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Recovery of logging residues from final harvest in steep terrain

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Cable cranes systems used in steep terrain generally results in higher extraction costs than ground-based systems, but biomass tops and branches yarded intact on logs may have little or no incremental extraction costs. However landings on cable units are often quite small and the area available for accumulation of residues is limited. In three different studies the amount of logging residues produced from final harvest in steep terrain and quantitative information about transport were studied. Because we measured the tree biomass it was also interesting to compare the measured biomass with existing biomass functions which are based on easily measurable tree variables like diameter and height. The amounts of logging residues from three different stands were in the range of 20–28 % of harvested log volume. The amounts of residues were estimated to 2.7 tons of dry matter per hectare.

Normally logging residues will be cleared away from the road and deposited in the immediate vicinity of the roadside or landing site. The study showed that there were a difference in the normal clearance of logging residues and stacking of logging residues in piles by the road. Regular removal of logging residues took 15 seconds per tree, while stacking logging residues took 23 seconds. This did not affect the production negatively, as the processor had to wait for new trees that were winched from the stand.

In this study, logging residues were transported with a conventional timber truck with frames. Four loads were studied and the average load weighing 6.4 tons. It cost about 48 Euro per tonne of dry matter, or 11 Euro per MWh to transport the load 50 km. The small loads make that the costs are very sensitive to transport distance. If the transportation distance is reduced to e.g. 10 km, the transportation costs are reduced by approx. 70 %. Better adapted equipment, especially a grab for log and logging residues will probably also increase both the loading speed and load size, and thus lower the cost of transporting logging residues.