displacement up to 6cm per year recorded at the body of landslide. The aim of this study is to set the threshold and generate early warning. Local peoples already alert towards landslide, if they have any types of warning system.
Keywords : early warning system, file transfer protocol, geo-morphological, geotechnical, landslide
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