

SESSION 9
PAPER a

PRINCIPLES OF PLANNING FOR FOREST HARVESTING

P.J. HILL
Forester
Forestry Training Centre

INTRODUCTION

The word 'planning' is used to describe anything from a series of arbitrary or dogmatic decisions to a critical and sophisticated investigation into the whole range of possible choices open to an enterprise. It is convenient to regard planning, in a general sense, as embracing three closely related activities. These are first, the collection and assembly of data, secondly the examination and testing, against the correct criteria, of the various possible courses of action and thirdly, the formulation of plans.

Planning for forest harvesting is no different from the planning of any production process. The same three stages of collection and examination of data followed by formulation of, in this case, the logging plan, have to be carried out.

I propose in this paper to describe the three broad levels of planning that apply to forest harvesting; Indicative, Tactical and Operational, and within these levels to briefly outline the data that has to be collected, the types of examination and testing that lead to decision making and the formulation of operational plans.

By this stage in the seminar, we will have examined three future harvesting problems by the case study method, therefore most of the planning steps should have become abundantly clear by now so this paper should serve as a formal summary of what we have found out for ourselves already.

INDICATIVE PLANNING

Although the seminar is aimed at discussing tactical planning which has been duly defined as, "the ways and means of logging an existing forest so that production, safety, and environmental protection are compatible at least cost, and that management and off site constraints are met", I find it necessary to extend the time horizons backwards so we can consider what previous decisions lead us to the point where tactical planning begins.

In other words, what data has to be collected, synthesised and acted on before it is decided to make the first important decision - to log this particular forest or part thereof.

There is no guarantee that all future wood supplies growing today will be logged. Certainly our history to date has proven that if the exotic resource is there we will find a use for it. However, in the not too distant future there will be wood

surplus to our present requirements becoming available and if demand does not rise at the same rate as availability then the harvest planners will have some choice as to where they procure the wood from. If this situation arises then the planners may well be looking for comparative least cost areas.

Table I outlines the major factors that have to be taken into consideration before the decision will be made whether to log or not.

TABLE I: INDICATIVE PLANNING - Major Factors and Description

- + Broad Based Mensuration Data: This will be needed to give a reasonably precise estimates of age class structures, average tree sizes, potential annual volume available for harvesting and potential product types, etc. The national planning model provides this data on a regional basis.
- + The Topographic Mix - Steep to Rolling: The proportion of steep to rolling, or static to mobile system topography has to be determined. This has a direct effect on the examination of possible logging systems.
- + Potential Markets and Utilisation Plants: These will have to be determined although the information may not be accurate it is needed - (1) To ascertain potential economic viability of harvesting and processing, and (2) For the calculation of likely transport leads and maximum load sizes.
- + Likely District Council or County Attitudes to Forest Harvesting: If forestry is a conditional land use then there may be restrictions placed on harvesting. There also may be requirements that the forest owner or customer pay for upgrading and maintaining county roads.
- + Likely Catchment Board Attitudes to Forest Harvesting: If the soil types are likely to be sensitive to logging then all possible means will have to be examined to ensure that logging meets catchment board standards. It may pay to include catchment board personnel in the planning team at this stage.
- + Possible Logging Systems: The potential systems to do the job will have to be listed and the decision making process to sort out which are the most likely systems, begun. It may be necessary to conduct trials to see which systems meet management constraints.
- + Capital and Operating Costs for Logging and Transport: Following on from the potential logging and transport systems it will also be necessary to attempt to look broadly at possible capital and operating costs for these systems. Decisions will have to be made as to whether the average landed cost is acceptable.
- + Labour Supply and Skills: Will the necessary skills for logging be available in the area concerned. If not, will training programme have to be instituted or will necessary skills be imported from other regions.

- + Planning and Management Skills: Does the organisation have adequate planning, management and supervisory skills to control the operation. If not, do you train or buy in.
- + Sale Type: Is the Sale Contract, assuming there is to be one, likely to be Log Sale or Stumpage. This information will affect, to some degree, who does the planning, management and supervision but does not negate the fact that someone has to do it.

It can be seen by examination of Table I that although the factors under consideration are not of a tactical nature, there will be decisions made at the indicative level which could well affect such factors as, logging system selection, transport methods, etc., that the tactical logging planner may have to live with for a long time. However, tactical logging experts are usually called in to advise at the long term (indicative) level.

The trend today is for a team of people with skills in different areas (multidisciplinary) to be involved with indicative planning. The number of different areas to be explored require inputs from economists, hydrologists, geologists, engineers, logging planners, foresters, etc., and it is simply not possible for any one person to have the necessary skills. Therefore teams of personnel with the required skills work together to analyse the situation and make the decision whether to proceed or not and if so, give firm indications of likely methods of operation.

The time horizon for this planning level can be anywhere between two to ten years or possibly even longer. The planning teams have to build a rapport with outside agencies such as catchment boards, district councils, port authorities and the public. Without communication between all parties likely to be affected by harvesting schemes, there could well be frustrations and unnecessary delays.

TACTICAL PLANNING

If after the initial analysis it is decided to go ahead and log an area of forest, then another set of factors come in for consideration. These are outlined in Table II. They have been subdivided into two sets of factors, primary and secondary. In general, the primary factors or sets of data have to be assimilated before the secondary factors can be actioned.

TABLE II: TACTICAL PLANNING - Major Factors and Descriptions

Primary Factors

- + Detailed assessment data for volumes and quality of wood resource: This is probably the most important set of data required at the tactical level. Virtually all consequent decisions rely on precise mensuration data.
- + Sale Contract: Type of sale - this may have already been determined, i.e. stumpage or log sale.
Pricing point - Concerning log sales, on skid, on truck, at mill.

Length of sale, right of renewal etc.
Weight - volume conversion procedures.

- + Settle on logging and transport system design and equipment selection.
- + Assembly of productivity data and work study standards for costing purposes: This information is needed for each system design so that potential production from each area can be calculated along with the cost per unit of production.
- + Contractor and/or wage gang capital and cash flow requirements: This pertains to both logging and transport. If wage gangs are to be used the capital cost of equipment and cash flow requirements will need to be calculated. If contractors are to be the prime source of production and transport then annual operating costs need to be calculated.
- + Preparation of annual cutting programmes: These programmes denote what volumes of specific species are to be cut from specified areas of a forest. The total scheduled volume usually equals the annual sale volumes that a forest is committed to produce.
- + Preparation of detailed logging plans for areas to be harvested: These plans consist of topographic maps giving position of roads and landings, plus detailed analysis of how the operation is to be carried out with all relevant cost data.

Secondary Factors

- + Catchment Board approval of logging plans: In some parts of N.Z. - particularly where a section 34 of the Soil Conservation and Rivers Control Act is in force - all logging plans have to be approved by catchment authorities.
- + District Council approval of logging and transport plans: Many district councils are likely to want to control some aspects of forest harvesting. Logging and transport plans may be required to be approved before they can be actioned.
- + Forward roading: Spur roading should be formed about 12 months before logging to allow for consolidation. Road stripping and formation operations have to be planned and actioned. The logging plan is needed before this operation can begin.
- + Inform outside organisations of start up dates: If this is a new operation then organisations such as Timber Workers Union, Drivers Union, Department of Labour, etc., will need to be informed of when operations are likely to commence so they can provide the necessary servicing.
- + Advertising of logging and transport contracts - Subsequent negotiations.
- + Purchasing of equipment for wage operations.

In effect, the culmination of the tactical planning exercise is the production of the logging plan which, after approval by

the harvesting organisation and any other agencies such as forest owners, catchment authorities and district councils, can then be put into action.

OPERATIONAL PLANNING

The final level of planning which is then entered into is the preparation of operational or day to day management systems. These management systems provide the control cycle for the planning-operation process. Information is needed so that the planner can ascertain if the operation is progressing according to the plan or not. If there are differences between what was planned and what actually happened, then analysis of information produced by the control systems will allow appropriate changes to be made either to the operation or the next generation of plans.

If a particular organisation has been harvesting in a region for some time then most of these control procedures will already be in operation. However, if an organisation is to be involved in harvesting for the first time, or is starting in a new region, consideration must be given to the factors outlined in Table III.

TABLE III: OPERATIONAL PLANNING - Major Factors and Descriptions

- + Production cost control: The establishment of cost control methods by which actual costs can continually be compared to estimated costs etc.
- + Quality control systems: The establishment of systems by which cutover control, residual wastewood and residual crop, if thinning, can be measured and achievement assessed.
- + Log cutting strategy: Development of systems to obtain maximum value recovery from logs.
- + Product output control: The establishment of a system so that the production of log volumes by product type can be compared against the assessment data. This enables both a check on precision of assessment data and a check on attempts to maximise value.
- + Contingency plans for fluctuating markets: How will management respond to over or under supply situations. The choices may range from shifting gangs to higher or lower productive areas, to adding or reducing production units.
- + Review of work study standards: The establishment of a system of review of work study and productivity data.
- + Accident Prevention Schemes: Setting up a system of training, education, incentive etc., to ensure the maintenance of accident free operations.
- + Logging system review: Have we got the best system/s operating???

TRAINING FOR LOGGING PLANNERS

Throughout this paper I have referred to Logging Planners and an inspection of the number of different areas in which the logging planner must have some knowledge should lead to the conclusion that such a person has to develop a wide range of skills. I accept, and indeed support, the present trend of

multidisciplinary teams operating at the indicative level where the breadth and depth of the examination requires specialists in the relevant fields. However, at the tactical level the logging planner is often on his own and therefore must exhibit skills in a wide range of disciplines. Not only must he have an indepth knowledge of logging systems and their application, he must also be able to assimilate data pertaining to soils, hydrology, economics and costing, forest mensuration, work study, roading, labour skills, photogrammetry, etc.

The challenge is how do we train such a person? In the past we have relied on experience often, but not always, coupled with some degree of formal training (woodsman, ranger, forester, engineer). Will this system be able to produce the number of planners with the increased skill levels required for the future crop, much of which will be on steep country with possible environmental constraints? Formal training in logging planning in New Zealand at the moment is limited to basic coverage in the forestry degree at Canterbury, and the N.Z. Certificate of Forestry, plus 5 day short courses taught at the Forestry Training Centre. If further comprehensive courses are required the New Zealand logging planner has to travel overseas, probably to Oregon State University in the United States, which offers a ten week course in Forest Engineering. To date only two New Zealanders have attended this course both of whom are working in logging research today. I would suggest that either there is a concerted drive to upgrade the courses available in this country or we start to send our logging planners overseas for further training.

SUMMARY

1. Planning for forest harvesting can be divided into three broad levels; Indicative, Tactical and Operational. Within each of these levels data has to be collected, examined and decisions made. In the case of new operations, all three levels may have to be actioned, in the case of on going operations only the tactical level may need to be actioned.
2. The complexity of some harvesting proposals require the utilisation of specialists from many fields, particularly at the indicative level. Time horizons should be taken into account when considering harvest proposals. Communication between all parties likely to be affected by a harvesting proposal is vital to the success of the operation.
3. The logging planner may only play an advisory role at the indicative level but is the key figure at the tactical level.
4. The large volume of wood available for harvest in the near future and the fact that much of the wood is on steeper country with consequent potential environmental problems makes it imperative that full consideration is given to training logging planners in the required skills.

REFERENCES: Johnston D.R. et al. 1967 "Forest Planning", Faber.
L.I.R.A. 1979 "David Henry Scholarship Report Pacific North West North America Study Tour", N.Z. Logging Industry Research Association Project Report No. 9.