INITIATION AND FAILURE MECHANISM OF ROCK FALLS ALONG THE KARAKORAM HIGHWAY (BESHAM-CHILAS SECTION)

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Abstract

Nowadays, rock fall has great importance due to its inclusion in China Pakistan Economic Corridor (CPEC). Rockfalls in addition to other slope failures are major threats to safety of travelers along the KKH. In this study, we try to analyze the initiation and failure mechanism of the rockfalls along Besham-Chilas section of the KKH. It passes through porphyry granite and gneisses of Indian plate and then through ultra-mafics and mafics of Kohistan Island Arc. Steep slopes and deep gorges characterize this section prone to rockfall hazard. Presence of multiple joint sets with an adverse impact on slope stability have preconditioned to ongoing rock falls. Furthermore, intense rainfall triggers these rock falls. We mapped twenty five rock falls along this section. A detailed field survey was conducted to acquire all necessary parameters to explain initiation and failure mechanism of these events. Precipitation and temperature data was obtained from the Climate Forecast System Reanalysis (CFSR) to determine rainfall as possible triggering factor. Kinematic analysis were performed on Dips 7.0 for each rockfall events. According to the results, rainfall triggered most of the rockfalls in the study area. Based on kinematic analysis, wedging and planer failures are dominant failure processes between Besham and Chilas section. Whereas, toppling is an important failure mode between Pattan and Sazin. Furthermore, stress release joints with short persistence in the Chilas Complex are responsible for hazardous rock falls of huge blocks (6m3) between Dynter Valley Bridge and Sazin.