PLANNING LOGGING ROADS

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There is no question as to the importance of logging roads in the lumber industry. However, the realization of their importance doesn't solve the problems that arise in building the roads. Proper planning of the roads is essential. This includes proper location and determining the standards that are to be used in their construction.

This is not an easily solved problem because it is impossible to set standards for logging roads that will satisfy all conditions. In actual practice, most companies have somewhat lax standards that they vary as they see fit. The private companies usually vary in their road standards proportionately with their size. The small gypos are interested in building the cheapest road possible for their immediate use; while the larger companies feel that more expensive roads will be more economical over a long period of time.

Although no two lumber companies have the same ideas on road planning, they are faced with the same basic standards when building roads on government land. The Forest Service has specifications for roads built under their control. Their standards cannot always be used satisfactorily because of the varying considerations in road construction. These standards are revised from time to time in an attempt to arrive at
some standards that will be best for all concerned. Private industry appreciates these efforts made by the Forest Service, but many of them feel that there is need for the local officials to have the authority to vary the standards under certain conditions.

**FACTORS DETERMINING THE CHARACTER OF THE ROAD**

In the construction of logging roads, the conditions and the demands to be made on the road must be carefully considered so that the most economical solution may be obtained. The principal factors that determine the functions and character of the road are the physical conditions, the expected use of the road, and the type of equipment to be used in getting out the timber.

**Physical Conditions**

The physical conditions consist of various factors such as climate, topography, and the soil. In a dry climate it isn't necessary to rock all of the roads, while in wet climates nearly all roads need to be rocked. Also, in wet regions, drainage is a much more serious problem. To adequately combat this, suitable ditches must be made; and considerable care must be taken in choosing culvert and bridge sizes.

In country of rugged topography much more care must be exercised in planning the roads; hence more rigid standards are required. Where the side slopes
are steep, slides are likely to occur, and erosion is a serious problem.

Soils vary with the climate and topography. The importance of the study of soils has only recently been recognized by logging engineers. Considerable money may be saved by determining the amount of rock required on various soils, instead of putting a uniform layer on the whole road.

The Expected Use of the Road

The expected use of the road should be one of the most important elements in determining the location and standards of the roads. In the past, the main object in building a logging road was to get to the timber to be cut in the most direct way possible. No consideration was given to the future use of the road as a means of getting the adjoining timber to the mill. Companies that followed this policy are now faced with building additional roads to the same areas. The logging companies that did this cannot be blamed too severely, because at that time timber was cheap and readily available. It wouldn't have been economically feasible to plan and build roads into distant timber when there was an adequate supply near the mill.

Times and conditions have changed, and companies now must plan to make use of all timber available. The best policy is to plan the logging plan and road system for the whole area. By using this method, much better
roads can be built at less cost per thousand board feet of timber removed from an area.

Other uses of the timbered area cannot be overlooked in the planning of the roads. This is particularly true on government land. If an area is to be used as a recreational area as well as a source of lumber, there have to be changes made in the location and standards of the road.

**Equipment Used**

The manufacturers of the large logging trucks have come a long way in their short experience in the manufacture of this type of equipment. Trucks of today are large and powerful. This presents two basic problems. The first is the problem of determining how steep an adverse grade can be economically hauled over. This varies with the size of truck. It is desirable to keep the adverse grade to a minimum; however, a short distance of steeper adverse grade is advisable if it substantially cuts construction costs.

The other problem is determining the maximum load that the trucks should carry. It is possible to economically haul ten to twenty-five thousand board feet per load with the off-highway trucks. However, having trucks that will haul heavy loads is of no value if the roads will not hold them. This makes it necessary to raise the road and bridge standards where these trucks are to be used.
TYPES OF ROADS

Logging roads are classified in three general types: spur roads, secondary roads, and mainline roads.

Spur Roads

Spur roads should not be constructed on a very high standard. They may be used for the first cutting only. When used for later cuttings on future sales, it may be wise to build on a temporary basis, and ignore future maintenance between sales because it is cheaper to reconstruct roads and bridges than it is to spend a large amount on a high standard road and the subsequent maintenance cost.

Another factor to consider in spur roads is their erosion hazard. Two methods have been proposed to combat this hazard. One method is to slope the road bank. The other method is to dig large ditches across the road at regular intervals. The latter method seems to be the best because it would be cheaper to make the ditches, and it would be cheaper to reconstruct if it were necessary to use the road again.

Secondary Roads

Secondary roads serve principally to get the logs from their sources to the mainline roads. Therefore, their standards should fall between the mainline and spur roads.

Their expected use is enough to merit using nearly as much care in the engineering work as that used in laying out mainline roads. This varies with the total
volume to be hauled over the road.

There is quite a difference between the ideas of private companies and the ideas of the Forest Service concerning the standards to be used on secondary roads. The Forest Service has changed these standards somewhat but the lumber companies would like even more changes to be made. They have some good arguments and further changes will likely occur.

The private companies main argument is that alignment and grade are maintained too high by the government. This results in an increase in the yardage to be moved. Sharper curves can hold the road to the contour with reduced yardage. On adverse grades, the trucks are going slower and curves can be somewhat sharper. However, care must be taken to prevent too sharp of a curve.

A break in grade line, using short sections of steeper grade, will reduce construction costs considerably. Avoiding an expensive rock cut is an example where this can be put to good use.

The Forest Service culvert specifications are criticized in the pine country. The merits of using metal culverts are questioned in the case of roads to be used for a relatively short time. Even where metal culverts are reasonable, there is dispute over the size requirements. The minimum allowable size is fifteen inches. A much smaller culvert would satisfactorily serve the purpose in some of the dry areas in the pine country.
Mainline Roads

The mainline roads should be considered permanent roads and constructed to standards that will serve the area with a minimum of maintenance, and still handle the loads hauled over them. If these roads also serve public travel, they must be constructed to standards sufficiently high to serve all purposes.

Nearly all companies agree upon the basic idea that these roads should be of high quality. Alignment and a limited maximum grade are followed closely so that more speed may be obtained. Since the mainline roads are used on a permanent basis, the initial high construction cost is offset by the reduced hauling costs.

A good foundation and surface is necessary on mainline roads so that they will be in good condition all of the year. Also, the road must be able to withstand the heavy loads hauled over it.

Some companies have paved their mainline roads. This results in a higher initial cost, but makes a better road and lessens maintenance costs. They have trouble with these roads in some cases. Point of the trouble is that they haul heavier loads that the road can stand. Another source of trouble is improper construction. A paved road requires solid ground, a good base, and a good wearing pavement. If the first two requirements are ignored, trouble is certain to occur.
SUMMARY

There is no set rule in planning a logging road. It is necessary to examine the physical conditions present, the expected use of the road, and the equipment to be used in hauling the logs. After careful consideration of all factors, the type of road to be built is chosen according to certain standards.

It is very important in planning logging roads to consider the whole area affected by the road.
APPENDIX

1. The Logger's Handbook
2. The Lumberman
3. The Timberman
4. The Journal of Forestry