

CONSIDERATIONS REGARDING THE SELECTION OF THE WOOD EXPLOITATION METHOD

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Abstract

The present paper has in view the assessment of the exploitation methods that can be applied in the case of exploiting a cutting area, by analyzing their advantages and disadvantages from an economic and ecological point of view. The exploitation method influences the costs of the exploitation (in the case of the wood mass fragmentation operations, that is: trimming out and sectioning), time, place and sorting quality, level of prejudices. From a juridical viewpoint, it is not foreseen that the one that accomplishes the exploitation must apply a certain exploitation method.

The case study presents the exploitation costs differentiated according to the exploitation methods and necessary time.

Key words: exploitation method, collecting, gross volume

INTRODUCTION

Most of the authors in the field consider the exploitation method as being a general concept of organizing the exploitation activities given by the way in which the wood mass is moved when collecting

The well-known exploitation methods accepted in general by the specialty literature (Ciubotaru, 1998; Horodnic, 2003; Oprea and Sbera, 2004) are classified exactly in accordance with the dominant form of the wood mass when collecting in:

- shortwood system;
- tree length system;
- full tree system;
- chip system.

Besides these four basic methods, there are other two mixed methods ARCOT, or multiples of assortments (Oprea, 1995).

The establishment of the exploitation method and of the piece form that will be collected represent a present issue with influences upon the exploitation technology, exploitation costs, the number of necessary equipment.

MATERIAL AND METHODS

The evaluation of the technological activity costs for the proposed solution in the case of exploiting a cutting area involves: activity costs, need of fuels and lubricants, evaluation of the costs necessary for other activities imposed by the preparation and development of the exploitation activities (indirect costs), the costs of the activities necessary for the preparation of the tractor/cattle roads, installing-disinstalling of the cable railway, preparation of the primary platform.

The costs are established according to a documentation that must include: technical-

economic project, installing-disinstalling project of the cable railway, project for the preparation of the tractor road, project for the preparation of the cattle road, project for the preparation of the primary platform.

Because the exploitation method is given by the form in which the wood mass moves, if the means and equipment necessary for gathering and clearing out-drawing near are used at a full-capacity, then it is considered that the costs of the exploitation differ from this point of view only in the case of the wood mass fragmentation activities, that is trimming out and sectioning--cutting into pieces.

According to the used method, these operations can be developed both within the cutting area and within the primary platform (table 1).

Of course, the time limits are longer in the cutting area in comparison with those in the platform, because in the primary platform (PP) there are better work conditions with mechanical sawers and axes, having prepared areas, being located near a permanent road, approximately plane, and so on.

If the gross volume for the production is noted down with V , for the calculus of the activity costs when harvesting the wood, we will proceed in the following way (Timofte and Budău, 2008):

- in the case of felling operation, it is used the gross volume for production V ;
- in the case of trimming, it is used a volume of 0 mc when applying the full-tree logging exploitation method; 20% of V when applying the partly-tree logging exploitation; 100% of V in the case of the other methods;
- in the case of cutting area felling, it is used a volume of 0 mc when applying the full-tree logging exploitation method; 20% of V when applying the partly-tree logging exploitation and when applying the tree length system; 50% of V when applying the method of multiple assortments and when applying the tree length system; 100% of V when applying the shortwood system.

Case study:

Name of the cutting area: Sirinca

Silvicultural location: u.a. 81A U.P. VII, O.S. Bihor

Administrative-territorial location: BIHOR

Surface of the cutting area: 3,5 ha

Nature of products: main

Progressive treatment: conjugation

Gross volume of standing tree for exploitation (m^3): Turkey oak and durmast 503 mc

Wood volume to exploit per ha: 144 mc

Volume of the average tree: 1,05 mc

Usable seedlings (% of the surface): 94%

Exploitation deadlines: restrictions in the vegetation season, maximum period: 3,5 months

Recommended exploitation method in the evaluation report (APV): tree length system.

There is the problem of maintaining and modifying this exploitation method by the person who will put into practice the optimum exploitation solution from an economic and ecological viewpoint.

Further, there are determined different costs according to the exploitation method to see if it is justified to change the exploitation method foreseen in APV, from the point of view of necessary time and activity costs (lei/mc), with respect to the available time tariffs and exploitation norms. The chip system and ARCOT are not used in our country. The results are presented in figures 1 and 2.

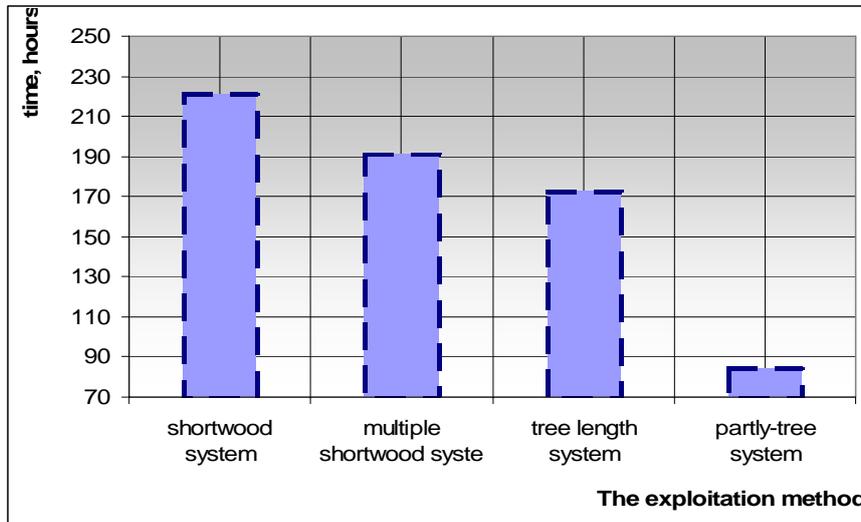


Figure 1 Representation of the time necessary for the execution of the trimming and cutting operations according to the exploitation method

It is noticed that the method of partly-tree system needs the shortest time for the accomplishment of these operations.

Although the volume in the studied cutting area is small, the results are relevant if we refer to the costs per mc.

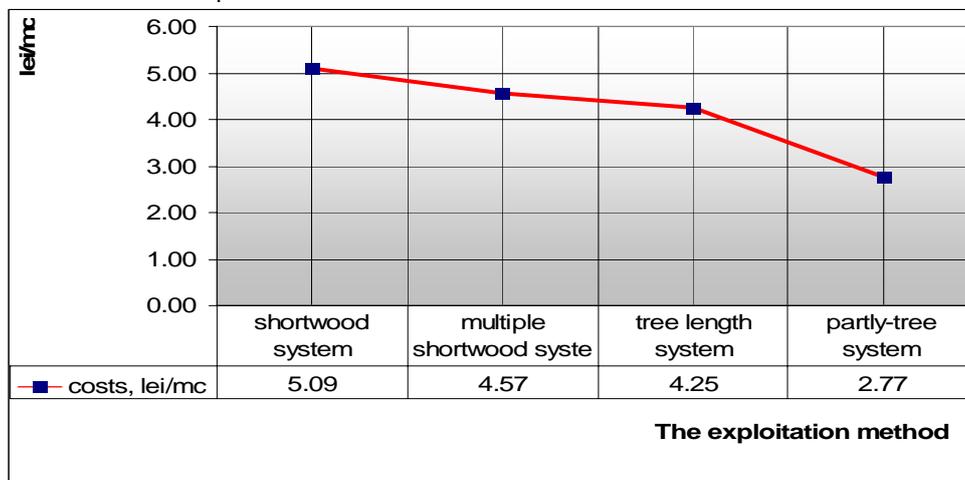


Figure 2 Costs for the activity costs and lubricants in the case of the four studied methods

From an economic point of view, in figure 2, the costs per cubic meter can be noticed. The method of shortwood system is the most expensive and that of partly-tree system is the cheapest.

RESULTS AND DISCUSSION

For the analyzed study, the shortwood system method and the multiple shortwood system are the most expensive, but they represent good methods when the windfall trees

have great dimensions and the movement distances are great; it is not the case of the cutting area under study.

The multiple shortwood system method is with 10% cheaper than the shortwood system method, and the tree length system method is with 17% cheaper. The partly-tree system method is with 45% cheaper from an economic point of view, being thus the most efficient.

The partly-tree system method has a significant negative impact upon the cutting area in the situation in which the usable seedlings is already present on 94% of the surface.

From an economic viewpoint, for the situation under study, the application of two exploitation methods is recommended, such as: the partly-tree system (when there are sufficient collecting ways, with short distances and the conformation of the standing tree and seedlings protection measures) and the tree length system.

By generalizing the study, the six existent exploitation methods can be compared from more viewpoints (table 1): of the costs (it coincides with main interest of the person that accomplishes the exploitation), of the prejudices (it coincides with the main interest of the forester), of the possible degree of mechanization (productivity), of the number of operations in the cutting area (transfer degree of the operations in the cutting area from the primary platform), value/quality of the assortments (Timofte, 2007).

By the criterion value/quality of the assortments, the following aspect have been had in view: the better the surface the sorting is accomplished (prepared, with no obstacles, stubs, standing trees, with small or horizontal slope, with no snow, etc), the better the productivity and sorting. It is also very important the experience of the cutter, sorter, but in general better working conditions lead to an increased quality and more valuable assortments (cutting quality, appropriate dimensions – diameters, lengths, super-dimensions requested by standards and beneficiaries). Thus, a sorting in the cutting area will be inferior to one that is made in a warehouse or on the primary platform.

The sorting place is presented in the last column of table 1.

Table 1

Analysis of the exploitation methods, considerations

(1- 6 represent the place that the method is placed with respect to a certain criterion)

Exploitation method	Small expenditures	Small prejudices	High degree of mechanization	Reduced operations in cutting areas	Value, quality of assortments	Sorting place
Shortwood system	6	2	6	6	5	Cutting area
Multiple shortwood system	5	3	5	5	4	Cutting area
Tree-length system	4	4	4	4	3	PP*, warehouses
ARCOT	3	5	3	3	2	PP
Full-tree and partly-tree system	2	6	2	2	1	PP
Chips	1	1	1	1	-	Cutting area

*primary platform

Out of the four exploitation methods described herein, apparently, the most ecological one would be the shortwood system method, due to the small volumes of the pieces and to the little impact upon the soil and seedlings, but a great fragmentation leads to an increased number of pieces, and the usage of many unprepared or poorly-prepared collecting routes. From an economic viewpoint, the cheapest method would be the full-tree and partly-tree system, due to the high degree of mechanization and productivity in the primary platforms

in comparison with the cutting area. In Romania, out of the mixed methods, the multiple assortments system is applied.

The considerations (1-6) indicate only the positioning (ordering) of the respective method with respect to the others, and not the quantitative level of the costs, prejudices and so on.

The tree length system method is very used in our country and represents a “compromise” between the cultural and exploitation sectors. The economic agents also prefer this method because it is on an average level regarding the prejudices, and on an optimum level from an economic viewpoint, especially if there is a well-designed collecting network.

CONCLUSIONS

Within one method, according to the available concrete conditions, especially at the level of the cutting area, more exploitation technologies can be applied, being chosen the optimum working option from an ecological and economic point of view.

From an economic viewpoint, there are important only the operations that differ from one method to another, from the point of view of the place and share in the case in which it takes place in the cutting area and in the primary platform, knowing that the norms in the primary platform are smaller than in the cutting area, due to the easier working conditions.

As regards the level of prejudices, a greater fragmentation in the cutting area imposes more moving routes for the pieces, but also the movement of big, unfinished trees lead to major prejudices, due to the great volumes. From a strictly-ecological viewpoint, a great fragmentation of the trees within the cutting area leads to maximum prejudices. Altogether with the transfer of the operations in the primary platform and with the piece collection on prepared routes, the prejudices decrease in the cutting area.

From a juridical viewpoint, it is not foreseen that the one that accomplishes the exploitation must apply a certain exploitation method. However, two or three variants should be assessed. The chip system method is applied in the northern countries, not being used in our country.

The provision from the evaluation report referring to the exploitation method must not have a compulsory character, because its elaboration doesn't have all the necessary information for a correct evaluation of the situation from this viewpoint.

As regards the application of the full-tree and partly-tree system, starting with 2002, the collection of the full trees is forbidden due to the Order 635, and starting with 2008 according to Order 606/2008 due to the prejudices in this case, only the variant of partly-tree system is allowed.

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