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LOGGING OPERATIONS ON RESTRICTED LANDINGS (U.S.A.)

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ABSTRACT

This Report is a discussion of a Report entitled "Logging Operations on Restricted Landings - Some Examples from the Pacific Northwest" prepared by Dallas C Hemphill, Consultant Logging Engineer, Eugene, Oregon, USA.

The full descriptive report of each operation, including photographs and scaled diagrams of the layout of each landing, is available from the LIRA library.

INTRODUCTION

It is generally recognised that in many areas the New Zealand cable logger will have to adapt to working on much smaller landings in the future than has been the case in the main operations of the Central North Island.

A LIRA contract research project studies the Pacific Northwest (PNW) experience, where small landings have been the norm, and describes successful practices there.

A total of eleven operations were studied; nine cable hauler log length extraction, one cable hauler tree length operation and one tractor/skidder partial tree length extraction.

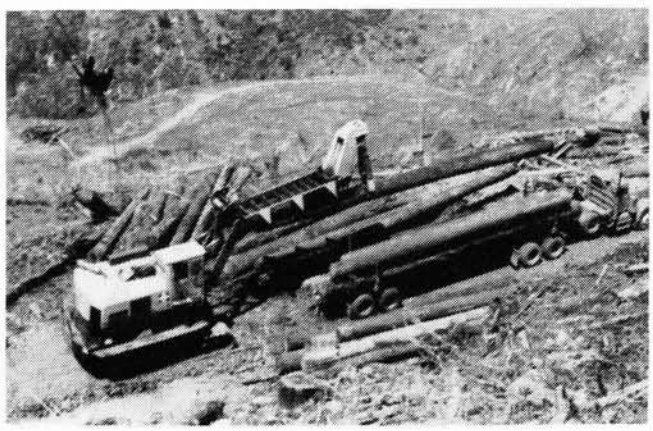

Figure 1 - Loading with a heel-boom machine

The landings described in this Report are small by New Zealand standards but not by North American standards all less than 0.10 hectares. Typical New Zealand cable landings range from 0.02 to 0.34 hectares (Raymond, 1987).

All of the loaders operating on these landings were heel-boom types with some track-mounted and others on rubber-tyred carriers. No landings with wheeled front-end loaders were studied.

Figure 2 - Typical radial decking pattern for a heel-boom loader

Log sorts ranged from 4 to 17 sorts (up to twelve different stacks).

The haulers studied were a mix of 15 m to 30 m towers. Smaller machines are rarely used in the Northwest.

This Report discusses some of the main findings from the studies and comments on points considered relevant to landing operations in New Zealand. Table 1 summarises landing sizes and productivity levels.

CONSIDERATIONS FOR NEW ZEALAND OPERATIONS ON RESTRICTED LANDINGS

Heel Boom Loaders

These machines require less space to operate than other types of loaders. They can work in an area no more than the width of a truck. Where only a few sorts are required, logs are often

TABLE 1 - SUMMARY OF OPERATIONS STUDIED

CONTRACTOR Hauler Make and Tower Height Loader Make and Model	PRODUCTION m^3	AVE. LOG SIZE m^3	NO.OF SORTS*	EXTRACTION LENGTH m	TREE SIZE m^3	LANDING SIZE m,ha	LANDING PRODUCTIVITY DATA Drag Size Pieces	m^3	Production per Scheduled Loader Hour Pieces	m^3
LOG LENGTH										
L.A. Surcamp McKenzie Br., Oregon Madill 046 - 27 m Link Belt LS98 Young Grapple	350 (9 hours)	0.85	5 Based on species	Pref. 12.4 m Few > 15 m	2.0 (45 cm DBH)	55 x 20 0.09	4.5	3.8	46	38
A.C. Brown, Siletz, Oregon Skagit 747 - 30 m Koehring 336L Young 147 cm Grapple	285 (8 hours)	0.93	17 Incl. 10 Export on to 12 stacks		(40 cm DBH)	46 x 26 0.10	5.1	4.7	38	35
A.C. Brown Siletz, Oregon TD15 plus JD 540B Prentice 410 Young Grapple	155 (8 hours)	0.86	17 on to 12 stacks		(40 cm DBH)	30 x 24 0.05			22	19
HP & H. Logging, Siletz, Oregon Edco Wildcat - 23 m Koehring 6625, Chapman 137 cm Grapple	260 (8 hours)	1.04	18 on to 12 stacks		1.5-2.0 (40-45cm DBH)	41 x 27 0.07	4.0	4.1	31	32
Weyerhaeuser, Marcola, Oregon Thunderbird TMY 50 - 15 m Koehring 6638, Danebo 135cm Grapple	301 (8 hours)	1.08	3 on diameter + 1 mixed + 1 bunklogs	Pref. 10.9 m Few > 14m	2.03 (40 cm DBH)	40 x 20 0.06	4.0	4.3	35	38

* Note that in some cases the stacks ran together with sorting done as the trucks were loaded

TABLE SUMMARY OF OPERATIONS STUDIED (continued)

CONTRACTOR Hauler Make and tower Height Loader Make and Model	PRODUCTION m^3	AVE. LOG SIZE m^3	NO. OF SORTS*	EXTRACTION LENGTH m	TREE SIZE m^3	LANDING SIZE m,ha	LANDING PRODUCTIVITY DATA Drag Size Pieces	m^3	Production per Scheduled Loader House Pieces	m^3
Weyerhaeuser, Marcola, Oregon Washington 188 Koehring 6638, Danebo 135 cm Grapple	217 (8 hours)	0.88	3 + 1 mixed + 1 bunklog	Pref. 10.9 m No logs > 14m	(38 cm DBH)	35 x 6 0.02	3.2	5.0	31	27
Christian Logging Fall Creek, Oregon Thunderbird TMY50 - 15 m Barko 450 Young Grapple	376 (9 hours)	1.58	3 on diameter + 1 chip	Pref. 16 1 m	(55 cm DBH)	22 x 11 0.01			26	42
Future Logging, Lorane, Oregon Madill 071 - 14 m Drott 80, Young Grapple	451 (8 hours)	2.29	5 1 Yum on to 7 stacks	Pref. 10.7 m and 12.5 m Few > 13 m	(80 cm DBH)	40 x 12 0.03	2.5	5.7	25	
L.A. Surcamp, McKenzie Br., Oregon Skagit BU80 - 27 m Prentice 610 on Pierce Carrier Mar 120 cm Grapple	573 (10 hours)	1.18	5	Pref. 12.4 m Few > 16 m	4.0 (56 cm DBH)	36 x 19 0.07	3.5	4.1	49	57
TREE LENGTH										
Leroy Britt Logging Cat 518 Grapple D6C Cat 225 on Pierce Carrier	682 (8 hours skidder) (9 hours loader)	0.56	3	Mean 16 m Range 5-28m	1.2 (42 cm DBH)	20 x 13 0.024	3.2		136	76
Z-Co Logging Interstate Westcoast - 14m Grizzly 400 on Pierce Carrier	200 (9 hours)	0 74	3	> 30cm 10.8 m < 30cm 15-28m	1.1 (36 cm DBH)	40 x 22 0.063	5.0		30	22

* Note that in some cases the stacks ran together with sorting done as the trucks were loaded

decked in a radial pattern around the loader. Logs are stockpiled as a matter of course on unstumped or unformed areas with slopes up to 11 and can be stacked on steeper slopes.

Heel-boom loaders offer safe, positive log handling in a restricted area. Trucks are loaded over the rear end of the loader positioned immediately behind the truck. New Zealand operators using hydraulic boom loaders tend to prefer a grapple which requires centre balancing the logs and trucks are loaded over the side.

A "fast travel" loader or "high walker" (has tractor-type undercarriage) can be used where the loader is required to shuttle for sorting or loading. This type of undercarriage allows relatively high speed travel and hence the ability to deck logs at distances up to 30 metres or more. Most models have simultaneous swing and travel capacity.

Hydraulic loaders are preferred because of their positive control, although many cable heel-boom loaders remain in use. The mode of operation for these loaders is similar.

Logging Operations

In western Oregon and Washington most of the logging is in log length. The trees are delimbed and cut to 12 to 15 metre lengths at the stump. Log length logging means that landing space need only be big enough to accommodate log lengths and not tree lengths. Furthermore, only a small amount of processing takes place at the landing so only one skiddy and loader operator are required. The breakerouts contribute to landing productivity by attaching logs on the front strop as close to the end of the log as possible, and on the rear strop further from the log end. This means that the log ends are as even as possible when they arrive on the landing, thus requiring less space and make it easier for the loader to reach the logs.

Landing Operations

The loader operator is most often the senior member of the logging gang, although he may not have overall responsibility for production. The loader driver is valued for his experience with log grades and co-ordinating the logging/transport interface. He is the key person in maximising landing productivity and optimising log allocation.

In New Zealand operations the principal contractor often operates the extraction machine and the landing work is left to less experienced members of the crew.

Scheduling of trucks throughout the day is critical to the smooth running of restricted landings. The loader operator may be required to start work before the rest of the gang. Ideally, trucks should be evenly spaced throughout the day to prevent truck loading causing interference or bottlenecks with extraction. Good radio communication is essential between the loader and trucks.

Landing Organisation

The studies of the PNW operations showed differences depending on the set-up and landing size. However, some general points are worth noting.

It was frequently observed that small logs or the smallest volume sort was stockpiled closest to where the trucks were loaded whilst large logs and high volume sorts were stockpiled closest to the the chute (where logs are landed by the extraction machine). On restricted landings, crew transport and truck turn-arounds can be well clear of the landing. In many cases, the trucks were backing in excess of 200 metres to be loaded.

While most US operators working heel-boom loaders prefer to keep grades of landings below 5 , steeper landings are sometimes worked. The restriction is often the type of hauler and the slewing torque of the loader.

Landing Productivity

Landing productivity is generally constrained to the level of extraction. It is usual for loaders to have spare capacity. Average production rates in the Northwest are typically in the range of 150 to 400 logs per eight hour day for a hauler and 100 to 200 logs per day for a skidder, depending on the piece size and stand density.

REFERENCE

Raymond, K. A. (1987) : "Factors Influencing Landing Size", LIRA Report, Vol 12 No 1.

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