

MUDAQIQ Amin (2017) : Rockfall risk analysis along road cantonal between Aigle and Le Sépey

Abstract

This study aims to identify the risk of rockfall alongside a road on a regional scale. On first step, rockfall source areas was identified, using slope angle distribution (SAD) procedure and then it was cross checked with orthophotos and field observation. Later, three software 1) CONEFALL (Jaboyedoff, 2003) 2) Flow-R (Horton, et al., 2013) and 3) Rockyfor3D (Dorren , 2015) were used to investigate the maximum possible of runout distance of rockfalls. Except CONEFALL, the two-other softwares provide the reach probability of rockfall to the road, made it possible to analyze the rockfall risk alongside the road.

The study area is mainly covered by a forest, and the effect of the forest on rockfall propagation have been tested by help of Rockyfor3D. To define the characteristics of forest (DBH and forest density), field observation and a software called FINT (Dorren , 2014) were used. The results of the study showed that forest has a big protective effect on rockfall propagation specially on big and medium size of rocks.

On the study area of Aigle, it was not clear to find a rockfall whit a distinct source areas to calibrate rockfall propagation using Rockyfor3D, to solve this problem another similar site was chosen (Frenieres sur Bex) and the position of rocks based on their volume were marked by GPS, then calibration was done on this area and parameters were changed to correspond the observed rocks positions on the field. Parameters used for simulation in area of Frenieres sur Bex were used for rockfall propagation in Aigle area.

For validation of the results from Rockyfor3D, two other softwares were used 1) RockforNET (Berger & Dorren , 2007) and 2) RocFall (rocscience, 2017). RockforNET showed that the protection effect of forest can stop the rocks with 5 m³ volume, confirming the simulations results from Rockyfor3D, and RocFall results for maximum possible of runout distance were corresponding the results from simulations done by Rockyfor3D.

Risk analysis along road showed that small rocks cost more than the medium and big rocks per year, and risk of driving heavy cars is higher than driving motorcycles or normal cars on the road between Aigle and Le Sépey.