Session 5
Paper (c)

MANAGING PRODUCTION OF PRUNED LOGS

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My presentation this morning is divided into two areas. First of all I would like to discuss some of the aspects of the production of pruned logs. I think I have attended previous conferences where similar topics have been discussed beforeIt could be considered to be old hat, but the value of pruned logs is extremely important to the forest owner. The expansion of our industry over the past few years has been colossal. The experience level of the people producing the pruned logs has gone, or perhaps we should just say, in places is very limited. And it's only this experience that we rely to produce a very high percentage of our potential revenue. Secondly, I would like to go over a method of assessing pruned log value, or quality, that we use in Southland.

From where we come from, being the producers of a product we actually serve two clients: one, the Forest owner, the other is the people who we produce the material for, who purchase the material off the forest owner. The objective of any logging operation is to optimise the return to the grower, the owner of the forest, through maximising value of recovery and also maximising volume. In some cases, there can be a conflict in that statement where you may have to waste some material to maximise value. But at the same time you must also be very aware of your client's requirements. To be able to do this, we have to rely very much on the logging techniques, the skills of the logger, and his understanding of the specifications and requirement of the client. Any failing in any of those three areas will affect the ability of the grower to return revenue to his stump.

Felling Techniques

Pruned logs are very much related to the above statement. Good harvesting techniques go right back to where we first cut the tree from the stump. At that point in time, the cross cutter determines the potential to the grower of available volume. He obviously has to minimise:

- high stump heights
- the tearing of the hingewood which can result in the slabbing
- the production of draw wood,
- damage caused by felling onto stumps rocks or trees.

Techniques that can reduce these effects are:

- keeping stump heights low
- using correct felling techniques
- using wing cuts
- directional felling.

At that point in time, we then have to decide how much we should cut off at the end of the log to square the end of the log, and to removed felling residue, be it hinge wood, draw wood or hopefully not, the effect of slabbing. The decision must be made how much to cut off, or more importantly, how much can we leave on the end of the log.

Probably within the first metre of the log we find all the defects we have to consider. In Southland it is very apparent where we have shorter trees with greater taper. Many of the defects that we perceive to be on a pruned log really occur in the first half metre of the log and also exist within the first 100 to 150mm of the log diameter. Within that area we also have considerably more fluting and some butt sweep to consider.

It is very common to square the butt end of the log, having removed supposedly the defect then walk out, measure your log, mark it, add on it the trim allowance, and cross cut it. What we would suggest is that perhaps, having minimised the squaring process on the butt, you could go out and measure the log, have the trim allowance perhaps at the butt end of the log as opposed to the head of the log, so that instead of squaring off all of your scarf, you can leave some of it on the butt end of the log. In doing so, the residue of that scarf may well be removed in the first cut at the saw-mill, as slab wood.

In Southland, we would suggest that if we have flanging, or bark encasement within the first 80mm of the log's circumference, we would leave it onWe don't believe it's necessary to cut that material off to create a very perfect gun barrel pruned log, having left maybe half a metre of waste on the skid to get that result.

If the scarf is put in put in as per the text book, immediately we are looking at reducing the length of that pruned log by at least 150mm or probably more likely 200mm. Where the cross cutter has put in the top cut to the scarf at a very high angle, immediately you can lose up to 250 to 300mm. All of a sudden you are starting to eat into your potential revenue very quickly.

Perhaps through debarking, flanging will be rounded off, or at the first cut through the saw-mill, it will go away in the waste woodIf it goes to the wharf, perhaps in the measurement scale that part of the tree doesn't come into the calculation anyway.

Identifying the Pruned Zone

Identifying the pruned zone immediately after felling is important as it is usually the faller who has the best view of where the first branches arises. After the stem has been trimmed and extracted through mud and some of the bark knocked off it can be difficult for the logmaker to identify where the pruned zone ends. Some companies use spray paint.

A technique we use in Southland to identify the top of the pruned zone is to put a cut in the log. In some cases it's probably not necessary, but in many trees where the first whorl of branches about the pruned zone is very fine and you are pulling your log through, muddy conditions, you soon lose the identity of the cut off point between the pruned zone and the unpruned zone. A small, very light cut is made intended to go through the bark, and into the cambium layer. It is not intended to cut into the log at all.

Extraction Damage

Some of the potential damage to pruned logs can be caused by over-zealous and unnecessary fleeting of logs by machinery prior to extraction, high speed ground hauling by cable machines, running over the logs with the machinery, particularly track machines.

Pruned logs can be damaged by pulling over the ground with a hauler. It could be suggested that, perhaps, in these cases, squaring the log at the stump, and

pulling along the ground to the skid site, will require the log to be trimmed again. It is a suggestion that the first cutting process be eliminated, and the log is only squared up once it arrives at skid zone.

Handling Damage on Landings

In Southland in particular, we had a logging systems where we used hydraulic diggers on unmetalled processing areas. Logs are stacked very closely together, so the opportunity to cross cut a log, and perhaps allow the end of the chainsaw to penetrate a log, which may be lying very close in proximity behind, is very apparent at all times.

Having extracted the tree, and hopefully maximised the opportunity for clearwood recovery, the next area is the handling of the log into the stacks. It's in this area that we can potentially damage a lot of our logs through the type of machinery that we use. Hydraulic loaders with grapples can affect a pruned log. Having said that, you can also see the same sort of damage caused by a wheeled loader. I'm sure we've seen cases where logs have been speared and stabbed, be it at the forest, at the mill or on the wharf.

Because we use grapples on all our logging operations this is a very common type of log damage. The initial attempt to gain access to the logs on the landing results in the spikes of the grapple tearing through. We transport some of our pruned logs to to a customer in Christchurch. One of our most common complaints they have is where loader operators have spiked the veneer. A way around it is to put plugs on the end of the grapple tines. We do the same thing with rubber tyred loaders as well.

Another area of potential damage to pruned logs is at the debarking site. We've all got very keen on exporting pruned logs. In some cases, it may not be the most appropriate type of machinery to carry out the process but in the end, we use what we have. In some cases, these types of debarkers can in actual fact cause more damage to the log. Damage occurs when the debarker stops and the debarking process still goes on. 'Pencilling' occurs when starting a log. To eliminate this we would normally feed the large end of the log in first, and start the debarking process on that end of the log.

Pruned Log Index

In 1991, one of our major clients in Southland noticed that the pruned product was going from 60 year old trees down to 35 year old trees, and perceived a drop in log quality. They requested us to consider using a pruned log index as promoted by and developed by the staff at FRI.

At that time, we sold our logs in two forms, basically based on diameter. An A grade log was a pruned log that had an SED greater than 460mm, then the B grade was 300 to 460mm. As we were moving into younger timber, our clients were saying the SED was going to become smaller and also the potential to recover clear wood would be reduced as well. So we looked at Pruned Log Index.

Pruned log index identifies the absolute volume of clearwood available within a log. It takes into account of the total log size, its shape, the defect core within the log, and develops a relationship between the two. It does not guarantee the saw-mill that they can recover that clearwood. It just identifies the clearwood is potentially available within the log.

We have recently tried three methods in Southland.

Sommerville Method

1. Measure size and sweep

2. Cut logs at each whorl and measure defect core

3. Calculate PLI

For the method promoted by Alan Sommerville, you must first of all very carefully, and with great detail, measure the outside of the log in set areas: from the butt of the log the first diameter is at 1.3m, which is generally related to DBH, half distance and three-quarter distance up the log, and of course, at the large and small end. From there, in Alan Sommerville's method, you then note where the branches are, you then cross cut that log at that point. With an axe you remove all the clearwood until you come down to just the defect core, and carefully measure that and relate it to the overall diameter of the log. You do it for the full length of the log, and then calculate the total clearwood volume and also the defect core within the log.

Park's Method

1. Measure size and sweep of log

2. Saw each log marking each board in order

3. Reconstruct log and measure defect core

4. Calculate PLI

Jim Park has a very similar method to that, but instead of perhaps destroying the log in the forest as we do in the first method, you measure the log as such on the outside. Then you take the log, put it through a mill, taking note of each board that comes off the log, and take the log. The log, is reconstructed measuring the defect core on the boards.

The method used in Southland encompasses this, but we bring it back to an individual logs. The following sampling method is used to select the pruned log grades used to construct a regression relationship between SED and PLI grades:

1. A minimum of 30 logs is used to make a sample.

2. A distribution of SED, obtained from MARVL, is used to the distributions of SED's required within the sampled logs.

3. Clusters of five logs per location are then selected from six randomly chosen locations within the stand.

4. Sample logs are sorted at landings and set aside for study.

For us the Prune Log Index in our major sale in Southland involves the hand scaling of every log that goes into our client's mill. Each log is graded rated on a scale and the customer is invoiced accordingly.

Problems with PLI

The sample locations are subjective and serve as a guide to sampling only. It is possible to end up with an inappropriate SED distribution. At the landing it is easy to miss sample logs or to lose then in transit due t loss of identification. The sampling system also relies on the cooperation of the contractor and the skill of loggers to prevent damage to sampled logs.

That in itself is an immense task involving a lot of people, a lot to time, and for that I would suggest a pruned log index has some very strong down side effects for us as operational managers especially when you now consider that the forests are being run with very few staff.

Stand Index Method

Another method that we used in the Southland was to evaluate the pruned log index rating of a stand and then advertised it as a log sale. For example, 2000 cubic metres offered that have a pruned log index of six. The clients could then tender the prices for those pruned logs. From an operational point of view it is a far easier way of managing pruned logs. But to get the people to quote, they must first have the knowledge of buying clearwood, buying pruned logs, and buying by a pruned log index scheme, and to date, we don't have that depth of knowledge in Southland.