ROADS IN THE MANAGEMENT PLAN

by

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Roads in the Management Plan

Everyone seems to agree that road planning is important in the management of forests for a sustained yield, but the real reason for these plans and proper considerations that are to go into road planning are often left out. This paper is intended to act as a reminder in road planning. Let us first look at some of the reasons that a good road plan is necessary and just what a permanent road system accomplishes.

A permanent road system is needed in a sustained-yield management area not only for the harvest of the present crop of mature timber, but also for the harvest and treatment of succeeding crops. Immature timber needs some silvicultural treatment to make it produce its maximum volume. Young timber should be thinned to get the most volume off a given area. This is impossible to do unless an adequate road system is in the area; this is one of the drawbacks in our present immature stands. They are in need of thinning, but will not produce enough volume to pay for both the logging and road building into the area. These areas of small volume or young immature timber will not support the building of access roads.

At the present there is a great deal of overmature timber that is going to waste because it is "inaccessible." This timber is beyond the present logging front and is
deteriorating rapidly. A good road system with a lot of foresight is needed to salvage these stands from total decay. The roads that are to reach these areas must be built soon. These facts must be considered in the long-range planning needed in a sustained-yield management plan. The roads built for this purpose, could also be used to harvest high value specialty items like the Noble fir and spruce that were needed by the aircraft industries during World War II.

The need for a well developed road network was shown in 1951 when a large volume of Douglas-fir was blown down in the coast range in Oregon. A large part of that timber is still rotting on the ground because it is located too far from existing roads to be easily salvaged. The problem of wind-throw is not localized in small areas, but is spread over thousands of acres in small patches containing only a few trees. It is economically feasible to pick up only the larger of these patches, and let the greater number of small patches rot. With a well-developed road system it would be possible to salvage these small areas by logging right from the road. It is true in all salvage work that a good road system must be present to make it pay.

In addition to meeting the silvicultural and harvesting needs of present and future timber stands, the road system must meet the economic, engineering, fire-protection, and
watershed needs of the area. If the system does not meet the economic limitations of the stand and throws an undue drain on working capital in anticipation of future yields, the average logging operation will not be able to sustain its harvesting operations at a constant or economical level. The road must pay for itself when it is built or immediately afterward.

The road plans must consider other than timber harvesting in some areas. A tract that stands in the watershed area of a municipality must consider the watershed value and make the road plans to correspond with the logging methods that will be used in such an area. Extra consideration must be given to road location within the area to prevent the blocking and polluting of streams. In some states there are special rules about the location of roads in watershed areas. These laws should be studied before any road planning is done in the area.

One of the most important uses of the road system is in fire protection. At all times throughout the life of a tree it is in danger of being destroyed by fire. The roads not only act as access to the fires but are also ready-made firebreaks and can be used to backfire from. In a well-laid out road system all areas of the stand are within reach of hose from a tank-truck on the road. This makes the initial action on a fire available sooner and each man and piece of equipment more effective.

When actual work on planning the road system begins one of the important, but little done things is an integration of the road system with that of your neighbors. This should
include the incorporation of logging on a boundary area where both property holders' timber must logically come out one way. It is often possible to co-operate on the building of a main-line road that will serve both owners to the best advantage. This is especially important in the rugged terrain in the Douglas-fir region, where property lines have no consideration whatsoever for the topographic features of the ground.

When actual road location on the ground begins, the planner must know the location of the various operating units in the area. He must be able to plan the roads so that the road to the first operating unit will also serve the next operating unit as well. All too often the main-line road is laid out with no consideration as to prolonging it into the next operating unit. If some topographic or other feature causes the road to the next cutting unit to start from some point other than the end of the road in the near unit, a lot of unnecessary high-class road must be built. This all tends to raise the costs of the road construction and also increases the amount of road to be maintained. Sometimes this is unavoidable, but often one road can be made to suffice if a small change in location is made.

Roads should be so placed within the unit that the delayed settings may be picked up as an economical logging unit with little, if any, additional road construction. These delayed settings should have the road constructed to serve their landings as well as those that are to be cut immediately. A small change in the initial location will often save
additional expenses when it comes time to harvest the delayed settings.

A great deal of time and effort may be saved if the spots in the area that are suitable for landings and cold decks are located and noted by the road planner. The location of these areas will make it possible to route the main-line road where it will minimize the construction of spur roads or swings. While the road plan is in the formative state a little altering of location is quite easy, and may lead to a substantial saving in the length of road to be constructed. It is wise to also keep in mind the fact that a road is a permanent fixture and will retain its value even after logging, whereas a swing or cold deck is an expense that will be incurred at each logging and leaves no permanent improvement on the ground.

The spacing of the road network is very important and varies with the logging methods that will be used on the area. The distance that separates the roads varies according to topography and equipment. Tractor logging requires rather flat terrain but permits a wider separation of roads. In rough topography the high lead method is most often used. The effective yarding distance of the tractor is about one-fourth of a mile, but is limited to favorable grades. The high lead has a more limited yarding distance, about 1,000 feet being maximum for long corners. The most economical limit is around 500 feet. The high lead also has the characteristic of working best on steep adverse slopes. From these figures the
average distance between roads can be determined. Tractor logging requires roads on the lower side of the setting, and they can be placed about one-fourth of a mile apart. Roads on a high-lead setting are best located above the area and should be placed at 800-foot intervals. The roads for a tractor operation should start as near the creek as is possible and work up the slope from there. The high-lead show should have the road at about 800 feet from the stream or a little farther depending on the amount of timber to be left along the stream. One exception to the spacing with the high-lead system is when the landing occurs on a ridge top and logging can be done down both sides of the ridge. In this case the distance between roads can be doubled.

Another consideration in the planning of the road system and in the logging plan is obtaining a balance between summer and winter shows. The operator who fails to build roads in the summer with this balance in mind often finds himself shut down during the rainy season with operations that are too wet to work. The only solution to this is to build roads during the summer and gravel them before they get cut up. The winter shows must be on low ground when snow is the limiting factor in the higher elevations. Where rain is the problem, they should be on well-drained or rocky ground. These considerations are important if year-around production is to be maintained.

When roads are to be maintained as permanent, as on a sustained-yield area, they should be well built and well
engineered. The roads should meet some standards for grade, surfacing, and radius of curve. A company will find that it will pay in the long run to hire an engineer to maintain these specifications. The object of this additional investment is to make the original road easier to maintain, more stable, and faster. The average speed that a truck can travel from landing to dump is a pertinent factor in log-haul cost. If the average hauling speed can be increased by straighter roads and better surfacing, the hauling costs of an operation can be considerably lowered.

In the last few years there has been some change in opinion regarding the striking of rock with a permanent road. It used to be that a locator would spend a great deal of additional time and effort to avoid hitting a rock face. The modern thought with respect to permanent roads is that the additional cost of rock work is almost nullified by the reduced yardage of excavation and the reduction in maintenance costs. In solid rock the side slope can be reduced to 1:1, which will reduce the volume on a lane and a half road by from one-half to a third of a 1:1 side slope cut. The average cost of rock work is two to three times that of dirt removal. Therefore, the costs per station is quite similar in the long run. The removal of the rock for road ballast can save the cost of additional borrow pits or rock quarries. Another factor is the permanence of a rock base. A heavy rain is not as likely to cause a portion of your road to slip down the hillside as it tends to do in dirt.
If the suggestions contained in this paper are followed, the forest manager should be able to have a well designed and useful road system at a minimum price. The manager must be careful in his planning not to cut his expenditures so close that in lowering his initial cost of roads he will not add subsequent high costs of road maintenance or truck maintenance. A little care in planning to bring these costs to a minimum will soon pay their way economically as well as in satisfaction.