

Project Title: Investigations on the development of hybrid energy absorbing cushion system for minimizing rockfall induced impact forces

Abstract:

Rockfall on slopes always poses potential threat to the safety of people and infrastructures. Though constructions of rockfall protection shelters were considered an appropriate solution, still there is a lack of understanding on rock mass-structure-sand cushion interaction which was mainly due to the impact and rebound characteristics of the detached falling rock mass. Considering rockfall induced impact response, geotextile in-filled sand bags have been developed in this study as a confined energy dissipation member against rock fall conditions. Using scaled down model structure, the performance of geotextile in-filled sand cushioning systems against impact forces were evaluated and compared. Additionally, the study specially used 2D Digital Image Correlation technique for displacement, strain estimation and force calculation measurement on the structure and geotextile in-filled sandbags due to rock fall impact. The observations proved that provision of geotextile in-filled sand bags over the structure showed 99% energy dissipation against impact load and can be an alternative to conventional sand cushioning layer with minimum additional load on the rock fall protection system. Also, 2D DIC monitoring was found reliable in impact application studies for estimating force and displacement measurement.

Objectives: Development of hybrid energy attenuation system for rockfall protection shelter.