

Contribution 45 in session “Forest operations: environmental concerns and natural hazards“

Tree damage in mechanized uneven-aged selection cuttings

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The amount of selection cuttings in uneven-aged stands is supposed to increase in Finland with the new Forest Act. In uneven-aged management it is estimated, that the cutting could be repeated every 15-20 year with the removal around 100 m³/ha. This interval and volume highly depends on survival of lower canopy trees in cuttings. The number of these trees (2.5 – 15 m in height) is typically limited. Felling larger trees from above means a high damage risk for smaller trees and also restricts the harvesting outside the heavy frost period due to top damage risk.

Damage to trees higher than 2.5 metres was studied in three selection cutting stands. Mechanized harvesting (harvester-forwarder) was carried out in late winter with no frost, which is optimal time for selection cuttings. On the average 21.5 % of the remaining trees was damaged. The percentage of damage with smaller (2.5-10 m) trees was highest, 28.4 %. Stem damage Distance from the nearest removed tree, harvested basal area within 25 m of the tree and tree size were the statistically significant factors in the model of the probability of injury. With a classification threshold of 0.5 for the fitted injury probabilities π_i , the rate of correct classification was 78.5 %.

gaps and breakage were the most common types of injury.

There is need to develop the best working practices for mechanized selection cuttings. Information on the stand structure, practical operator tutoring and knowledge of the goals of forest owner are needed for successful harvesting implementation.