

REGULATORY ASPECTS REGARDING THE INTERNAL ACCESSIBILITY OF STANDS WHEN HARVESTING THE TIMBER

Timofte Adrian Ioan*, Timofte Claudia Simona **

* University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea;
Romania, e-mail: adi_timofte@yahoo.com

***University of Oradea, Faculty of Law and Jurisprudence, 26 Gen. Magheru St., 410048 Oradea,
Romania, e-mail: clau_timofte@yahoo.com

Abstract

In this paper, there are presented some aspects regarding the regulatory issues on the accessibility of the forest stock with respect to the harvesting roadways and the need to develop roads for the timber harvest in order to adopt optimal solutions for logging operations.

Four working type schemes have also been proposed for the correct design of works within a felling area. At the end of the paper, some arguments are brought to support the internal accessibility of forests and some recommendations are made on the way the logging operations take place in compliance with the rules and regulations in force.

Key words: rules, accessibility, collection roadways, skidding road, average distance, timber logging

INTRODUCTION

Generally speaking, the accessibility of the national forest stock refers to the forest roads and railways. The legislation in the field, Law 46/2008 - Forest Code, Law 56/2010 on the national forest accessibility, MARD Order no. 1540/2011, Order no. 560/1999, Technical norms in forestry (2, 3, 4) and Forest Management Plans make precise references on the accessibility of forests by roads for the execution of silvicultural works, for fire prevention and fighting and for the forest exploitation in ecological and profitability conditions by settling, even annually on river basins, the priorities for achieving the roads on physical units and cost estimates.

At the level of plot, subplot or felling area, the situation is poor. Internal accessibility, provision of hauling-skidding facilities is given by the existence of the harvesting routes, their condition and their effectiveness, displaying many particular aspects.

All harvesting routes within a logging site are called a harvesting network (Ciubotaru, 1998). The cable-way and skidding routes used for the hauling-skidding of the timber represent internal access routes and do not change the forest category of the lands on which they are placed (Order 1540/2011).

At a closer look, the Romanian forest stock is accessible in terms of timber exploitation in a proportion of 65% (Ciubotaru, 1998. Popovici, Bereziuc, Clinciu, 2003), the remaining 35% (2.3 mil. ha) is considered

inaccessible due to a harvesting distance of more than 2 km, considering the issue of economic efficiency in the harvest of wood. In Art. 83 (1) of the Forest Code - Law 46/2008 - in Chapter 12- Forest Accessibility, it is stated the fact that enhancing the accessibility degree of the forest represents a prerequisite of sustainable forest management.

The accessibility of forests with permanent access roads or with harvesting roads is made to ease the access into the forest not only in terms of timber extraction but also for all the silvicultural and management works. Failure in not accomplishing the harvesting roads in time and in optimal conditions brings prejudices to the productive stock by damaging the trees due to their high density. We must also bear in mind that, according to Law 46/2008, Art. 54: "Public access into the forest is allowed only in designated areas and marked trails as such, and public access into the forest by cars, motorcycles, ATVs and mopeds is prohibited, except for sports, recreation and tourism, which can be practiced only with the approval of the forest owner or the manager of the public property".

According to the "Guidelines on timing, modalities and harvesting periods, logging and transport of wood" approved by MARD Order no. 1540/2011, 'the accessibility degree is the distance determined based on the measurements in the field, along the route of the hauling-skidding equipment, between the center of gravity of the felling area and the nearest permanent route for the freight, road or rail or shipping point'. Theoretically, this average distance is the distance between the center of gravity of the felling area and the primary platform. The degree of accessibility influences directly the value of timber and the starting price of tenders for the standing timber.

MATERIAL AND METHODS

In designing the operating works, when preparing a technical-economic exploitation estimate, it is very important as this average distance to be as accurately as possible determined because it affects the labor costs with regard to the hauling-skidding activities, fuel costs when harvesting but also overheads costs given by the operation of equipment. The calculation of the average harvesting distance is summarized in the Norm on the design of the forest roads - Indicative PD 003-11, but it is best presented by Professor Ciubotaru (1996): the distances are calculated separately for each operation or phase in which the wood movement is made with the general relationship:

$$D_m = \frac{\sum \left(\frac{d_{0i}}{\cos \alpha_i} \cdot c_s \cdot c_a \cdot V_i \right)}{\sum V_i} = \frac{\sum (d_i \cdot V_i)}{\sum V_i}$$

where:

D_m is the average moving distance of the wood with a harvesting means, in m;
 d_{0i} – horizontal distance, measured on the map or established analytically, along which the wood is going to be moved, on each homogenous surface or route, with a certain means of collection, in m;

α_i – land gradient corresponding to each homogenous surface or route, in $^\circ$;

c_a , c_s – coefficients of route oblongation and sinuosity;

V_i – volums corresponding to each homogenous surface or route, in m^3 ;

d_i – wood harvesting distance on the homogenous surface or route i , in m.

Based on this calculated distance D_m , the accessibility degree G should be established for a certain felling area, so that no interpretations should be made, so as, if

- $D_m \leq 250m \Rightarrow G = 1$
- $D_m = 251...500 m \Rightarrow G = 2$
- $D_m = 501...1000 m \Rightarrow G = 3$
- $D_m = 1001...1500 m \Rightarrow G = 4$
- $D_m > 1500m \Rightarrow G = 5$.

For an optimum accessibility into a stand, some access paths for thinning and harvesting should be made by developing the existing access routes (roads, paths, compartment lines) with regard to their location, size and current status.

An optimum harvesting network should be carried out at least during the thinning or the first cuttings (progressive I, successive I).

Thus, according to the Technical Norm no. 2, the interior accessibility works must ensure an access network into the stand, with the aim of executing the tending works under appropriate conditions even from the stage of the thicket.

Besides the silvicultural, technological and economic objectives mentioned inhere, the accessibility corresponds to other purposes as well, such as to facilitate the application of some preventive and firefighting measures; harvesting and exploitation of forest products; protection of game; connection of stands to the main transport route network etc.

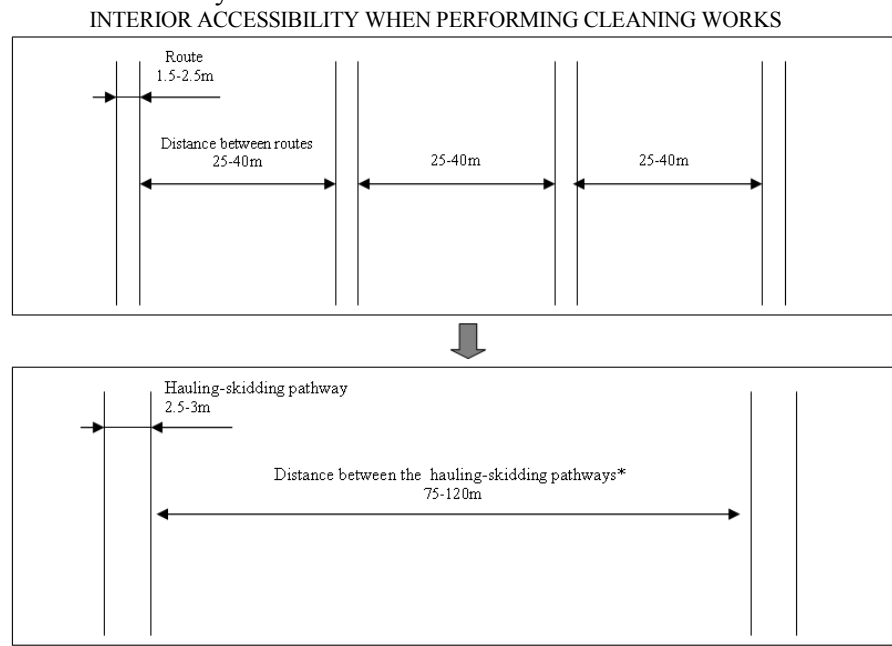
RESULTS AND DISCUSSION

Starting from the existing access roads, the network should be wide routes, hauling roads, skidding roads which subsequently to be developed as forest roads without overlapping the coverage/serviced areas for each access route. The overcoming of the normal density of the access routes for the

timber harvesting brings prejudice to the productive stock by removing some important areas from the production.

The proportion of different types of roadways within each stand is determined depending on the relief and stand, as well as on the means to be used in the execution of works and harvest of the resulted material. It is not recommended to impose the logging method to the logging agent, but the timber is needed to be harvested only on approved routes and materialized in the field, fact stipulated in the Order 1540/2011, Chapter III – Silvicultural rules on timber exploitation, Art. 13.

Figure 1 shows how a stand can be made accessible in time, with color (when cleaning works), hauling-skidding pathways for an integral harvest by tractors (when thinning, afterwards other treatments) and, why not, afterwards with the transformation of some hauling roads into forest roads, taking into account that Romania is far from the European average in terms of forest road density.



*80-100 m in the plain, 100-160 m in the mountains (widening the thinning routes from 3 (4) to 3 (4) routes

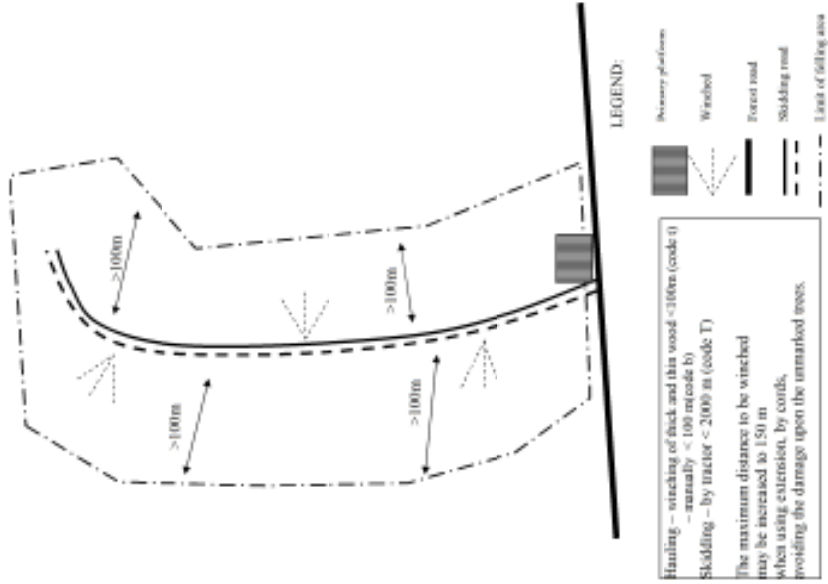
Fig.1 Recommendations regarding the interior accessibilization when performing cleaning, thinning and other treatments

In order to prepare the felling area, according to Order 1540/2011 (Chap. II Authorization and delivery towards exploitation of the felling areas, Section A Authorization of felling areas, Art. 8 2a), for the arrangement of hauling-skidding equipment" the authorization may be issued with maximum 30 days before the start of timber exploitation. " In Chap. III- Silvicultural rules on wood exploitation, we find that the harvesting routes must be approved and materialized in the field and must be complied with accordingly (letter k), wood harvesting by tractors during the rainfall periods is prohibited (t); it is forbidden to use the stream channels as trails for timber harvesting (s). In Art. 14 it is said that skidding roads used for timber hauling-skidding are placed so that to avoid the damage of the areas with usable seedlings (1), with a maximum width of 4 m (2) on hillsides with slopes of up to 25 degrees (3), and the approval for making the hauling-skidding roads is given by the chief of the forest district (4).

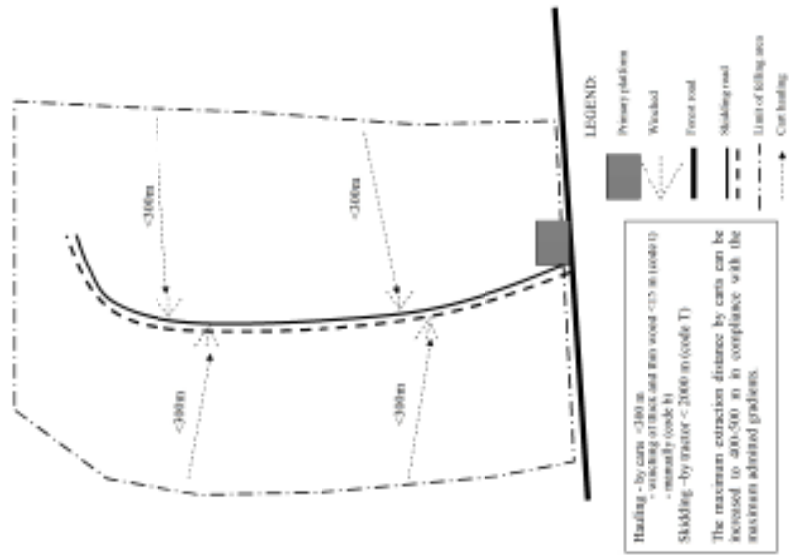
Order nr.815/2014 amends the afore-mentioned order and foresees that the location of the hauling-skidding pathways and related facilities to be differentiated according to the applied treatment and type of cutting, so as not to cause injury to the regeneration of the standing trees, soil degradation and water banks above the limits admitted by the technical rules (Article 10, paragraph 2).

In the literature (see Cicerone Rotaru, V. Andreescu, A. Ciubotaru, Horodnic S., I. Oprea, Ionaşcu Gh., Timofte etc.) there are specified the ways of placing the collecting network (***,1997), factors, distances (minimum or maximum, optimum), advantages, disadvantages, operating methods and technologies to determine the optimum harvesting solutions, but concerning the norms, there are missing some clear explanations, particularly in the setting and location of the harvesting routes.

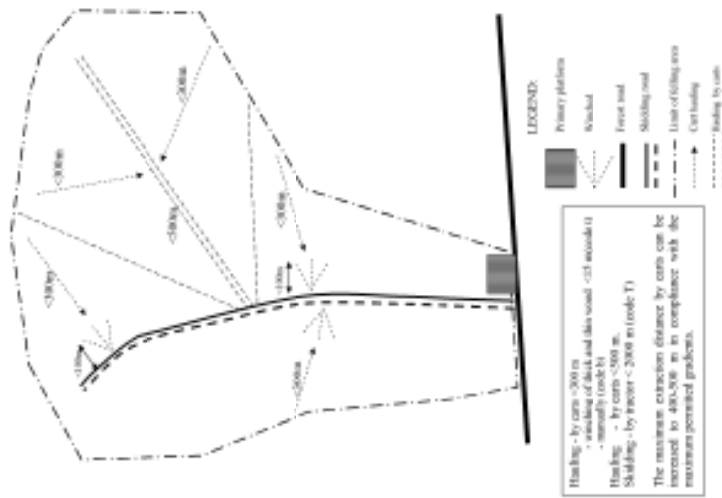
Based on the theoretical data and existing recommendations, the maximum and optimum distances from an economic point of view, four type schemes have been made for classic exploitation technologies in our country.



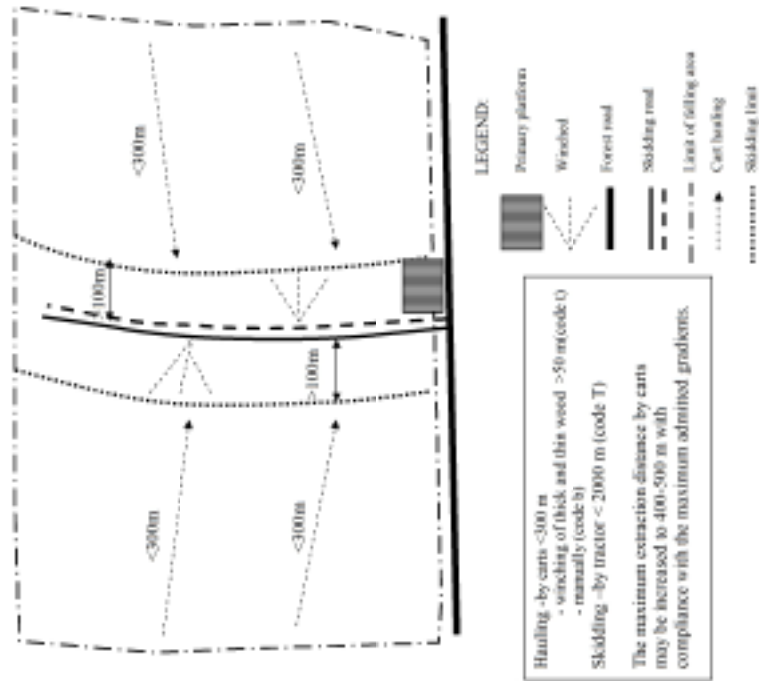
SCHEME 1 – CODE T t b



SCHEME 2 – CODE T a b



SCHEME 4 – CODE T A a t b



SCHEME 3 – CODE T a t b

CONCLUSIONS

The four recommended type schemes can be easily used as a model in practice when making the map of the felling areas by the economic agents and when determining the average harvesting distances and the most accurate determination of related expenses.

Those who deal with wood exploitation must know that establishing the required facilities (hauling-skidding roads, cable-ways, other access routes etc.) and their placement in the field, is made in agreement with the forest department, taking into account the possibility of logging and the need to protect the environment, identified possible elements of biodiversity and the general interests of the forest management and when the delivery of the felling area, its map will be attached to the taking-over certificate.

An optimum harvesting network will provide the reduction of wood harvesting distances, decrease of labor force, material and energy.

For each operating felling area it should be known very well the existing network of pathways and establish the proposed and required access routes by drawing a map to scale and approximate costs should be determined.

In the Forest Management Plans, Chapter IX –Transport equipment, exploitation technologies, there are foreseen:

- Inventory of existing and necessary transport facilities,
- Current density of the existing roads,
- Accessibility of the production and protection stock,

but there are no data regarding the harvesting networks and degrees of accessibility. An existing situation and development of a database on existing skidding roads would be a real help to optimize the exploitation works, to determine the operating costs faster or to determine the average distances for harvesting and accessibility faster and more accurately. In these management plans, there are only stipulated that the accessibility recorded in tables (on forest roads) is calculated according to the surface, respectively the volume accessible within a maximum harvesting distance of 1.2 kilometers, the surfaces and volumes exceeding this distance being considered unreachable .

The adoption of some optimum solutions and appropriate technologies to harvest wood will be made in accordance with the provisions of decennial plans to harvest timber, in compliance with the provisions contained in the technical norms for the selection and application of treatments (***, 2000 b) and those regarding the timber valuing (***, 2000 c).

Because there is a problem regarding the accessibility within the stands, optimum density of the harvesting pathways, it should be also taken

into account the presented aspects, and the pathways made during the cleaning works, then the routes to achieve the thinning, then the skidding roads or forest roads within the forest stands required for the removal of the timber to be overlapped as much as possible.

To cover the possible expenses regarding the possible damages, including the restoration of forest road elements destroyed by its fault (economic agent), that bail of 5% out of the contract value (filed to forestry department, in advance issuing the operating license, according to Law no. 46/2008 - Forest Code, republished) to remain to the Forestry Department or Forest District, respectively.

If a small part of the hauling paths would turn into forest roads, the gain would be very high. When speaking about roads' construction, there is no discussion on their immediate return. Their costs would decrease by 45% if the recommendations of Order no. 560/1999 which updates Norm PD 67/80 on the design of forest roads for motor vehicles would be complied with. Thus, it is recommended as the economic agents to foresee the realization of valley skidding roads, with geometric elements in plan and in the longitudinal profile similarly to the auto forest roads of class III, to facilitate their further transformation into forest roads. By transforming the valley hauling-skidding roads into forest roads, a more stable forest road is carried out, with less preparatory work, earthwork and earth blasting and the area to be deforested is reduced.

In forest exploitation, the analysis of 2-3 collection variants is required. It will always make the best use of the existing collection network and the development of new routes should be analyzed not only in terms of monetary and value effects but also silviculturally, environmentally, socially, etc. so that to finally consider that the optimum solution was adopted.

REFERENCES

1. Ciubotaru A., 1996, Elemente de proiectare și organizare a exploatării pădurilor, Ediția a II-a. Editura Lux Libris, Brașov
2. Ciubotaru A, 1998, Exploatarea pădurilor. Editura Lux Libris, Brașov
3. Oprea I., Sbera I. , 2004, Tehnologia exploatării lemnului. Editura Tridona, Oltenița
4. Popovici V., Bereziuc R., Clinciu I., 1998, Extinderea rețelei de drumuri pentru accesibilizarea fondului forestier și, în general, a pădurii. Bucovina Forestieră XI,2.
5. Timofte A.I, Budău R., 2008, Exploatarea pădurilor. Îndrumar de lucrări practice și de proiectare. Editura AcademicPres, Cluj-Napoca,
6. ***, 1977, Scheme tehnologice cadru pentru exploatările forestiere, Ministerul economiei forestiere și materialelor de construcții, București
7. ***, 1999, Ordinului nr. 560 din 21.06.1999 emis de M.A.P.P.M. care reactualizează Normativul departamentului PD 67/80 privind proiectarea drumurilor forestiere pentru circulația autovehiculelor

8. ***, 2000, a, Norme tehnice pentru îngrijirea și conducerea arboretelor, nr.2, Ministerul Apelor, Pădurilor și Protecției Mediului, București
9. ***, 2000, b, Norme tehnice privind alegerea și aplicarea tratamentelor, nr.3, Ministerul Apelor, Pădurilor și Protecției Mediului, București
10. ***, 2000, c, Norme tehnice pentru evaluarea volumului de lemn destinat comercializării, nr.4, Ministerul Apelor, Pădurilor și Protecției Mediului, București
11. ***, Legea 46/2008 - Codul silvic, publicata în Monitorul Oficial al României, Partea I, nr. 38/27.03.2008
12. ***, Legea 56/2010 privind accesibilizarea fondului forestier național, Publicat în Monitorul Oficial, Partea I nr. 183 din 23 martie 2010
13. ***, 2011, Ordinul 1540/2011 – Norme privind stabilirea termenelor, modalităților și perioadelor de exploatare a mesei lemnoase din păduri și din vegetația forestieră din afara fondului forestier național
14. ***, 2012, Normativ privind proiectarea drumurilor forestiere aprobat cu ordinul Ministrului Mediului și Pădurilor cu nr. 1374, din 04.05.2012
15. ***, 2014, Ordinul Nr.815 din 29.09.2014 pentru modificarea și completarea Instrucțiunilor privind termenele, modalitățile și perioadele de colectare, scoatere și transport al materialului lemnos, aprobate prin Ordinul ministrului mediului și pădurilor nr. 1.540/2011, emis de Departamentul Pentru Ape, Paduri si Piscicultura, publicat în MO 740 din 10 octombrie 2014