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Innovative use of geosynthetics for near nature construction measures

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The construction works in the high mountains needs special attentions on planning, construction, materials and methods. Especially for the protection works against rock fall, boulders fall and snow avalanches, the construction cost, availability of material, limited construction time and safety aspects are major influencing factors for the planning and execution of works.

In this paper, two examples of protection works with the innovative use of geosynthetic are presented. In the first example, a rock fall protection dam and in the second example, an avalanche protection/diversion dam in Tyrol, Austria is presented.

Two rock fall check dams each with a height of 25m and base width of 80m were constructed. The both check dams were partially reinforced with geotextile, with which it was possible to make it steep, which finally reduced the quantity, enlarged catchment's volume and saved the construction cost. Locally available grass and bushy vegetations were planted on the valley side of the dam slope.

In the course of planning a diversion dam for snow avalanche in Lanersbach, Tyrol, it was thought that the protection structure should fit well into the surrounding natural environment as far as possible. For this purpose, the valley side of the 10 m high reinforced concrete retaining wall was covered on the side with a geosythetic reinforced green earth layer. Locally available grass and bushy vegetations were planted on the valley side of the slope. The both edges of the slope were protected with boulder pitching.

The use of geotextiles in retaining structures is advantageous. Due to the ductile behaviour of the soil-geotextile composite, the kinetic energy from the moving rocks or boulders can be easily dampened. For this reason, the local plastic deformations resulting from high impact of boulders will have negligible effects on the overall stability of the retaining wall. Through a selective choice of dryness resistant plants, lasting greenery on the slope can be ensured.