Collapse prevention force of forest root systems in mountainous steep slopes

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Though traditional methods of thinking for slope stability with forest root systems have been used for two-dimensional soil layer, it evaluated to only vertical root systems. Slope collapses occur three-dimensionally. On the analysis of slope stability, it is necessary to evaluate the horizontal root systems. This report shows that the collapse prevention force (C, kN/m²) of the horizontal root systems as the cohesion value in Coulomb's equation in the various species, various stand density, and various age of forest. Calculate method of C is summarized the pulling force for root diameter in vertical one square meter of soil layer. The smallest point of C in the artificial Hinoki forest and Larix forest is the center between two stands. The C in the saturated soil condition is 70% of the ordinary condition. The C changes for tree species, stand density. Thinning makes C value twice as large as the no thinning. Three-dimensional analysis for slope stability shows the horizontal root systems is up to 0.2 for the rate of slope stability in the saturated soil condition. Maximum C for stand density is about 900/ha.

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