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Rockfall hazard evaluation and risk management: an example of a comprehensive approach in northern Italy.

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In the context of slope instability phenomena, the detachment of blocks from steep walls —and their ensuing free fall, bouncing and rolling along the slopes— account for 40% of landslide occurrences in Alpine areas (Cocco, 1991).

This phenomenon, also known as rockfall, occurs in densely populated area such as the Italian Alps, where the hazard is quite high due to the presence of several buildings and houses.

We have chosen to assess the risk posed by potential rockfalls in an area hosting a small industrial complex close to a steep limestone slope. To this aim, a comprehensive set of geological, geomorphological and geomechanical surveys were conducted both in detachment and transit zones.

The study area is located in the Carnic Alps, in proximity of a small stream —torrent Vajont— at a height of 800-1300 m.

Besides the industrial shed located close to the slopes, the zone under consideration also hosts a large parking area, trunk road 251 which links the Vajont valley and Longarone, and a protection structure upstream of the parking area. All these facilities are located in a small gently rolling terrain (Frasen Plain). The terrain was formed by the materials that filled a basin which, in turn, originated from the Vajont landslide (1963).

Landslide scars are located at a distance of 200 m. from the parking area. These scars were evaluated using the Q system to define susceptibility to rockfalls. The transit

areas were the object of detailed surveys which involved both fallen blocks and materials present along the slopes. These analyses, combined with airborne and terrestrial laser scanning surveys, permitted to identify 12 possible trajectories.

Along these trajectories, rockfall simulations were performed by means of RocFall —a statistical analysis program— to determine maximum run-out distances, bounce height and velocity along the slopes.

In the last phase, a RES method adjusted to account for rockfalls was used. This method —which was developed by the University of Milan (Cancelli and Crosta, 1993)— was used to integrate simulation results with geological and geomechanical parameters, so as to appraise hazard and specific and residual risks in the study area.

The presence of the trench and of the embankment reduces the hazard to the area to an acceptable level.

The approach used, which integrates a quantitative analysis (RocFall) with a mainly qualitative one (RES), proved a comprehensive method to evaluate and quantify all the aspects that rockfalls involve. Furthermore, this method can be easily used —in the form of thematic maps representing hazard levels and maximum run-out distances— also by non-experts such as the public administration staff to promptly identify risks and any need for mitigation works.

Reference

Cocco S. (1991), “Frane di crollo-definizione dei coefficienti di dissipazione dell’energia”, in Studi Trentini di Scienze Naturali, Acta Geologica, Vol. 68/2.

Cancelli A, Crosta G.B. (1993), “Rocfall hazard and risk mapping”, Proceedings 7° International Conference and field workshop on landslides.