# Optimisation of cushion materials for rockfall protection galleries



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#### OPTIMISATION OF CUSHION MATERIALS FOR ROCKFALL PROTECTION GALLERIES



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Vdf Hochschulverlag AG Nov 2007, 2007. Taschenbuch. Condition: Neu. Neuware - Rockfalls of various magnitudes occur regularly in mountainous regions and Switzerland is no exception. Protection galleries made either of reinforced concrete or pre-stressed concrete members, with a cushion material laid on top, could be used more efficiently to prevent rockfalls that lie within the prevalent range from damaging infrastructure and lifelines. This requires greatest care in developing the general concept of design and construction, considering the ductility requirements of the structure and the selection of material for the energy absorbing cushion layer. Currently, design of the gallery in Switzerland is dependent upon the impact force selected as the 'action' and the corresponding penetration depth of the falling rock into the cushion material with design limit of 3 MJ. Main aim of this research is to increase the efficiency of energy absorbing capacity of the rock protection galleries using standard and new cushion materials while improving the existing design methods. This work on cushion materials for rockfall protection galleries is divided into experimental, numerical and analytical modelling of a rockfall event at prototype energies. Prototype energy scenarios are simulated in the centrifuge using small-scale models, which are exposed to enhanced gravity to replicate a full-scale event, by taking advantage of wellproven scaling laws. Impact energy conditions are varied (up to 20 MJ) and detailed impact force and stress distributions on top of a gallery are measured using state-of-the-art measuring units under defined boundary conditions. A systematic variation in the system parameters such as mass, fall height, impact angle of the rock boulder, type and thickness of the cushion material and finally the type of construction of the cushion material are carried out. New ideas for cushioning materials for damping the impact on top of the galleries are also investigated. Laboratory...



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