# ASPECTS REGARDING THE REDUCTION OF COSTS FOR THE STAND TENDING WORKS (CLEANINGS) IN THE MONTANEOUS AREA

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#### Abstract

In this paper some aspects regarding the reduction of costs for cleanings in the montaneous area and the main factors that interfere with the value of the labour necessary for the execution of this works according to the volume to be extracted, slope and species group are presented. The calculi have been done according to the unified labor standards in the forest works, respectively to the time rules.

Key words: cleanings, strips, intensity of tending cuttings, minimum expenditure.

#### INTRODUCTION

According to the technical Norm no. 2 from 2000, by cleaning – we understand the tending work with a negative selection character applied to the stands in the thicket stage with the aim of improving the quality, growth and composition of the stand, by extracting badly-formed, damaged, sick, dying or dry, crowded and invaded trees or belonging to some species or genetic forms less valuable that don't correspond to the management objective and ecologic requirements.

The trees are cut down and the resulted material is capitalized according to the present regulations.

Some works will be performed in advance to achieve the inner accessibility of stands by opening the necessary access roads (Oprea, Sbera, 2000; Timofte, 2008).

The cleanings can be accomplished with the following tools and mechanisms (where appropriate and depending on the equipment): axes, scissors with power amplifier (for cutting section diameters up to 40-50 mm), hand saws, portable aggregates equipped with knife-disc etc. for harvesting the wood some animal-drawn means can be used as well as mechanical means adequate to the equipment.

The execution season is relatively large: for coniferous trees, the sprout formation period (1st May- 31st of July) should be avoided. For the deciduous trees, the cleanings can be made all year long.

The intensity of cleanings will be generally moderated, intense and very strong according to the situation without interrupting the dense stand

stage. The consistency must not be reduced below 0.75 especially in the forests intended to fulfil protective functions of land plots and soil. Intense cleanings are made in spruce and other coniferous stands.

The periodicity of cleanings ranges from 3 to 5 years according to species, state of stand, site conditions and previously executed workings. Generally, the first cleaning is made altogether with the beginning of the natural pruning for most trees. The next cleaning is always made in the next year of accomplishing the full consistency, after the previous intervention. Usually, 1-3 cleanings are performed. Some measures for increasing the capitalization degree of the timber obtained through these interventions will be taken into account, so as the performance of cleaning could be triggered through economic key factors in all the forests that need such workings (Florescu, Nicolescu, 1998; Milescu, 2006).

Table 1

Name of	Development	Objectives		
works	stage in which it			
	is performed			
Cleanings	Thicket stage	<ul> <li>thinning and mass selection by the extraction of the specimen_inappropriate as species and conformation;</li> <li>improvement of the stand composition;</li> <li>increase of the stand resistance towards the action of harmful factors;</li> <li>improvement of growing and development conditions of</li> </ul>		

Classification of stand tending works (Florescu, Nicolescu, 1998)

Periods and terms of wood exploitation for cleanings are foreseen in ANNEX 2 of the Order 606/2008.

Table 2

remous and terms of wood exploitation for cleanings					
Treatment and cutting type	Period allowed for harvesting and collectin				
Tending cuttings in young forests: cleanings					
- in deciduous forests	All year long				
- in coniferous forests	1.VIII-31.IV				

Periods and terms of wood exploitation for cleanings

## MATHERIAL AND METHOD

The intensity of tending cuttings expresses the ratio of the wood volume harvested from a stand through cleanings with respect to the total production of the respective stand when reaches the exploitation maturity.

In the case of cleanings, the volume to be extracted influences very much the cost of works as it is shown below. The calculi were made according to the unified labour norms in the forestry work, respectively to the time rules. I. Specimen cutting, collection, settlement in small piles that can be transported to the places between the remaining standing specimens A. execution of works on the whole surface:



Fig. 1 Expenditure on cleanings performed on the whole surface in the montaneous area for the formation of small piles according to the timber volume extracted per ha and the species group, in lei person/mc

- B. execution of works on reduced surfaces
- B1. width of strip run with works of 4m



Fig. 2 Expenditure on cleanings performed on strips of 4 m, in the montaneous area for the formation of small piles according to the timber volume extracted per ha and the species group, in lei person/mc

B2. width of strip run with works of 5m



Fig. 3 Expenditure on cleanings performed on strips of 5 m, in the montaneous area for the formation of small piles according to the timber volume extracted per ha and the species group, in lei person/mc

B3. width of strip run with works of 6m



Fig. 4 Expenditure on cleanings performed on strips of 6 m, in the montaneous area for the formation of small piles according to the timber volume extracted per ha and the species group, in lei person/mc

**II.** Collecting and stacking the wood resulting from cleanings (gathering the cut specimens and the branches resulted after sorting, transport on an average distance of 100m, placement near access roads, in typical piles)



Fig. 5 Expenditure with cleanings for the formation of typical piles according to the collected and stacked timber per ha and to the slope, in lei person/mc

It is noted that there are significant differences (between 13-19%) between cleaning costs for volumes to be extracted up to 10 mc and volumes over 10mc/ha, and less significant differences on lower slopes.

## CONCLUSIONS AND RECOMMENDS

According to the values obtained in Fig.1-4, for the mountaineous area, the expenditure on cleanings for the formation of small piles according to the volume of timber extracted per ha and strip width were shown for the coniferous trees (fig. 6).



Fig. 6 Expenditure on cleaning, for the coniferous trees in the montaneous area, for the formation of small piles according to the volume of timber extracted per hectare and strip width in lei person/mc

For minimum costs, it is noticed in the figure below, that the execution of the works on the entire surface is more expensive than that in strips, the cheapest being the work on 6m width strips, especially at low volumes to be extracted (<6mc/ha). The works all over the surface are less expensive when the intensity of cleaning is strong and very strong (15-20mc/ha).

The total cost of labor for cleanings was determined by cumulating the values obtained in Section IA with the values in Section II. The results are shown in Figures 7, 8 and 9, depending on the slope: A. Slope <15  $^{\circ}$ 



Fig. 7 Total expenditure on cleanings in the mountaneous area with a slope <15 °, depending on the volume of timber collected and stacked per hectare and according to the group of species in lei person/mc.



Fig. 8 Total expenditure on cleanings in the mountaneous area with a slope 16°-30°, depending on the volume of timber collected and stacked per hectare and according to the group of species in lei person/mc.



Fig. 9 Total expenditure on cleanings in the mountaneous area with a slope >30  $^{\circ}$ , depending on the volume of timber collected and stacked per hectare and according to the group of species in lei person/mc.

The main factors influencing the costs were determined, demonstrating the influence of the volume to be extracted upon the costs with the tending works.

Thus, for the cleanings in the mountains, according to representations 7-9, if the volume to be extracted increases from 4-6mc/ha to 18-20 cm / ha, the total expenditure on labor decreases according to the table below:

Table 3

Cost reduction	on cleanings when the amount of extracted volume increases in the						
mountains							

Slope, in	Percent of cutting the expenditure, in % on group of species/species					
degrees	Coniferous	Mixed	Deciduous	Pine		
	exclusively Pine	Coniferous+Deciduous				
Under 15	40.6	41.7	40.7	47.0		
16-30	38.5	39.6	38.7	44.6		
Over 30	34.6	35.8	35.0	40.5		

### **Recommendations**

- establishing and enforcing the technical- organizational and economic conditions for the collection and use of resulted wood;
- sorting the wood in the felling area / ramp / intermediate storage should be made more efficiently
- the access lanes for cleaning and tractor or pulled cart roads for the wood hauling, when thinning, to be executed and verified to allow the increase of the mechanization degree for the subsequent interventions on these roads. The areas occupied by corridors are not taken out of the production cycle, because the width of corridors is actually less than the distance between trees to be exploited.
- selection of those who perform the cleaning should be more rigorous on the classification of workers, equipment, tools: using modern and effective means, specific for this works (eg. for cleaning: Clearing Saws Husqvarna 355FX, Jonsered RS 44, Stihl FS 480, etc.)
- an optimum network of roads could allow the usage of the chipping exploitation method.

Unfortunately, the economic operators tend to simplify all the work (design, organization, execution) and put almost always on the first place the gain, the obtained profit.

However, the main objective after an intervention isn't always the immediate return, because the costs might be much lower for the following works, interventions, cuttings, for example, if a collecting network is accomplished so as to be optimum for the felling area, basin respectively, or it is decided to carry out a section of a forest road to make accessible the respective area (the felling area).

The operations in the felling area must be "moved" in primary platform to increase the work profitability.

The primary conversion is represented by all activities through which the collected timber is prepared for the technological transport, according to the requirements imposed by the optimal deployment of this process. This preparation is done by taking into account the following aspects: \* conversion of timber in pieces of shapes and sizes, appropriate to the capacity use of the means of transport;

\* grouping of converted timber, for transport, according to species or group of species, size (diameter, length), shape, quality, etc.;

\* provision of some optimal conditions for transport for the entire volume of collected timber;

\* provision of some optimal conditions of loading.

The activities taking place to achieve the primary conversion can be grouped into: round wood conversion, cordwood conversion, branch conversion in bundles; wood charring; finely wood chipping.

The role of the primary platforms decreased a lot lately with negative effects upon forests (through injury in particular), and an optimum accessibility would lead to a better return by spending less and more valuable and accessible assortments.

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