



DELIMBING: MILL ACCEPTANCE STANDARDS

LIRA's 1977 delimiting studies were aimed at examining possibilities for reducing the costs and high labour involvement in the process of trimming* trees. As part of this project the mill acceptance of a lower trim standard was investigated.

The possibility of reducing log trim acceptance standards in New Zealand was investigated during 1977 by a consultant, G. Brown, working to the LIRA brief "to compare a variety of current mill log acceptance standards having regard to specific restraints imposed by wood-room machinery" and "to identify the aspects of milling that would be significantly affected by any relaxation in current trim standards". The study was confined to five major mills of the Central North Island area, each with log inputs as indicated in the table below:

Annual Saw and Pulp Log Intake to Mill Yard in Thousands of m ³					
Use of Logs	Mill				
	N.Z.F.P.	Panpac	Tasman	Waipa	Fletchers
Sawlogs	370	130	453	354	225
Groundwood logs	-	-	443	-	-
Disc Refiner logs	-	170	277	-	-
Chemical Pulp logs	1101	-	827	-	-
TOTALS:	1471	300	2000	354	225

DELIMBING FOR SAWMILLS.

Written log specifications in use by the firms above were obtained. Only one of these mentioned the quality of delimiting at all and then only to say that all branches must be trimmed flush with the stem. The reason for omission was that only one specification is acceptable - flush trimming. Mill personnel considered that compared with other things efficient delimiting is only of minor importance, noting that it could be of major importance were it not the subject of constant check, supervision and control. More actual mill damage and downtime is in fact caused by nodal swellings, bumps, bends, draw-out, splits, partial breaks, fluting and taper, all of which can cause delays in handling.

* In this report the terms "delimiting" and "trimming" are used synonymously.

In practice a considerable difference exists between written log specifications and the range of types of log that reaches the mill. Standards of delimiting actually achieved are illustrated below.



Photo by G. Brown

FIG.1 Radiata pine logs for sawing - well delimited.



Photo by G. Brown

FIG.2 Douglas fir sawlogs - a "barely acceptable" standard of delimiting.

Generally on logs without noticeable nodal swellings, branch stubs of up to about 5 cm diameter and 5 cm length in logs up to about 30 cm small end diameter, and branch stubs of up to twice these dimensions in the largest logs, would not cause delays in most mills. Logs with branch stubs of similar size associated with nodal swellings would be likely to cause trouble but because of the swelling rather than because of the stubs themselves. The proportion of logs not flush delimited affects the situation; one bad log among many clean logs would not cause trouble. Most machines in a large sawmill have a little time in hand and an occasional short delay with a difficult log does not starve the next machines in line and is therefore not of great importance.

Large modern exotic sawmills are designed for rapid automatic handling of flush trimmed straight logs with moderate taper. Production is adversely affected by logs that are bent, severely tapered, forked, have marked nodal swellings or are unduly short. The fact that branch stubs do not greatly affect production is due to the fact that large stubs in practice are uncommon. Branch stubs can cause delays or breakdowns at the following points:

1. Any break point in the bull-chain feeding logs into the mill.
2. In the ring debarker branches can jam the operation of the tool arms.
3. At mills without their own pulping facilities, lowering the efficiency of the debarker by branch stubs on the logs can raise the bark percentage of slab chips to a level at which they become unsaleable.
4. On the band head rig, half broken stubs may foul the band on the return of the carriage. Small cut off pieces can also fly dangerously.
5. On the band head rig, branch stubs and nodal swellings have to be removed by an unprofitable pass of the carriage before the face cut is made.
6. Branch stubs interfere with the passage of flitches through a horizontal band saw.
7. Branch pieces falling below the band head rig into the sawdust disposal chute can clog the system.
8. Stubs on logs and slabs travelling sideways can cause the logs or slabs to get out of parallel and so cause pile ups.
9. In the frame gangsaws, stubs can knock out the sideblocks.
10. In a double-arbor gang circular saw, stubs can jam between the blades.

It appears impractical to alter the design of a large mill and therefore the standard of delimiting must be maintained to suit the existing mill.

For sawlogs there is thus a day-to-day continuing need for supervision to maintain delimiting standards. Allowance must be made for the inevitable gap between specification and performance; a gap which requires constant liaison with workers in the bush for it to be kept reasonably small.

DELIMITING FOR PULP MILLS.

In general, the standard of delimiting required on logs for pulp is lower in practice than that for sawlogs because smaller logs of lower value with a higher proportion of branches are involved. Generally any pine log not good enough to be used as a sawlog could be chipped prior to pulping. The different pulping processes in the mills studied create differences as to the quality of pulp log acceptable.

The following photographs are indicative of the range of type of log that reaches the mill.

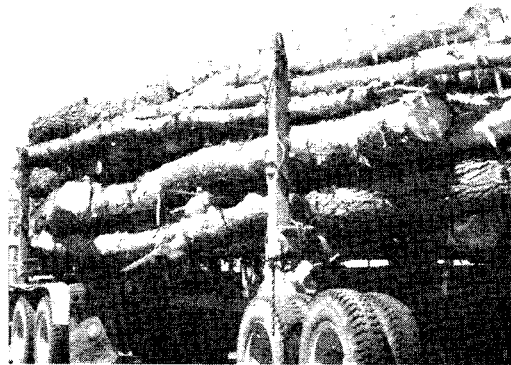


Photo by G. Brown

FIG.3 Acceptable Radiata pine pulp logs.



Photo by G. Brown

FIG.4 Contorta pine logs for chipping - standard of delimiting considered "a little too rough".

In New Zealand the majority of pulp logs go through an initial debarking process prior to further processing, the only exception being where the pulp logs are chipped in the forest. Ring debarkers, hydraulic debarkers and drum debarkers are used. Good delimiting is required for effective ring debarking and substantial branch stubs can prevent adequate debarking in drum debarkers. In general however branch stubs do not cause major problems in debarking machinery, they just affect the quality of debarking.

With the exception of pulp logs for stone grinding, all pulp logs are then chipped. Apart from the likelihood of long branches jamming in a chipper throat, the actual chipping operation presents few problems. The quality of chips resulting however can vary, depending on the extent of prior debarking and delimiting. Branches and branch stubs which get through a debarking system intact (as happens more readily with ring and hydraulic debarkers), tend to chip into oversize short cylindrical lengths, not thin chips. This may also occur with small log ends less than approximately 7.5 cm diameter, which have come through a drum debarker intact, as the small ends tend to shatter. Delimiting quality thus has a significant effect on the size of chip produced in chipping.

The three different pulping processes used in New Zealand include stone grinder, disc refiner and digester. Pulp logs for direct grinding on

stones bypass the chipping operation, and the delimiting standard required is as high as that required for sawlogs, as branch stubs cause handling difficulties into the grinders and overheating of the stones. The disc refiner process, which mechanically reduces chips to fibres, has little problem in accepting oversize chips as may be caused through chipping a pulp log with branch stubs. However adequate debarking is necessary to maintain pulp quality thus, depending on the debarking method used, the disc refiner process is not unduly affected by the standard of log delimiting. Pulping by cooking chips in digestors requires clean uniform sized chips. Oversize chips do not cook properly and a piece as small as 5 cm x 2 cm will pass through a digester little reduced in size. Meanwhile it has taken up digester capacity, absorbed valuable chemicals, and will later block screens. Pulp logs headed for digester pulping thus require a good standard of delimiting to minimise the frequency of oversize chips. Dirt, and particularly pumice grit, causes wear in the machinery associated with digester pulping, thus mechanical delimiting or field chipping methods should aim to minimise dirt intrusion into wood destined for digester pulping.

As with sawmills, it is difficult to alter the design of existing large pulp mills. The three New Zealand pulp mills studied use a range of debarking and pulping options which, in the main, require well delimited logs. A lower standard of delimiting however can be accepted in a pulp mill that achieves adequate debarking and pulps chips with a disc refiner process as occurs at Panpac. Where the chips may be destined for a digester such as at N.Z.F.P. and Tasman, or where pulp logs are for stone grinding such as at Tasman, then clean delimiting is desirable.

CONCLUSIONS:

For sawlogs, clean flush delimiting is essential and no relaxation of trim standard can benefit the economics of the process. There is a continuing need for close contact and understanding between the staff of mill and bush to ensure that the required standard is maintained.

For pulp logs the situation is different. For groundwood pulping complete flush delimiting is as important as it is for sawlogs. For other pulping processes clean delimiting is desirable although not so vitally important.

The relaxation of New Zealand mill acceptance standards for delimiting does not currently offer any real potential to reduce the costs or labour consumption of manual trimming. This is due to a number of aspects, the major limitation being posed by the capabilities of existing log chain, debarking and pulping equipment. However, with appropriate mill equipment incorporated, it is feasible to accept a lower standard of log trimming in the smaller diameter logs for pulp, in particular where a disc refiner process is used, thus new pulp mills being planned should consider this option. This option does not exist for sawlogs where clean flush delimiting is essential.

Although the study included a consideration of veneer logs and export logs, the detail is not included in this brief report. The study findings were that clean flush delimiting is essential for both veneer and export logs.

FOR FURTHER INFORMATION CONTACT: **N.Z. LOGGING INDUSTRY RESEARCH ASSOC. INC.**

P.O. BOX 147 PHONE 82-620
ROTORUA, NEW ZEALAND