

The making method of two dimensional distribution map of the collapse prevention force with tree survey

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The collapse prevention force of the forest root system is a grand total of the pulling out resistance of each root per vertical cross section (1m^2) of soil layer. The pulling out resistance of root (T, N) shows a following equation using root diameter (D, mm), $T=aD^{1.6}$, varies in the coefficient by a tree class. The quantity of root system is distributed concentrically from the tree center and decreases for distance from tree exponentially.

Here I propose the two dimensional distribution map of the collapse prevention force with only the ground information of tree survey, breast height diameters and distribution of trees.

I performed an investigation that each in 3 Hinoki artificial plantation stand and 1 natural broadleaf forest, and made a two dimensional distribution map of the collapse prevention based on the tree positioning and the diameter of trees at breast-height. And I compared which I got by investigating every tree and compared the outcome of maps and the actual measurement that I dug a trench. As a result, the estimated values and the actual values did not exactly match, however a very meaningful relation was seen in both value within 1% of the risk ratio.

Furthermore, I applied this method and estimated a chronological order change of the collapse prevention force. Because the data required for estimating the ability of collapse prevention are only positioning of the trees and diameter measurement at trees breast-height, I can even estimate a change in the result after thinning, by using it in conjunction with the growth prediction by the density management curve.

Keywords: root system, collapse prevention force, artificial plantation, natural forest, two dimensional distribution map