MECHANISED LOGGING IN PRACTICE

Ken Holmes
Logging Contractor,
Rotorua

OBJECTIVE

To run through some of my experiences with mechanisation - the things I've needed to consider, the problems I've faced. In doing this I hope there may be some useful information for other contractors looking to mechanise and for managers and planners looking to fit mechanisation into their forests.

INTRODUCTION

I have been a logging contractor since 1983 when I began with Pan Pac, Napier, with a Komatsu D31 tractor. My background as a certified Diesel Mechanic working with heavy machinery, my engineering skills and my desire to succeed have encouraged me to try to change and develop methods and systems to improve production and safety. I have never been content to just log conventionally, and have always strived to innovate to this end.

1. In 1984 I converted my D31 to a clambunk grapple using a cranab crane to do away with pulling rope, and to accumulate more stems.

2. In 1990 purchased a Komatsu PC 90 tracked excavator and attached a Denis D-55 directional chain saw felling head, this was used in clear fell minor species. Difficulties encountered here was dense undergrowth, and tree size unsuited to felling head.

3. 1991 Komatsu PC 200 excavator with logging grapple for all phases of operation, in particular shovel logging and loading

4. 1991 Bell Static Delimber to which I have made several modifications

- increased stability by shortening log bed and increasing base size.
- motorised and mounted the knives and log bed on a larger more stable base
- introduced remote control operation of knives
- recently lengthened, strengthened the log bed, and added another set of knives for larger radiata.

The Static delimber has been used in conjunction with the Komatsu PC200, Komatsu wheeled loader, and grapple skidder.

5. 1993 Rotosaw 2800 Feller Buncher on Caterpillar 235B front shovel excavator.

6. 1995 Waratah 234 mounted on a Komatsu PC 400LC excavator

My logging operation today consists of felling with the Rotosaw Feller Buncher, delimbing with the Waratah 234, extracting with Caterpillar 525 dual arch grapple skidder, and conventional skid operation.

I shall endeavor to summarise these in this presentation.

MECHANISED FELLING

The main reasons for machine felling are:

- safety - the removal of the human element from the potentially dangerous felling face,
- to simplify felling management,
- increased production,
- stems can be aligned for extraction,
- higher value recovery through lower effective stumps
- less breakage
- extra shift options.

This is the first phase of the logging operation, and done correctly can offer all of these advantages.

Some of the hurdles I've had to overcome have been butt-splitting, and learning the capabilities of the machine. Radiata is very heavy and has a large sail area which all leads to a high incidence of mechanical failure. The small sliver left on the front of the stump is different but I believe unavoidable - with any mechanical felling unit. A man with a saw will always be necessary for doing the break trees and any large trees within the stand.

MECHANICAL DELIMBING

Mechanical delimbing possibly offers some of the greatest advantages to logging as it takes the man away from the most monotonous and dangerous part of the job. It offers a flush trimmed log that can be produced over an extended day at a competitive cost. The impact of mechanised delimbers creating perceived stem damage and premature sap stain are still issues to be resolved. Motor manual production is unaffected by malformation, mechanical production is halved, why give a machine malforms? - machines should only be introduced if there is enough suitable resource for them.

MECHANICAL EXTRACTION

We use a Caterpillar 525 dual arch grapple skidder for extraction. As logs are pre-bunched in 2-3 pieces in the delimbing stage grapple skidding offers high volume extraction to match the front end of the system with very few limitations, but skid sizes must be large enough to handle greater volume. Care must be taken to eliminate butt damage.

MECHANICAL PROCESSING

We currently use a conventional skid system to process our logs. My ambition is to mechanically process, the perceived advantages would be safety, high volume and longer shifts. Due to the complexity of log making in N.Z. it is unlikely that a current model processor would be able to offer length and diameter accuracy, measure knot sizes, count whirls of branches and still produce adequate volumes - we hope Kiwi ingenuity will find a solution in the near future.

CONVENTIONAL SKID SYSTEM

This system offers a very high quality output, industry is familiar with it so there are very few problems from the company perspective.
From the contractors view it is constraining, always the bottle neck in the operation and requires high management. The following are some of the difficulties in catering for such a system:

- safety constraints - man/machine interaction
- balancing felling and delimbing for multi skid use especially if there are limits on the time between felling and sapstain treatment
- increased excavator traveling
- volume constraints - per skid
- 7.00 - 3.30 worker mentality

- climatic constraints - wet weather
- day light constraints

With the continued use of conventional skid systems we have to work around these constraints to the best of our planning ability.

MACHINE OPERATORS

We currently have only two personnel who can operate the felling and delimbing machines. This lack of skilled machine operators is an important issue and is the greatest challenge facing mechanised loggers. The current workforce are not necessarily the right people to upskill into operating complex, expensive machinery and it is difficult to attract people from other industries. The wrong person operating a machine can cause much breakage and down time, so it is important to carefully select the person to train. The learning curve involves lower production, higher repair and maintaince costs and an operation imbalance. The New Zealand logging industry has enough machines to require and support a training program for contractors and operators, from skidders and loaders to the more recent mechanised machinery.

There is currently no industry training available in N.Z. so the responsibility falls on the contractor.

OPERATIONAL CONSTRAINTS

Having run conventional operations I found it very easy to undertake most jobs, or settings with only a small variation in cost.

In mechanisation there are far more variables that effect the cost

- tree size,
- branch size,
- malformation,
- machine utilization,
- skill of workforce,
- terrain and undergrowth.

If any one of the above is wrong it can double the production costs of the mechanised operation.

SAFETY

With the introduction of the Health and Safety in Employment Act (1992) has come an increased emphasis on minimising exposure to work-related risks. One method for achieving this aim is to reduce the number of workers exposed to risk of injury in a logging system. Most of the accidents to workers in forest operations occur during felling and delimbing. Introducing mechanisation can reduce accidents. The physical stresses on an operator are less than if they are using a chainsaw and life-threatening accidents are reduced.

SERVICING

Because of the distance and time it takes to travel to the operation it has been necessary to set up service facilities for the job.

For this a small truck was purchased and rigged with: hose press, welder, auto grease, generator, compressor, grinders and a stock of parts and fittings. Staff have been trained to use this facility and we find it an essential tool for mechanisation.

TIPS TO CONTRACTORS CHASING MECHANISED CONTRACTS

Investigate systems in use, compare efficient with inefficient and how they would relate to your situation. This is getting easier all the time as contractors are finding what works.

With the recent influx of mechanised equipment into N.Z there is plenty of opportunity to evaluate systems here to gain an overall impression. Try and draw

parallels between resource types visited and those you are proposing to work in. Consider soil types, stability, terrain, undergrowth, timber size, customer requirements.
Consider what the machinery dealer has to offer - technical support and back-up, parts availability, operator training.
Consider availability of suitable resources, volumes and capital. Aim for long term contracts to inspire confidence to invest capital, then set realistic rates and stick to them.
Submit a professionally written proposal, and be prepared to give presentations to whoever the company deems relevant.

LOOKING TO THE FUTURE SUPERSKIDS

The traditional use of several small skids in any given compartment appear to be counterproductive - skid personnel are able to "disappear" to another skid, and spend a great deal of time traveling between each.
Trials are being run with the concept of large 50 x 200 metre superskids placed in the centre of logging compartments. This concept appears to offer the contractor the opportunity to produce 15 - 20% more volume with minimal extra cost which can be attributed to the containment and closer supervision of skid personnel.

CENTRAL PROCESSING YARD

The disadvantage of a log yard are the costs of double handling the product from the stand to the yard.
The advantages I see to the logging contractor include: no operational skid constraints, lower hauling distances, larger storage areas (road sides), less management, more production capacity, and the ability to extra shift.
Tasman Forestry is currently trailing the use of Central Processing Yards and I believe it can only enhance mechanised logging.

CONCLUSION

With the pressures on production, safety, quality and professionalism in our industry, mechanisation is the only true solution. Because of the differences of Radiata to our competitors product new harvesting and processing systems will need to be developed and evolved.
This is a frustrating, costly and time consuming process which can only succeed with the full backing of management, planners, and company staff. With a partnership philosophy between company and contractors huge gains can be achieved into the future.