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LONG-TERM IMPACTS OF GROUND SKIDDING ON STANDING TREES: ASSESSMENT OF DECAY USING STRESS WAVES

Davoud Kartoolinejad^{1*}, Akbar Najafi², Saeed Kazemi-Najafi³

¹Department of Forestry, Faculty of Desert Studies, Semnan University, Semnan, Iran

²Department of Forestry, Tarbiat Modares University, Nour, Mazandaran, Iran

³Department of Wood Science and Technology, Tarbiat Modares University, Nour, Mazandaran, Iran

Abstract

Timber harvesting and log extraction with conventional ground-based skidding systems in steep, mountainous terrain often results in severe damage to residual stands and forest sites. In this study, the impact of rubber-tired skidders on standing trees along sides of the trails was investigated 5 to 20 years post-harvest in terms of frequency and development of decay at the points of wounding. The study was located in the Hyrcanian mountainous forests of Iran. All standing beech trees (healthy or wounded) were evaluated on both sides of the skid trails; four age classes (determined in relation to time since logging) were selected in chronosequence over 20 years (four 5-year classes) in a managed forests. Stress wave velocity was tested in three directions (on wound, perpendicular to wound and longitudinal directions on trunk) of each standing tree located along sides of trails to characterize the trunk decay. In order to compare the results with a reference wave velocity, 20 healthy beech trees were selected in a non-harvested area. Totally 205 standing beech trees were investigated using stress wave. Results showed that more than 75% of the standing trees located up to 1.5 m from both sides of the skid trails had been injured by skidding operations. Among these, about 24.8% had been decayed as a result of wounding. Most of the decayed trees were observed down slope along the trails and also on both sides of the curves. The percentage of decayed trees and decay intensity were boosted with increasing the age of skid trails from 10 to 20 years. However, traffic intensity had no effect on tree decay. Based on the results of this study, durable injuries were produced on standing beech trees in areas affected by skidder movements; however, many of these injuries were easily prevented.

Keywords: beech tree, decay, Hyrcanian forests, skidding impacts, standing trees, skid trails

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* Author to whom all correspondence should be addressed: e-mail: kartooli58@semnan.ac.ir; Phone/Fax: +98-23 3333 54 04