Geophysical Research Abstracts, Vol. 9, 06394, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06394

Effects of plants in vegetative crib wall- results of pore water pressure and soil moisture measurements behind a vegetative crib wall

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A crib retaining wall is a structure built up of individual elements to form a series of box-like cells into which soil material is placed. In a vegetative crib construction, in addition to soil material, live cuttings or rooted plants are placed in between two crib layers. The inserted plants and the fill material act as an integral part of the structure together with crib elements. In the present work, wooden logs are used as crib element and live cuttings are used in between two crib layers. These walls are therefore called live crib walls or live reinforced crib walls or vegetative crib wall, which is a kind of soil bioengineering wall.

There are various factors associated with a living plant which grow on the slope and it has its influence on the shear strength of soil and the slope hydrology that affects the overall stability of a slope or embankment. The net effects of plants on the slope stability can be divided into two groups: mechanical and hydrological effects. For the calculation of safety factor of a particular slope or embankment at any time in future one should be able to quantify these effects at that point of time.

There are no exact methods to calculate the increase in shear strength of soil due to existence of plant on the slope. Such calculations are primarily based on the experimental data and empirical calculations.

The soil moisture and sub surface water play a vital role in the stability of a slope. Therefore in this work, field measurements of different soil-water related parameters like pore-water pressure and soil moisture are carried out. The field measurements of

soil moisture and pore water pressure behind the wall (within the fill material) are carried out in an embankment supported by a vegetative crib wall. Nine tensiometres are placed horizontally in three different levels in a 5m high vegetated crib wall constructed in Sattlebergstrasse, near Unter-Tunnelbach in Lower Austria. Soil moisture is measured using four TDR (Time Domain Refelctometres) sensors. The data are measured in every 30 minutes intervals. The results of these measurements are presented in this paper.