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# Large-scale Testing of Rockfall Protection Galleries

K. Schellenberg (1) and A. Volkwein (2)

(1) Swiss Fed. Inst. Techn. ETHZ (kristian.schellenberg@ethz.ch), (2) WSL Swiss Federal Research Institute (volkwein@wsl.ch)

Protection galleries are important structures to reduce the risk caused by falling rocks. The aim of the tests described in this contribution is to gain experimental data to improve the design methods for rock fall galleries.
A series of rock fall impact tests on six reinforced concrete slabs with a cushion layer consisting of compacted gravel was performed in a scale of $1:2$ to a typical rockfall gallery. Concrete cubes of $800\ kg$ and $4000\ kg$, respectively, were dropped with different free falling heights varying $2..15\ m$ until failure of the slabs was reached.
The relevant data to describe the dynamic processes in the structure are the measured reaction forces at the supports, the accelerations in the boulder and in the slab as well as the strains at the upper slab surface and in the reinforcement. In addition the impacts were recorded by high speed cameras.

The concrete slabs had the common dimensions $3.5\ m\ \times\ 4.5\ m$ with different thickness ($0.25\ \&\ 0.35\ m$) and sometimes additional shear reinforcement. One side of the slabs got line-supported the opposite corners were single support.
For the tests $0.40\ m$ gravel is used as a cushion layer. The cushion layer is kept in place by a steel mesh cylinder with a diameter of 3 m. Considering a load spread angle of about $45°$, the influence of the steel mesh on the behaviour of the cushion layer should be negligible. In order to avoid the cushion materials to penetrate the mesh, a geo-textile is applied.

It can be shown that the test setup produces reliable results. The obtained data is very detailed and allows for an extensive analysis describing the rock impact, the behaviour of the cushion system and the interaction between impacting boulder and concrete slab.