ANNALYSIS OF THE TERRACE WORKS VOLUME SO AS TO PROLONG THE LESU FORESTRY ROAD

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Abstract
The current study had been done in order to establish the technical possibilities to prolong the Lesu forestry road site under the administration of O.S. Remeţi, D.S. Oradea, in the context of the extension of the net of forestry roads, a net with values way below the ones necessary in Romania's forestry fund. In order to establish solutions related to the design and achievement of forestry roads the current work has studied a section of forestry road and having in view the obtained results certain discussions are presented which can offer some answers to the possible arising questions.

Key words: forestry road, access, design.

INTRODUCTION

The development of a forestry road net in order to increase the accessibility of the forestry fund is a major preoccupation of the Romanian forestry due to a very low value of the average thickness index, thickness situated around 6,67-6,69m/ha, an index considered inferior in comparison with the developed countries where this index reaches values of 45m/ha and which should have a minimal value of 12,5m/ha (a value which would contribute to a lower cost for collecting and for transport) (after Leahu I., 2001). This constitutes the main premises for practising a modern forestry and requires the existance and the respecting of a perspective concept, based on economical and technical reasons. The management of forests and the application of timber products harvesting plans requires the presence of some road nets which offer a certain degree of wood accessibility in corresponding economical and technical conditions.

The necessity for building forestry roads as well as the necessity to ensure the maintenance of the existent ones is motivated by the need to ensure a transport net able to serve all the needs of the forestry sector in close concordance with the current ecological requirements.Thus, the researches related to the situation of the forestry roads are done with the intention to emphasize their estate and with the intention to come up with suggesting certain technical solutions in order to solve the arising problems as well as to build new roads. (Iovan C.,2008).

The building of forestry roads must have in view the promotion of ecological solutions, being known that, on average , for each kilometer of road a hectare of forest/wood is being cleared and even more forests are cleared on high declivity areas.

MATERIAL AND METHODS

The work presents data related to the technical details and to the analysis of the earthwork movement. The suggested forestry road and the road presented in this study is situated Remeți locality, in U.P.IV Iadolina, The Remeți Forest Ward (1***), as part of Oradea Forest Board. The forestry road sector is placed in a mountain area, with inclined mountainsides and it develops itself in the continuation of an already existent road (Leşu) , on Leşu Valley. The whole route unfolds as a valley road on both mountainsides of Lesu Valley. From Hm 3+59.40 it crosses on the left mountainside with a tubular footbridge of Ø 0,60 m and it maintains itself on this route until Hm 8+62.60, where the road crosses back on the right mountainside once again with a tubular footbridge of Ø 0,60 m. maintaining like that until Hm 10+14.60, when it crosses on the left mountainside through a flagstone bridge and then it reaches the final point at the 11+71.00. hectometric position.

The field conditions that the designed road covers are tough due too the freted relief which leads to the dislocation of a great number of earthwork for the achievement of the platform and stone and cliffs are present in a percent of 11% from the digging volume. The longitudinal declivity of the road has the average value of 8,52%.

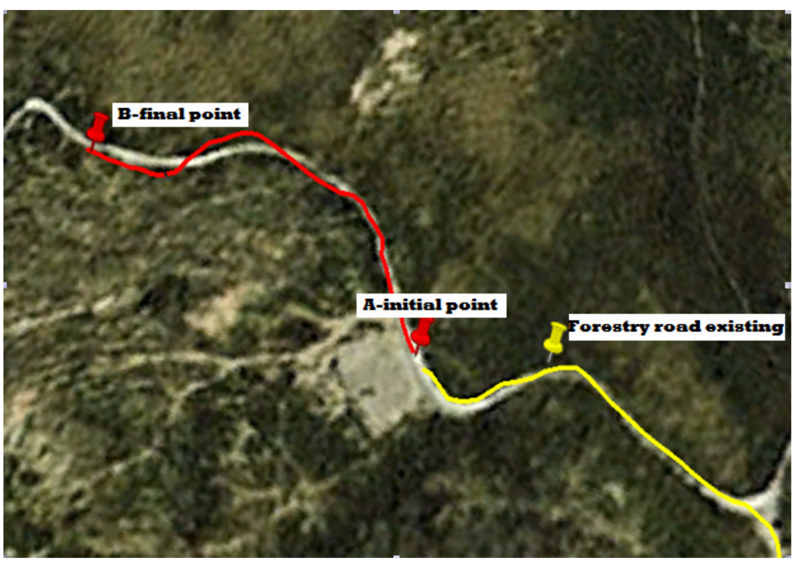

Fig. 1 Location of the designed road

The longitudinal profile of the road represents the unfold projection in vertical plane of the route line (the black line) and of the road axis(the red line or the project line) (Olteanu N.,1996). The natural relief conditions and the geological structure of the field lead to the creation of the corresponding road assembly and to two standard transversal profiles which can be applied in earth areas and in cliff areas according to the standard transversal profiles (fig. 2 and 3) recommended by the norms.

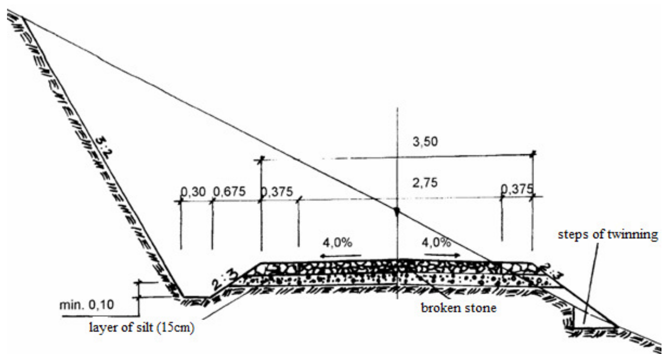

Fig. 2 Standard transversal profile for earth areas

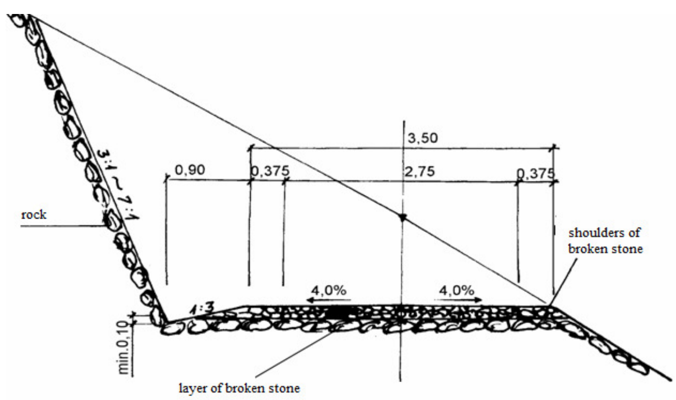

Fig. 3 Standard transversal profile for cliff areas

In order to analyze this road sector we had in view the 40 characteristic transversal profiles as well as the distances between them and the volume of the earthwork (digging and filling) as they can well be observed in table 1, their values being extremely relevant for determining the investment effort and the execution period. (Bereziuc R.,1981)

Table 1

The situation of the distances between the transversal profiles the digging and fillingvolume

Distance between profiles	39,1	63,6	6,1	14,4	10,0	5,2	8,0	3,5	11,5	3,0
Digging	407	8	198	123	125	161	99	72	152	61
Filling	31	0	0	0	0	0	2	0	0	0
	1	2	3	4	5	6	7	8	9	10
Distance between profiles	10,9	1,4	12,6	1,0	16,1	6,9	5,0	13,1	8,5	6,0
Digging	96	149	79	71	160	57	12	110	138	111
Filling	3	0	9	17	1	5	82	71	31	0
	11	12	13	14	15	16	17	18	19	20
Distance between profiles	10,1	10,1	10,5	5,5	8,1	12,4	6,0	12,0	8,0	1,0
Digging	57	64	145	34	74	55	17	96	34	48
Filling	10	9	0	0	0	107	21	49	76	26
	21	22	23	24	25	26	27	28	29	30
Distance between profiles	10,8	5,2	1,5	1,5	6,5	1,5	9,0	74,6	56,8	0,0
Digging	74	24	122	166	153	44	114	646	693	522
Filling	0	0	0	0	0	40	0	0	127	265
	31	32	33	34	35	36	37	38	39	40

RESULTS AND DISCUSSION

From fig. 3 – If we follow the analyses of the distances that separate the transversal profiles placed in all the points considered characteristic for the studied forestry road sector - we can notice a very small variation of these distances in comparison to the average distance between them, which ensures premises to a lower movement volume in the earthwork, movement which in turn leads to a lower value of the costs (2***); At the same time in fig. 4 we can notice a big difference between the digging volume and the filling volume, fact which implies a series of ecological problems because the difference of non-used earth volume in the earthworks must be stored on certain areas from the forestry fund.

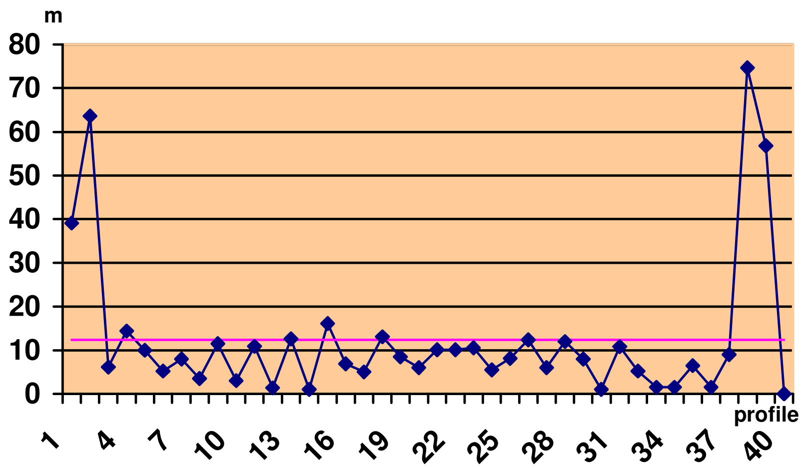

Fig 3 Variation of the distance between the transversal profiles in comparison to the average

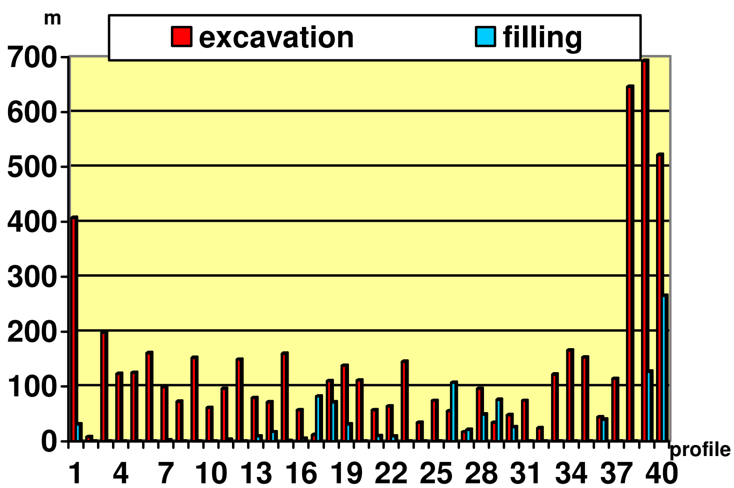

Fig.4 Variation of the digging volume and the filling volume

CONCLUSIONS

The design of a road for forestry transport is a complex problem and it must have in view technical and economical aspects (Ionaşcu G. ,1995). In this way any technical solution means an investment effort and it has a certain economic efficiency for whose right appreciation is to know the general economic effects of the ward's endowment with roads and to know the problems related to the cost of timber transport from cut to the timber sorting and pre-industrialization centres.

The Leşu forestry road sector suggested according to the technical norms in force (***3), has a length of 1,170 km and it unfolds through a succession of 19 alignments and 18 curves being fit out with 2 crossing stations and one turn around station. For the achievement of this road it is recommended to use as much as possibly local materials for the construction of the road system (stone and ballast). The average thickness through which an efficient timber colllecting and transport activity can be performed in Romania is situated between the values of 12m/ha (after Leahu I., 2001) and 14-18 m/ha (Popovici V. et al.,2003).

In the context of the complex functions that the forestry roads perform, the necessary startegy for the achievement of the road nets must respect the forest planning in order to ensure the continuity of the forestry production and to ensure the protective role of the forests. (Ungur A. et al,2003).

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