Evaluation of selected landslides of Muzaffarabad persuaded by earthquake of October 8, 2005.

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Abstract

Landslide, entitles the forward, outward and downward movement of the slope constituting materials (soil, rock, fill or combination) under the action of gravity, along a peculiar identifiable surface of failure. The individual slope failures generally are not as outrageous as other natural calamities e.g. earthquakes, major floods etc, but they are more voluminous and the economic loss due to slope failures is significantly greater than that for any other single geologic hazard. Such a natural catastrophe, poses an earnest threat to the population dwelling in the mountainous regions. Landslides are quite recurrent in the northern part of Pakistan, stretching over the mountainous regions of Himalayas, Karakorum and Hindukush. With the appropriate evaluation, analysis, design, and construction, slope stability problems can be subdued to a great extent.

This study incorporates the area of Muzzafarabad city, accentuating upon two landslides; Landslide A (Behind Dam Office, Muzaffarabad; 32° 20′ 84" N, 74° 22′ 41" E) and Landslide B (Jehlum Valley Road near Subri; 32° 20′ 84" N, 74° 22′ 41" E), as the case study. These landslides were triggered by the annihilating earthquake of Oct. 8, 2005, which struck the area of Northern Pakistan and Azad Jammu Kashmir. The appraisal of the regional geology and the tectonic settings of the area, including the structures located in its close proximity was carried out. Along with that, stratigraphy of the area ranging from Pre-Cambrian to Quaternary was also taken into account. The landslide inducing mechanism i.e. earthquake, rainfall, rapid water level fluctuations and the engineering characteristics etc of the entailed slope material were evaluated in detail. The field data were collected during the study, encompassing the landslide classification, characteristics, geometry, mode of failure, physiography, natural slope conditions, slope constituting material and its engineering parameters. On the basis of the slope failure inducing factors and the natural slope parameters, appropriate mitigation measures were formulated. The relevant stabilization measures focused upon curtailing the destabilizing forces and enhancing the resisting forces (e.g. improved drainage, demarcation of the buffer zone, shifting of the cultivated areas away from the crown, construction of the retaining walls and some other structures) were suggested for the project area.