Geophysical Research Abstracts
Vol. 15, EGU2013-7472, 2013
EGU General Assembly 2013

Analysis of slope stabilization by soil bioengineering method

Barbara Maria Switala and Wei Wu

Institute of Geotechnical Engineering, University of Natural Resources and Life Sciences, Vienna, Austria, barbara.switala@boku.ac.at

The aim of the project is to create a numerical model which will include the impact of vegetation on the slope stability analysis, considering both mechanical and hydrological factors.
This will enrich the current knowledge about how roots reinforce the soil layers on the slope and how it influences the increase of shear strength of the soil. This has to be combined together with hydrological effects caused by evapotranspiration: modified soil moisture regime, dissipation of excess pore pressure and established matric suction.
Coupled analyses (mechanical and hydrological) are rarely conducted, or only outdated models are used, which leads to overestimation of the additional shear strength of soil. That is why there is a need to support this branch of landslide hazard assessment and develop a new model. This research will help to raise awareness, that soil bioengineering methods of slope stabilization can in some cases be more appropriate and less expensive than traditional methods.
As an input to the model, the appropriate slope geometry and soil properties have to be chosen. It is also important to consider different plant types and root properties, as well as different levels of groundwater table. To assess the effect of evapotranspiration it is necessary to know the geographical location of the slope and the weather conditions in the chosen region.
The final output of the model, which will help to quantitatively assess the impact of vegetation on the slope stability, is the factor of safety (FOS) for vegetated slope for different types of soil and degrees of saturation. Results may then be compared with different conditions and factors of safety, calculated for the corresponding non-vegetated slope. It will be possible to specify the most favorable and unfavorable conditions. Moreover, the calculations provide also information on changes of cohesion, caused by mechanical and hydrological effects, as well as the change in the friction angle of soil.