ANALYSIS OF PROTECTION BARRIERS FOR ROCKFALL RISK MITIGATION

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Within the context of rockfall risk mitigation, the research addresses the non-linear and dynamic response of falling rock protection barriers, metallic structures designed to intercept and stop block moving along an unstable slope.

The research group has been working on this topic for the last fifteen years focusing on both physical and numerical aspects of the phenomenon. Studies have first focused on full scale testing of flexible falling rock protection barriers characterised by high energy absorption capacities (from few hundreds to more than 5000 kJ). Tests were carried out at the test site located in Fonzaso, in Italy, thanks to the fruitful collaboration with the Consorzio Triveneto Rocciatori and the Officine Maccaferri. Results of these tests provided a rich database, which the research group has successfully used for the development of several non-linear and dynamic FE models. These numerical models, calibrated and assessed based on the experimental results, has then led to the development of a general and efficient strategy for the numerical modelling of these structures. The strategy now enables to:

1) Perform relevant analyses to investigate the response of these structures in any boundary impact condition as a tool to aid the design of both structures and intervention plans.
2) Explore the response of these structures when damaged from a previous event.
3) Investigate the response of other structures so far not adequately studied, as it now happens with structures with comparatively lower capacities (less than 200 kJ) (Fig. 1).

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- University of Newcastle and Centre of Geotechnical Science and Engineering (NSW, Australia, http://cgse.edu.au)
- Université Grenoble Alpes, Irstea, UR ETGR and UR EMGR St-Martin-d’Hères (http://www.irstea.fr/lнститут/нос-centres/grenoble)

Fig. 1. FE analysis of existing semi-rigid rockfall barriers (drawings by Govoni)

Fig. 2. Effects of the size of the impacting block on the structure response (drawings by Govoni, picture courtesy of PAB)
MAIN PUBLICATIONS

RESEARCH PROJECTS
Research and consulting contract with Consorzio Triveneto Roccia, Belluno, Italy (2006-2008). Investigation of the behaviour of falling rock protection barriers from the results of full-scale impact tests. Scientific Coordinator: Guido Gottardi.


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