

Pentes instables dans le Pennique valaisan

MATTEROCK: une méthodologie d'auscultation des falaises et de détection des éboulements majeurs potentiels.

Abstract

This program was born in the Mattertal and the Saastal which are among the most exposed valleys to stonefall and rockfall in the Swiss Alps. The large Randa Rockslide (30 million cubic metres) indicated that neither scientists nor the Canton were in a position to foresee such an event. Since then, it has seemed to be of top priority that the Swiss National Research program NRP31 attempted to fill this gap by developing an auscultation methodology of the cliffs named MATTEROCK. As far as putting it in perspective with climatic changes is concerned, it would appear that there was far from sufficient development at that time when mobilisation mechanisms for this type of emergency were not even correctly apprehended.

Assuming the axiom that there is no rockslide without discontinuity, it consists, at first, of establishing a structural pattern of the cliff, then confronting it with the local topography. Thus, cliff compartments favourable to slide or topple are identified under the name of HAZARDS. The allocation of a degree of dangerousness enables definition of the probability of mobilisation of a hazard in terms of the volume of rock liable to a process of slow and irreversible degradation. Combined with a numeric model of land, statistical and probabilist methods have enabled the project to draw up automatically hazard maps. They are new procedures with considerable possibilities of progress.

The DANGER map generated by hazards has become an indispensable tool for development planning in mountain regions. Federal recommendations advocate qualifying the degree of danger from the intensity and the probability of occurrence of the event by attributing a temporal connotation. However, the unsuitability of treating the probability of occurrence in terms of frequency - as is the case with hydrological dangers - originates from the assumption that all rockslide of a certain importance will not be reproduced at the same place. MATTEROCK claims that probability of mobilisation of hazards (or dangerousness) and probability of reach (by the blocks) of site to be protected are, on the whole, determinants in the subject of CLIFF danger.

At this stage of development, the methodology suffers from a lack of homogeneity, notably in that which concerns geomechanical aspects for which available models are limited to a few particular configurations. The continuation of the MATTEROCK program has the objective of developing the procedure of the « structural pattern-topography » application with the perspective of being able to treat all the discontinuity families and to consider the geomechanical aspects simultaneously. The aim is to provide the pratician with an expert system allowing him to determine in probabilist terms the propensity of cliff to produce a rockslide.

REFERENCE

ROULLER J.-D., JABOYEDOFF M., PHILIPPOSIAN F., MARRO Ch. (1998): Pentes instables dans le Pennique valaisan – une méthodologie d'auscultation des falaises et de détection des éboulements majeurs potentiels. Rapport final du PNR 31. Edition VDF