

EVALUATION OF AVAILABLE FOREST ROADS: A CASE STUDY

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Abstract- Because of the wide, scattered and large part of the forest areas being located far away from the settlement areas, transportation can only be realized through forest roads and the importance of transportation of forest roads has been emphasized. The grading method and the quality classification were made based on the criteria of the study.

In this study, for each of the forest roads, technical characteristics, economic characteristics, characteristics of the road through which the road passes and disturbances on the roadside were assessed., the forest roads of the Gerede Management Directorate Aktaş Operation Chief affiliated to the Bolu Forest Regional Directorate in Turkey were handled in terms of "scoring and evaluation of existing forest roads".

According to the findings obtained, the forest roads selected for the evaluation and evaluation of the existing forest roads subject to the survey; the names of the area in which they are located, the status of the existing roads are classified according to the reasonableness of the criterion of the criterion of work, by supporting the photographs and graded by considering the positive and negative situations. In the light of this information, 6 (B type) forest roads in the study area with a total length of 29 km have been investigated. In the results of working; one of ecological, economic, social and technical aspects of the forest roads in this planning unit III. quality class and 5 of the II. forest roads have been identified.

Keywords- forest, forest road, technical, mapping, Turkey

INTRODUCTION

Forest roads can be defined as single-lane roads, which provide for all year transportation of wheeled vehicles that serve to open the forests((Erdaş 1997).

In our country, forest areas are scattered, mostly in mountainous and sloping areas away from residential areas. The majority of the forest roads in our country, which are being built and built, are the type B sub-forest road. For forest roads with high construction costs, repair and maintenance activities also cause loss of time and money. Interventions to emergency coded roads after scoring will increase the life span of the road and decrease the environmental damage caused by the road.

Today, the quality conditions of forest roads are determined by considering the technical standards (OGM, 2017).Forest roads, which have a permanent trace in the forest and which have an expensive infrastructure, should take a passing note in the light of a certain evaluation in order to ensure their versatile functioning, efficient use and no problem in the future. Various studies have been developed which have different criteria for evaluating roads according to these parameters (Potocnik et al., 2005; Acar and Unver, 2007; Gümüş, 2009;Ada 2011).

In this study, in order to determine the quality levels of forest roads, it is aimed to implement the system of scoring the existing forest roads, which reveals the quality status of a forest road network in economic, ecological and visual aspects with different criteria and indicators, in 6 forest roads.

MATERIAL AND METHOD

Study Area

The study was carried out on the forest roads in the borders of Aktaş Operation Directorate and Gerede Operation Directorate of Bolu Forestry Regional Directorate. Aktaş Forest Management Chief has 13,885,80 ha forest area with 15,926,30 ha clearance area.

In this study, the forest roads in the borders of Aktaş Forestry Directorate, 328, 329, 336, 339, 341 and 357 were evaluated.

Method

In this study forest roads; The technical and economic situation of the road, the characteristics of the road and the road surface deterioration were evaluated according to the method of scoring the existing forest roads consisting of 28 criteria(Acar ve Ünver, 2007).

The classification of forest roads according to quality conditions is made according to the table below(Acar ve Ünver, 2007).

Table 1. Classification of forest roads to quality status

QUALITY CLASS	DESCRIPTION	TOTAL SCORE
I. CLASS	VERY GOOD ROADS	81-100
II. CLASS	GOOD ROADS	61-80
III. CLASS	BAD ROADS	30-60
IV. CLASS	VERY BAD ROADS	<30

I. Class roads; roads that are ideal in all respects and whose life will be long,

II. Class roads; roads that are in good condition and do not need urgent intervention,

III. Class roads; roads that are in poor condition and need urgent intervention in the short term

IV. Class roads are in a very bad condition in all respects, urgent interventions that need to be intervened and which require major repairs or disasse.

RESULT AND DISCUSSION

In this study, 6 type B forest roads were investigated. The general characteristics of roads are given in Table 2.

Table 2. Characteristics of forest roads investigated

		forest roads					
Code number		339	336	329	357	341	328
Slope (%)		3-8	5-8	6-9	9-12	3-9	5-9
Length (km)		6+500	9+500	3+850	4+800	2+650	2+450
Construction Buildings number		3	3	3	3	-	-
Construction Buildings number Type	pipe	3	2	3	3	-	-
	culvert	-	1	-	-	-	-

It was determined that some of the forest roads examined showed maintenance work and their age was more than 20 years. This situation has been due to the fact that forestry activities have been carried out widely since the ancient times in the region. The general slopes of the roads vary between 9% and 12%, and it is determined that only forests are located and generally high in the places where they are produced for production purposes and only allow the transport of slopes down.

All of the roads investigated are in the form of B type secondary forest road but some of them are earth roads although they have superstructure and they need to be serviced at continuous intervals. This situation was caused by the use of the forests of the region for production purposes, being far from the forest villages and access to the plateaus.

There are no superstructure materials on some forest roads and they are crude roads. This increases the maintenance costs of roads and causes them to deteriorate more quickly. In all of the forest roads, the horizontal curves vary between 30-80 m and it is determined that they meet the B type forest roads standard.

There is a transverse slope of the forest road and it has been determined that the vehicles are able to perform their curves in a safe way and the water flowing through the road. The forest range is approximately 350-500 m and the forests are suitable for B Type forest roads.

Table 3. Evaluation of forest roads

TECHNICAL SPECIFICATIONS OF THE ROAD	GROUP DESCRIPTION						
ROAD CODE		339	336	329	357	341	328
Age of Road (years)	20 <	-2	-2	-2	-2	-2	-2
General slope of the Road (%)	% 9-12	+2	0	+2	0	0	+2
Geology of Road Route	soil	0	0	0	0	0	0
Superstructure Material	Soil road	+1	+1	+1	+1	+1	+1
Horizontal Curve Radius (m)	9-30 m	+2	+2	+2	+2	+2	+2
Transverse Slope / Path Extension	Yes/no	+1	+1	+1	+1	+1	+1
Encounter Ranges (m)	250-500 m	+2	+2	+2	+2	+2	+2
Road Density (m / ha)	< 15 m	-1	-1	-1	-1	-1	-1
Average Range (m)	300-800 m	+2	+2	+2	+2	+2	+2
Opening Rate (%)	%60-80	0	+2	+2	0	0	+2
Greening Rate on Slopes (%)	% 10-35	0	0	0	0	0	0
Connection of the Road in Other	sufficient	+2	+2	+2	+2	+2	+2
Distribution of Hectare	100 m ² - 250 m ³	+1	+1	+1	+1	+1	+1
ECONOMY							
Cost of the Road (\$ / km)	35 000 <	-2	-2	-2	-2	-2	0
Cost of Construction Building (\$ / km)	5 000-10 000 \$	-1	-1	-1	-1	+1	-1
Number of Construction Building (pcs / km)	2-5	+1	+2	+2	+1		+2
Disorders in Construction Building	Fractures and crashes	-2	-1	+1	-1		+1
The presence of the ditch	Yes/no	+1	+1	-2	-1		0
PROPERTIES OF THE ROAD							
Land Slope	% 60-100	-1	-1	+1	-1	-1	+1
Aspect	Eastern and Western	0	0	+2	0	0	0
Agricultural Area	Close to agricultural field	+1	+1	+1	+1		
VISUAL DISORDERS ON ROAD FLOOR							
More than 5 cm in depth	0-5	+1	+1	+1	+1	+1	+1
Number of Cavities (pcs / km)	0-10 cm	0	0	0	0	0	0
Wheel Track Depth (cm / km)	Yes/no	-1	0	0	-1	-1	0
Plant Growing in Road Platform	0-5 m	-1	-1	-1	-1	-1	-1
POINTS :		70	67.5	77.5	65	52.5	62.5

339, 336 and 357 on the forest paths of some of the art structures of the dry creeks due to floods are blocked and deformed. In some parts of forest road code number 357, deformations of dry streams along with flood waters were observed.

One of the most important issues in the construction and maintenance of forest roads is the drainage problem of rain water accumulated on the forest road surface. Ryan et. al. (2004) stated that a forest road that does not have good drainage provides sediment to the environment at any time and the damage to the environment which has good drainage is the lowest level. It has been observed that it is more well maintained than the other roads where it is in the forest road II quality class. It was determined that the forest road passing through Tensil and the nearby forest road was in a better condition than the other forest roads, the number of art buildings were high, the road maintenance was made more regularly, and the repair was taken 1 year ago.



Figures 1. Images from investigating forest road

CONCLUSION

In this study, forest roads were applied to the Bolu Forestry Regional Directorate Gerede Forestry Management Directorate Aktas Forestry Directorate of Forestry Planning Unit. In the results of working; The forest roads in this planning unit were evaluated ecologically, economically, socially and technically. One of the investigated roads was III. quality class and 5 of the II. quality class.

The working area is very sloping and has a difficult terrain. The forest roads in this area are planned in accordance with the type B sub-forest road. However, during the construction of roads there are areas where the side ditches are not built adequately or properly.

Providing quality status, road maintenance plans can be made for each region and it can be ensured that the roads have longer life time and open to winter and winter operations.

According to the research we have done, the problems of the roads that are rated and evaluated according to the characteristics of the roads are quite high.

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