

PROGRESS IN NEW ZEALAND

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INTRODUCTION

Since the beginning of mankind, there has always been some busy-body telling people that there is a better way of doing what they are doing. In some cases it has been warranted and improved the lot of the person doing to some extent. More recently, these busy-bodies have given their studies, in keeping with these studies, a new and improved name, ergonomics. The word, a derivative of the Greek word 'ergon' work, strict definition is the study of man in relation to his working environment, or adaption of machines and general conditions to fit the individual so that he may work at maximum efficiency (Ref.1).

The logging industry has come in for its fair share of attention of these studies. Justifiably so, as there has been identified room for improvement in the physically demanding manual work involved.

This paper addresses the progress made to date by New Zealand in ergonomic development and implementation. Development has been separated into two parts, technological and technique developments. New Zealand's record of implementing developments is considered in the final discussion session. Hopefully, this seminar will give considerable attention to how we can more rapidly introduce developments.

TECHNOLOGY

Chainsaws

The unit we take most for granted was first introduced to New Zealand logging in 1950. The one man saw arrived in 1952, but wasn't used for felling until 1959 (Ref.2).

During the last 25 years the chainsaw has undergone considerable refinements. Such developments in chainsaw evolution have, in the main, been aimed at producing a smaller, lighter, more easily used unit. Features now standard on the better professional saws are :

- Vibration dampening. An important development as it reduces white-finger risk and makes the saw less fatiguing to use. Unfortunately, the importance of good vibration damping is not recognised and bushmen often run saws with rubber mounts that no longer serve any useful purpose, thus negating this important improvement.

- Body design. More streamline design of the chainsaw body, which allows more efficient use for delimiting, but also includes the provision of "sights" on the saw which fallers can use to better "aim" felling cuts.
- Muffler. Reduction in noise levels and, in most cases, better location of muffler to reduce incidents of burnt legs.
- Power. Better power to weight ratio through use of plastics rather than metal for body mouldings.
- Guidebars. Sprocket nose bars which are more efficient and smoother cutting.
- Other. Better handles, chain catches, chains which reduce kickback, etc.

### Felling Aids

Numerous aids are now available to fallers which are of assistance when felling small wood, such as first and second thinning of radiata. Felling levers were designed to reduce the physical effort required to directional fell trees and are also helpful in dislodging hang-ups. Other aids have been tried and proven successful for directional felling and dislodging of hang-ups. Some of these are :

- portable winches
- turnbands, a simple webbing sling which is wrapped around a tree that is hung-up and a pole placed through a loop on the free end enables even quite large trees to be dislodged if hung-up with reduced danger of injury (sprain) to fallers.
- air bag attachments for chainsaws. These were developed to further reduce the effort in directional felling using a lever.

### Felling Bench

"The felling bench is primarily a work saving device developed for pine fallers working an outrow system in first and second production thinnings in South Australia" (Ref.3).

Recognising the potential of this concept, considerable research, development and demonstration of the felling benches use was carried out by LIRA in 1979/80. It proved to be an excellent method of achieving a good delimiting height which meant less fatiguing delimiting techniques could be practised.

### General

Other areas of ergonomic progress have been in several areas :

- Miscellaneous accessories, such as chainsaw file holders which give better protection during filing and result in a better sharpened saw, thus less wear to equipment and operator.
- Retractable logging tapes. Somewhat easier to use than a 10-12 foot pole or conventional tape measure.

- Protective equipment. This is only mentioned in passing as it will be covered elsewhere in the seminar. However, good leg, head (eyes and ears) and foot protection is readily available.
- Improvement in smoko huts on site, well in evidence in most company crews, although contractors still have fairly basic smoko huts in most cases.

### TECHNIQUES

Changes in techniques have been as slow as the adaption of technology. Two important events have occurred during the past 15 years which have lead to a slow changing in certain techniques for felling and delimiting.

#### Nordfor

In 1972, two Nordfor instructors were employed by N.Z. Forest Products Ltd to introduce the Nordfor technique of felling and delimiting. The technique involved a change of saw size and bar length. Jonsered 80's, with 20" bars, replaced the, at that time, McCulloch 125 superpro with 26" bars. The technique difference was considerable in areas of scarfing and backcutting, as well as trimming. The advantages of the Nordfor technique were said to be increased safety of saw operator, increased man hour productivity, and reduced fatigue due to the use of smaller, lighter saws.

In October 1974, a student dissertation (Ref.4) set out to compare conventional felling to Nordfor felling. The study was unable to draw any significant statistical conclusion on whether the Nordfor technique was faster. However, subjective comment from operators said conventional was much better. The report concludes by saying that in 45 year old clearfell stands, trimming is not necessary and small saws make felling too slow and that in 30 year old clearfell stands small saws may be better. The author did however reduce the rest allowance from 36% to 34% due to the advantages of using the smaller saw.

#### Swedfor

In 1980, LIRA, with assistance from the ACC, employed a consultant group, Swedforest Consultancy AB, to investigate safer felling and delimiting techniques for New Zealand conditions (Ref.5). That group alluded to the difficulty of developing standard techniques as the working conditions varied. However, those consultants summarised a good technique as having the following characteristics. It is safe for the operator and those around him, it is ergonomically correct, thus minimising fatigue, it is efficient, it gives a good result from a quality point of view. The techniques developed by the consultants were centred around the equipment described in a previous section of this paper, technology, especially lighter saws, felling aids and protective clothing.

The techniques developed can be divided into two areas, felling and delimiting.

Felling : "The goal of tree felling is to fell the tree in such a direction that the following sub-operations are helped as much as possible. A prerequisite is that the work is performed in

a safe way".

Each sub-operation was treated separately and a specific work technique described. The sub-operations were, clearing round the tree, butt trimming, scarfing, backcutting, felling of difficult trees and dislodging hang-ups. Special mention was made of clear-felling of old crop and new crop, as most of the abovementioned refer to thinning.

Trimming : "To carry out delimiting quickly, safely and without unnecessary effort, the movement of the operator and those of the saw has to be co-ordinated so that the work becomes a smooth flowing process without stoppages. A flowing delimiting demands a correct working height, a firm stance, a light saw, support of the saw on the trunk, a correct grip and selection of a suitable technique for different types of branches and trees".

There has been other development work subsequent to these two which, basically, build on those to make them more suitable or acceptable for New Zealand conditions. Most of that development work has been aimed at smallwood logging. That development is now seen to be at a mature level and emphasis is now swinging more to clearfelling of second rotation.

#### DISCUSSION

The adaption of different equipment and techniques in New Zealand has proven to be a slow process. Understandably, different people and organisations adapt parts of developments quicker than others. If we firstly look at technology improvements and how much has been put into use, the picture does not look good. Following through three examples we see the use of helmets was introduced by legislation and now all bushmen wear these. Ear protection and eye protection, which is now almost standard equipment on helmets, is often removed or left in the non-use position. Although many older bushmen suffer from some degree of hearing loss, the younger, or newer ones, seem to think it could never happen to them. The second example is that of improved design of chainsaws, especially those manufactured in Sweden. On purchasing the saw, it is in good condition as per what the manufacturer wants. After two months work the saw is often in a sorry state of repair, to the extent that all the good features are virtually negated, i.e. the example earlier of vibration damping mounts. The last example is that of the felling bench. An excellent development for reducing the fatigue involved in trimming in first thinning of radiata, ideal in the Tarawera Forest one-in-three outrow system, yet fallers couldn't get past the extra work involved in carrying the bench into the bush each day, which accounts for perhaps ten minutes out of 400 minutes work.

When looking at techniques used, considerable money was invested by management in getting the techniques demonstrated in New Zealand so they have a vested interest in implementing these techniques. However, again we see very slow adaption of these techniques.

From the Nordfor exercise we saw a change in scarfing technique to putting the top cut of the scraf in first. After 12 years and considerable effort recently from the L. & I.F.T.B., almost all fallers now use this technique. Four years down the line from Swedforest's work here, progress has been a little better with good protective clothing available. A slow swing to smaller saws with marginally shorter bars and good implementation of

different backcutting techniques.

To date in the New Zealand logging industry no work has been undertaken in the area of levels of physical requirements of various techniques to try and prove one is better than the other, thus it is only subjective when one technique is said to be better than another. Whether that type of work will encourage quicker implementation is something which this seminar should be addressing itself to.

One development which deserves special mention as it has greatly increased the speed of extending and adapting new equipment techniques, has been the formation of the Logging and Forest Industry Training Board. Firstly, by incorporating new techniques into their certification scheme means that the techniques are more quickly and widely applied. Secondly, their important role as a co-ordinator of the numerous company trainers allows more rapid interchange of information about new developments.

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