

ORGANISED FELLING FOR THINNING RADIATA PINE

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INTRODUCTION

LIRA has recently undertaken research into developing an organised felling technique for production thinning radiata pine. This report explains how the technique has been applied and discusses its advantages and disadvantages.

Organised felling is widely used and accepted as normal practice in most European countries. Recognising the vast differences between the species common to Europe and those common to New Zealand, it was desirable to develop a technique for local conditions rather than directly transfer the overseas technique. Radiata pine, New Zealand's predominant production species, has distinctive features such as large heavy branching, variable lean, irregular form and a high weight/volume ratio. Considering these variables, an organised felling approach has been developed over the past year for use in radiata pine thinnings.

Organised felling for skidder extraction

Development and testing was carried out in three systems :

- (1) Extraction by skidder using a seventh row outrow system and separately using random extraction tracks, tree length, age 13, thinning from 995 sph to 300 sph, average piece size 0.25 m³.
- (2) Extraction by Island hauler using corridors at 20 m intervals, age 14, thinning from approximately 1500 sph to 350 sph, average piece size 0.22 m³, processed lengths (extracted piece size 0.12 m³).
- (3) Extraction by skidder using random extraction tracks, tree length, age 18, thinning from 900 sph to 325 sph, average piece size 0.36 m³.

In both skidder operations, the majority of trees were head pulled.

BACKGROUND

Organised felling is felling carried out to a defined method which results in the clear separation of produce from the slash. It demands a disciplined approach by the faller.

The first step is to thoroughly assess the area to establish :

- (1) Predominant lean and changes which occur in lean direction.
- (2) Irregularities in topography that could change felling direction or placement of extraction tracks.
- (3) Pockets of windthrow which may cause difficulties in maintaining wood alignment.
- (4) Best direction of extraction to utilise lean and natural features such as gullies or gaps in stocking.
- (5) Felling aids that will be required.

The importance of pre-assessment cannot be overstated. If done correctly, a faller should have a good understanding of the area he is working which will enable him to work to his original plan.

FELLING AND TRIMMING

The basics of felling and trimming have been described in previous publications (Ref. 1 and 2)*. Two key points are :

- (1) The accurate felling of trees aided by proper use of the sights on the saw and directional felling devices.
- (2) Good clean trimming ensuring the saw is rested on the log or the operator's thigh.

Both of these must be carried out correctly as they significantly affect subsequent work.

EXTRACTION TRACKS

The simplest option is an outrow system if topography, stand conditions and management permit. A common procedure in New Zealand, when using outrow thinning, is to remove every seventh row of trees and thin three rows either side to be extracted down the outrow. The constraints of this system are :

- (1) Topography should be reasonably flat so that outrows, once started, can be fully utilised.
- (2) The stand must have been planted and the rows of trees easily discernable.
- (3) The forest manager must accept that some crop trees will be removed during outrow felling.

On more broken terrain, a system using random extraction tracks can be used. With this system, the faller must use natural features such as gullies and gaps in the stand. The best possible line from produce to skid must be maintained. Changes in direction should be gradual, ensuring the drag can be pulled without damaging residual crop trees. This type of extraction method needs more care and attention by the faller.

When a hauler is used for extraction, corridors will need to be cut at right angles to the contour. These should be spaced at 15 m - 20 m intervals, depending on the machine to be used and the length of the produce. The best method of marking the corridor is using a compass and aligning two or three poles at the start of the corridor. These poles are kept in line as the faller progresses up the hill. He should always be able to line up at least two poles so extra poles may be needed.

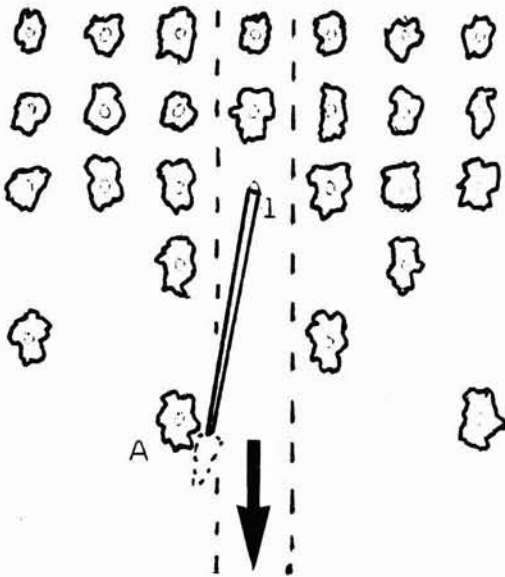
All these extraction tracks should be kept clear of slash. Produce to be extracted should have at least two metres clear of slash from the end to be hooked on. Pulp hooks or bench trees should be used where produce needs to be moved closer to, or on to, the extraction track.

* Ref. 1 "Tarawera Pilot Scheme - Introduction of a New Felling and Delimbing Technique", Gaskin, J.E., LIRA Report Vol. 6 No. 5 1981.

Ref. 2 "Development of Safe Felling and Delimbing Techniques with Chainsaws" LIRA, Swedfor Consulting AB, LIRA Project Report No. 14 1980.

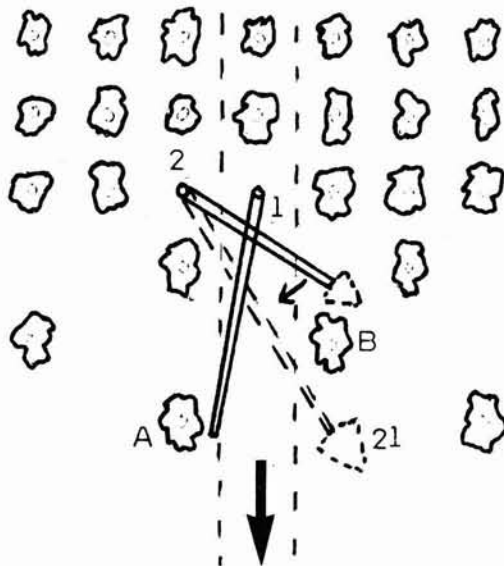
THE METHOD

Fig. 1



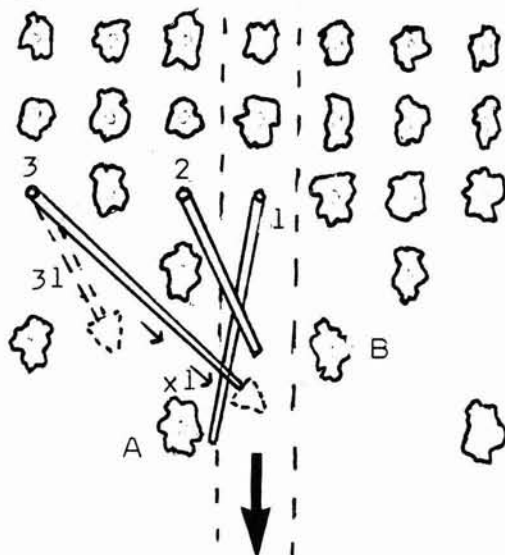
Having decided on and "marked" in the extraction track (the parallel dotted lines in Fig. 1), the first tree felled is that which is on or closest to the extraction track. This tree should be felled so that the head lands off the track. The tree is trimmed and branches that lie between the dotted lines should be removed to the left side of the stem. The head is cut up and stacked against the trunk of the crop tree (A). This will protect it from possible bark damage during extraction. If Tree 1 was short, it should be felled so that the head lands on the left of tree A and the tip swung on to the track manually. This would involve less work moving the head as it would be well off the track. Tree 1 now acts as a bench on which to fell subsequent trees to facilitate easier trimming or movement.

Fig. 2



The faller can either continue falling trees on the track or start thinning the side. In Fig. 2 he has thinned the side tree 2, in this instance a short tree. It has been felled so the head is well clear of the track and does not need to be moved. Again, all branches which lay on the track should be cleared. When the tree was headed off, he could swing it, using Tree 1 as a bench, in the direction of the arrow so it was better aligned for extraction. If tree 2 had been long, it could have been felled to the left of B as shown by the dotted outline 21. This would mean more branches to be removed from the extraction track. However, the head would be well clear and not need to be moved.

Fig. 3



When trees some distance from the track (such as tree 3) are felled, it is unlikely that the head will clear the track. In the case of tree 3, the head has landed on the track. When headed off, the head would be cut up and stacked against A in the area of x1. This will protect A from damage during extraction. If tree 3 had been short, it would have been felled as the dotted outline 31 indicates and dragged (using pulp hooks) so the tip lies across tree 1. The head would still be stacked against A at x1. With trees like 3, there is no need to remove branches that land off the track. Only branches close to the head would need to be moved and stacked against tree A.

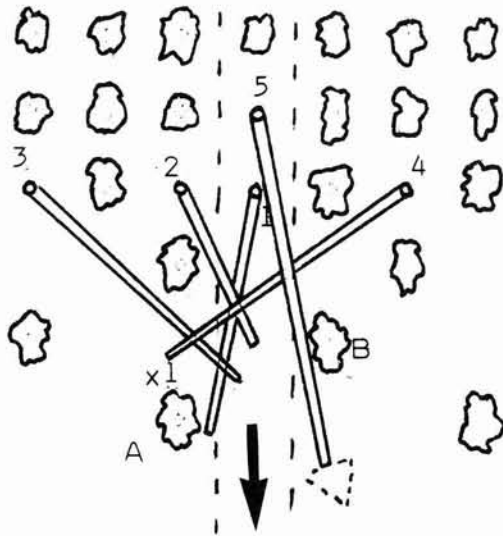
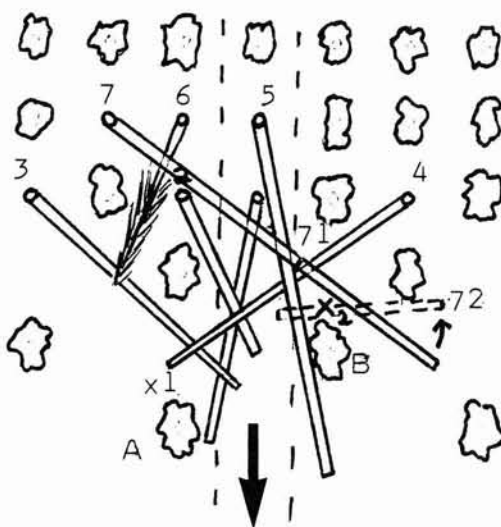


Fig. 4

Before the faller could fell tree 5 which is on the track, he would have to fell tree 4 as indicated. This would then provide a bench to fell 5 across. Tree 5 would be felled so the head lands on the right hand side of the track where it would not need to be moved. All branches falling on the track would again be cleared.

The sequences described above are then continued, ensuring that adequate bench trees are used. All slash is cleared from the extraction track and that cleared slash is stacked to protect crop trees.

Fig. 5



Two features are illustrated in Fig. 5. The first is the felling of dead and/or non-merchantable stems, (tree 6). If these are felled away from or parallel to the track as indicated, there is no need to move them as they should be well clear. If they occur on the track or have to be felled over the track, then slash falling on the track should be removed.

If the produce specifications enable short logs to be cut, the best way to fell tree 7 is as indicated. The tree is completely trimmed and headed off, leaving the head where it lies but removing the slash from the track. The slash should then be stacked against tree B at x2. Tree 7 is then crosscut at 71 and the short head piece is manoeuvred in the direction of the arrow so it lies in the position as indicated by the dotted outline 72. Felling 7 thus greatly reduces the slash removal than if it had been felled to the left of tree B.

DISCUSSION

The intention of this report is to illustrate the concept of organised felling. Felling is the first step in extraction and if done correctly, will significantly improve subsequent phases. A concept such as organised felling cannot be introduced overnight. It requires considerable time and commitment by supervision and training personnel and needs patience of managers.

There will be extra work required to remove slash and maintain clear extraction paths. Decreases in the amount of time required to hook on drags and larger drag sizes due to more easily found produce should result in significantly increased machine productivity. If fallers are already working to capacity, then it will be necessary to employ extra fallers. Each situation will need to be judged on its merits. Reduction in damage to crop trees will occur by correct placement of slash.

Further reports will quantify production levels with organised felling and provide information on the balance of manpower to machinery.

For Further Information Contact:

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