



Influence of the forest on slope stability with different forest felling condition

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Forest is among the best land use for slope stability as well as environmental conservation. It reinforces not only the slope surface against the surface erosion but also the soil layer to control shallow failures. The effect of roots in slope stabilization emerged into the spotlight with only a few considerations on negative effects of forest load. The portion over the slope surface i.e., their trunks and canopies, act as surcharge load for slope stability. Although roots have no effects on deep slides that sometimes appear with heavy rainfall and severe earthquakes, these negative effects have seldom been examined. Hereby, assessments of slope stability with forest surcharge have to be taken in order to ensure the slope stability analysis when it comes to planning countermeasures of landslide. Three different types of forest slope (two conifer forests and a broad-leaved tree forest) in same geology were chosen as test slopes in this study, and analyzed the factor of safety "Fs" by non-circular slip surface analysis (Janbu method) with different forest felling types, i.e., no felling, and 50%, 80%, 100% felling from the top of the slope. Consequently, it is found that there are some cases in which its effect reached up to approximately 4% of their safety factor in case of deep landslides. Notwithstanding this result, it is found that the 50% felling from the top makes sufficient improvement on the slope stabilization in some slopes. However, almost cases, the forest surcharge was found to be virtually harmless to the slope stability even with severe seismic forces. On the contrary to that, according to the same stability analysis for the shallow landslides, the root system of forest reinforces the soil strength and stabilizes the slope in terms of "Fs" up to 2.5 or 2.6 times safer than the deforested slopes.