

Cableway logging operations and residuals harvesting: cases study in windthrow areas in the Eastern Alps - Italy.

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In the last years many devastating windstorms occurred in Central Europe have highlighted the vulnerability of our forest. Forest damage is an important economic issue at a country level especially in particular areas where the value of the wood is high.

This paper describe some studies carried out in the Italian Eastern Alps where different logging system were applied in windthrow trees conditions.

Cableway logging extraction systems were applied in different sites in Trentino Alto Adige to harvest windthrown trees.

The use of helicopter was needed to assembly the skylines. Working times and productivity were collected.

According to the harvesting system chosen and the tree diameters the equipment needed for cross-cutting long logs or for further processing was selected and the Full Tree System and the Tree Length System were applied.

When the whole-tree method was applied, a wood processor was used and different chipping machines have worked to the landing to harvest residuals. Logging residue represents moreover an important wood source that can be exploited for energy purposes: hence the interest for new technologies that can reduce the cost of recovery and increase the share of logging residue within economic reach. There is a general interest to streamline the recovery of logging residue, which demands specific knowledge. This is particularly important for the Alps and temperate Europe in general, since much of the knowledge currently available has been generated in the Nordic Countries, under very different work conditions.

Logging residue originates from tree processing into traditional assortments, such as sawlogs and pulpwood. Processing can be conducted at the stump or at the landing, if whole trees are extracted. The latter case offers the advantage of concentrating residue, thus making recovery easier. On the other hand, residue left at the stump can always be collected and forwarded to a landing after processing.

Here production costs of full tree vs. cut to length harvesting have been analyzed along with three recovery alternatives for logging residue, identifying the conditions that make one preferable to the others. Spreadsheet models based on experiments are presented, which return the delivered cost of wood and biomass harvesting as a function of working conditions and costing assumptions. Chipping, bundling and transporting loose uncomminuted residue are all viable options, and they are indeed applied on a commercial scale in several Countries, including Italy. Transporting loose uncomminuted residue is the simplest method, which avoids investing in costly equipment. However, this system is constrained by the difficulty of fully exploiting vehicle payload: it is not suitable to the handling of fine slash, and is preferable only over short hauling distances. Chipping at the landing is technically the most effective method, but it requires close co-ordination of the transportation fleet.

Keywords: windthrow – cableways – processor – logging residue, chipping, delivered costs