

New Trends In Forest Opening-Up And Forest Road Construction

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1. Forest opening up, as the basis of a near-to-nature, multiple-purpose forestry

Society wants forest management to satisfy different demands. Forest should produce basic material make relaxation and recreation possible so it should play a role in public welfare. With a defending function it should defend the natural and artificial elements of the environment/soil, air, water on one hand, buildings, roads, rail on the other/ The society also requires the forest management should not harm the symbiosis of the forest and it also should defend the biological and genetic variability of the forest. To satisfy these two, often contrasting requirements we have to accomplish a nature close, multipurpose forest management.

Forest management is a division of national economy which, in accordance with the demands of the society, makes material and immaterial assets produced by the forests easy of access for the society. Within the different divisions of the national economy this is a special producing branch the results of which can not always be measured by direct economic measurements.

There are three requirements towards forest management: cover of needs, duration or a maintainable development and the economic efficiency. However social demands towards forests have changed and this also refers to the ratio of needs. Earlier forests were playing a role as resources of raw material. Nowadays the society accepts nature close forest management in which public welfare tends to be more and more significant. The demand for the production of basic material remains, but the ratio of it decreases slightly. To fulfil this job we have to use more indulgent but frequently more expensive methods. The condition of the production of basic material is to open up forest as we have emphasised so far.

Economic purposes may be accomplished best in forests steady in terms of ecology. To this the most suitable operation method must be applied, which adjusts itself to forest site and operates with small area interventions. By doing so the most favourable stock structure can be formed, and the renewal of stocks when old becomes continuous. According to some Austrian analyses if we carry out forest management with keeping the above theories during the life of a 110 years old commercial forest 28 interventions are needed per hectare. The pre-condition of this is that we can approach the parts of the forest at any time.

Nowadays the new requirement is the care of the forest and the satisfaction of forest hygienic claims. Forest damage, the prevention of the multiplication of harmful organism appearing in spots and the removal of the infected species are tasks, which have to be done quickly in a

certain point of time. These duties can only be solved if we have opened up the forest to the required extent.

Public welfare duties might also be solved within the framework of the nature close forest management. But the condition to that is that crowds wishing to relax and recreate in the forest could be able to approach pre-determined areas, generally by different sorts of vehicles. The chance to do so must be created, but also barriers should be drawn, which can be carried out by the formation of an opening up network.

To summarize the near-to-nature and multi-purpose forest management we have to strive that:

- natural renewals should spread in wide-ranging areas,
- we should create mosaic-style silviculture adjusting forest site fundamentals
- we should pursue preventive forest protection,
- production of basic materials should be accomplished with tolerant wood utilization decreasing the harmful effect of machines on the productive area,
- public welfare tasks should be concentrated on certain areas of the forest, by opening, however limiting the burden of the forest, too.

To execute these tasks each and every part of the forest, at any time, when needed must be encountered without obstacles. The condition to this is that the area of the forest should be opened up as it was declared by Károly Kaán at the end of the last century: "Where mountainous forest are not opened up with land roads of technical meaning, and the transport of wood products needs water routes, or wood sledge routes covered by doubtful snow or we might also need other vehicles influenced by the changeable weather, forestries suffer from the burden of centuries-old methods and expended clear fellings, which have a lot of disadvantages and harm in many areas." /Kaán, 1902/.

Then later he says: "The right operation and handling of trees is in direct ratio of the intensiveness of wood-carrying equipment and machinery." We could also cite from well-known foresters like Leibundgut who declares: „Silviculture is preceded by road building". Hannes Mayer is even more accurate by saying: "In an ecology-oriented mountain-type forest management the first step of silviculture is road building."

This means that near-to-nature and multipurpose forest management can not neglect forestry roads and their network, which is opening up. The reason for the existence of opening up network can be derived from the intended purpose of forest opening up. Those who are aware of the motives of why to execute opening up networks accept the reason of its existence. Jobs to accomplish with forest opening up can be grouped as follows:

- Economic tasks
 - within forest management:
 - pre-condition of forest management
 - transport line and working area
 - pre-condition of small area management
 - out of forest management:
 - pre-condition of accomplishing public welfare tasks
- Forest protection tasks:
 - overcoming of harmful organism
 - prevention

- putting up fire
- Defending tasks:
 - soil protection
 - protection of technical establishments
- Social tasks:
 - chance to approach forest work-sites
 - protection against rigours of weather, being close to vehicles,
 - assurance of prompt first-aid chances when accidents happen
 - decrease of accidents by insuring more favourable job conditions

This means that a properly formed opening up network is a sort of multifunction establishment:

- in its function of utilisation it insures the cost-sparing and harm-preventing harvesting and forwarding
- in its function of silviculture it helps the increase of the steadiness of stocks and the possibility to implement considerate silviculture processes
- in its function of forest protection it makes possible to accomplish the forest hygienic interventions and the stop and localisation of the biotic and abiotic damage having taken shape before
- in its function of general protection it executes the defence of, water, air and that of other natural and artificial objects
- in its function of recreation it shape varied scenery and by forming it the value also increases, and all the take place with profitable trade.

If we accept now that the base of a nature close, multipurpose forest management is the rational forest opening up, the question is what it should be like, how and with what tools it should be solved in a way that both public and forest management view-points could prevail.

The realisation of forest opening up with new aspects needs that new principles on two areas should be composed: referring to the design of opening up networks and forest road constructions.

2. New principles to form the opening up network

According to the above opening up network is not only a transport line to serve wood material moving, so forest opening up has to be shaped not only with its taking into consideration. In the multipurpose near-to-nature forest management direct forest managing duties on the forest area, and other duties on the whole area appear, and this occurs in the same periods very often. The opening up network must be shaped in a way that on each and every part of the forest area could be reach very quickly. This is why the opening up network must be accomplished as an area-opening up network. This is to say opening up network created solely on the basis of economic reasons fulfil wood-stock opening up, satisfying with this a momentary economic optimum. Networks formed this way can only become area opening up networks in the long run. In the process of the gradual formation certain roads lose their importance and the opening up of other territories may fail to come about, or they can only be opened up with the building of other road sections. Area-opening up networks not only do create economic optimum but also serve forest management in a favourable way after their total execution. After the order of proprietorship and the formation of owners behaviour there may be a new view-point to open up gathered agricultural and forest territories, which can be

regarded as a complex opening up. In this case some other interests should also be taken into consideration when shaping the opening up network.

For the sake of the formation of area-opening up networks we should

- transform the concept system of forest opening up
- a new method for network planning must be worked out, and then on the basis of this the existing opening up plans have to become timely.

When we revise the concept system of forest opening up we must

- investigate if our earlier target system was suitable
- compose our principles one more time.

According to these:

- we have to recompose the principle of forest transport and instead of the narrow-sense material moving we should interpret the wide-sense of the idea
- in its aspect we must change the place and interpretation of the opening up network in forest management and it must be considered as the infrastructure of the forest
- instead of the solely economic reasons an argument system with the analysis of every effect must be accomplished in order to form the networks.
- we have to revise the theory of the optimum road-density
- a new dissection of opening up networks must be formed and on the basis of that the opening up conceptions have to be worked out.

In accordance with the new concept system new planning methods must also be drawn up. The area-opening up networks assist and offend different interests. Therefore to the planning of the opening up network a special planning method must be worked out, which collects all the pros and cons of the execution of the network and can also handle the conflicts. Later among the processed opening up varieties it can help choose the most suitable one in an objective way.

The clarification of the principles of a new aspect network development has been finished. The elaboration of the opening up planning method is in progress. The basis of that is spatial informatics, which makes possible to analyse handle and evaluate a number of pieces of spatial information (GIS).

3. New principles of the Accomplishment of Forest Road /Design and Plans/

Opening up networks can be accomplished with roads according to the national geographical and managing circumstances. However forest road construction got into the cross-firing of nature and environment protection. Certain parts of the notices sentences forest road building in a rightful way. Searching for the reason of the mistakes we can declare that there is not a particular problem with the prescription of road building and road planning. All these might become deformed during the practical accomplishment due to a false behavior when designing and executing. This means that the cause of mistakes may be derived back to the faults of planning and executing mostly, and it takes place very often. As a first step these

ethical-type problems should be solved and later the technical regulations might be changed.

Tasks in this field are:

- to supervise the blame able principles and to compose the new ones
- to compose the new general technical and ethical principles of nature and environment protection
- to revise the technical prescriptions
- to have all these accepted and introduced in the technical practice of forestry

The acceptance of a term must be regarded as absolutely essential. This is to say that technical establishments, in any form and at any time, might confuse the living neighbourhood in which they were placed. This must be regarded as a fact and can not be denied by any sort of solution or explanation. After that all the problems have to be opened up and the possibilities should be examined. Later our technical methods should be chosen in a way so that formed establishment could harm the environment to the least extent and utilising the capacity of self-accommodation it should fit in within the shortest period of time. The harmony may be realised again and not in the long run.

The formation of the guilty aspect in terms of investment, planning and executing aspect must be due to the wrong road-building principles of economic theories and the constant lack of money.

Within the framework of forest management with economic trends the minimisation of building expenses/planning and building/ was declared as a basic theory. In that case forest road construction was only given motives by economic advantages. By doings so they wanted to reach the purpose of recovering expenditures for the investment of forest roads in short terms. During the minimisation of the expense they did not consider the demands of nature and environment protection and road maintenance. Roads having built with this aspect were not in harmony with traffic and environmental conditions this is why the expense for maintenance increased in the long run. Since these expenses were not available at the certain forestries the prompt damage of our forest roads, because of the week condition when starting, started early.

The other reason of the unfavourable situation is that the designers of forest roads were strongly influenced by the lack of the available capitals. This fact could lead to the decrease of the amount of assets in an uncritical way charging with that the right and economical solutions. The wrong investment aspect having shaped by all these and also the planning practice were tried to prove by the false theory of technical minimum. The ambition to the technical minimum does not mean that we try to reach the decrease of the executing costs without regarding the economical factors of the whole road operation. We must build roads with suitable parameters for them especially the ones with a role of a transport line basically, beside the required expenses. In the forest management of ecological aspects to this we must add that all these must be solved with the consideration ecological conditions, which also means the increase of expense.

Basically the principle of summarising right trends but false technical minimum in practice can not be cast away, because the same with certain additions might be useable and acceptable in terms of ecology and economics. This means that forest roads should be built with certain technical parameters and expenses, which is in harmony with the largeness of

forestry traffic and other demands, too. Besides it provides a sort of suitable technical security and also covers the environmental conditions.

What does the new-found decision of technical minimum mean? When constructing forest roads our purpose is not only decrease the costs in an unreasonable way. Instead, the planning and building prescription should be defined in a way so that they would lead to cost decrease anyway with proper technical solutions. Further cutting of expenses will be reasonable neither from the point of view of economics /minimum of building-maintaining expenses /nor ecology in the long run. The keep all these prescriptions we provide a quality controlling system having worked out in a suitable form. By doing so all the social demands referring to forest road construction may be satisfied. However due to the higher constructing level building expenses will grow, which cannot be covered by forest management solely. This also means that to the construction of forest roads the financial support of the society is needed.

The next problem circle is the composition of the ethical engineer behaviour from the point of view of nature and environmental protection.

General engineer behaviour can be summarized in this respect as follows.

- continuous endeavour to stop harmful environmental effects
- far-reaching thinking about ecology and economy
- exemplary handling of our own expert-field.

With such an aspect of engineering activity harmful environmental effects might be diminished in a significant way and this also will decrease the conflicts.

From the technical point of view, these principles means that our facilities:

- will not be formed bigger than required,
- are assured in terms of inner and outer stability
- are of maintainable structures
- help accomplish right material-utilisation and management.

In the technical practice of forestry it is essential that the worked out facilities might not be larger than required. This condition when talking about forestry technical establishments can be kept, because the buildings are small anyway and they do not satisfy other claims /e.g. convenience of travelling, speed, increased security etc./. The road network elements should be adjusted to the needs of forest management.

At all times suitable steadfastness is a requirement. The lack of this does not immediately lead to tragedy but it is detrimental with the prevention of right utilisation and the continuous maintaining demand from the point of view of economics and environmental protection. Putting under grass of a surface or planting of trees can be solved if the surface is steady in its technical meaning, though the same cannot be worked out on a surface of whirling and spinning type.

The requirement of the maintainability is essential as we have mentioned several times before. Any structure with a continuous damage needing the work and moving of machines, using with that a lot of energy, or the structure becoming unserviceable without the above must be regarded as harmful from the point of view of environmental protection. During the

construction and the work-phases before that we have to create suitable technical conditions so that it would count in maintainability and the demand for maintenance from both economic and environmental protecting view-points. This is a case when purposes of economy and environmental protection correspond to one another.

The consideration of the principles of material usage is also a basic factor of the moderation of harmful environmental effects. We do our best if we follow these basic principles:

- life-span increase
- building in purposeful materials fulfilling employment
- neglecting surplus materials
- using substitute materials
- employing recycling or recycled materials
- exact portioning, little might be a lot at times
- technological change preferring mechanic solutions.

Summarising the above principles we can declare: technical solutions formed with ethical compromises will be favourable solutions from the point of view of both economics and environmental protection. Knowing these basic principles and keeping them during the process of road building we can create adequate facilities from the view-points of economics and ecology.

To decrease the harmful effects of forest road construction the next proper activity would be the supervision of the technical prescriptions. By accepting the above the Forestry Department of the Ministry of Agriculture and Regional Development had the prescriptions referring to forest road planning reworked. Keeping of these on the designing level it is the condition of gaining support. Purposefully the following activity could be the accomplishment of the technical control of the execution. This would assure the success of the realisation of roads having planned with right theories.

When the aspect of a general nature and environmental protection and its base of an ethic engineer behaviour become general really, the unfavourable effects of forest roads will diminish to the least extent.

The change of aspects however is a time consuming process, which can only be accomplished with consistent and solid resolution.