Developing and applying of natural wood wool for the slope stabilization

Summary

The internal stability of slopes and scarps is ensured by inner friction between the layers in normal soil conditions. Heavy rainfall has a destabilising effect, because the pores in the soil structure become saturated with rain and the cohesion between the grains is reduced. A disruption of the balance of forces can lead to landslides and slope slumping. Functional vegetation protects from soil erosion and helps to stabilise the slope by acting positively on the water budget. There are numerous field solutions, which can be used to prevent soil erosion.

The aim of one of these field solutions is to cover the soil surface with, for instance, erosion control mats or geo-textiles, which offer temporary protection. Wood wool mats or fleece are an ideal protection against surface erosion, because they store the rainwater on the slope surface and promote rapid plant growth. Once a dense network of roots has formed less rainwater seeps away into the subsoil. Protecting against erosion with wood wool greatly reduces or even temporarily eliminates the cause of disintegration and decay of slopes in mountain ranges.

Using wood wool to protect against erosion is a possible solution, which has been supplanted in Europe and Switzerland by the boom in the use of synthetic materials. Therefore, knowledge about the suitability of the various native types of wood for use in wood wool products for the construction industry has been lost. In collaboration with the Lindner Suisse Company from Wattwil the Institut für Bauen im alpinen Raum (IBAR) [Building Institute for the Alpine Region] at the Chur University of Applied Sciences is trying to re-establish the knowledge base for erosion protection using wood wool in Switzerland and Europe. In the last two years several projects have been set up using wood wool mats. The initial pilot project is located in Wattwil with the support of the St. Gallen Cantonal Land Improvement Department. The test area has shown that wood wool stabilises mineral soils and soils with a low organic content and encourages seed germination. Therefore, it offers huge potential for planting green plants and securing steep surfaces with critical gradients. It is immediately obvious that, by using certain species of wood, a new purpose has been discovered for native deciduous timber, which otherwise can sometimes be difficult to market. It is important for practical everyday use to respond to questions about how to install this type of protection. It may, however, be assumed that there are no major differences between the use of this material and of other materials based on the same concept (jute nets and cocoa matting).

Trials in the field laboratory show realistic values, which are comparable with similar material from the USA. The field trial shows that planting green plants on a slope with native woods can be successful. Admittedly, the diverse factors, which may influence the results of the trial, have not been recorded. These must be more closely investigated in a follow-up project. Furthermore, a way of fixing the fleece must be investigated.

Keywords

erosion control, surface erosion, slumping, slope stabilisation, geo-textile, erosion control mats, wood wool fleece

Compleat summary of the study: natural wood wool for the slope stabilization

Abb. 31a: Aus dem oberen Drittel der Matte

Abb. 31b: Aus dem unteren Drittel der Matte

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