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REPORT

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TWO CABLE HAULERS IN SERIES

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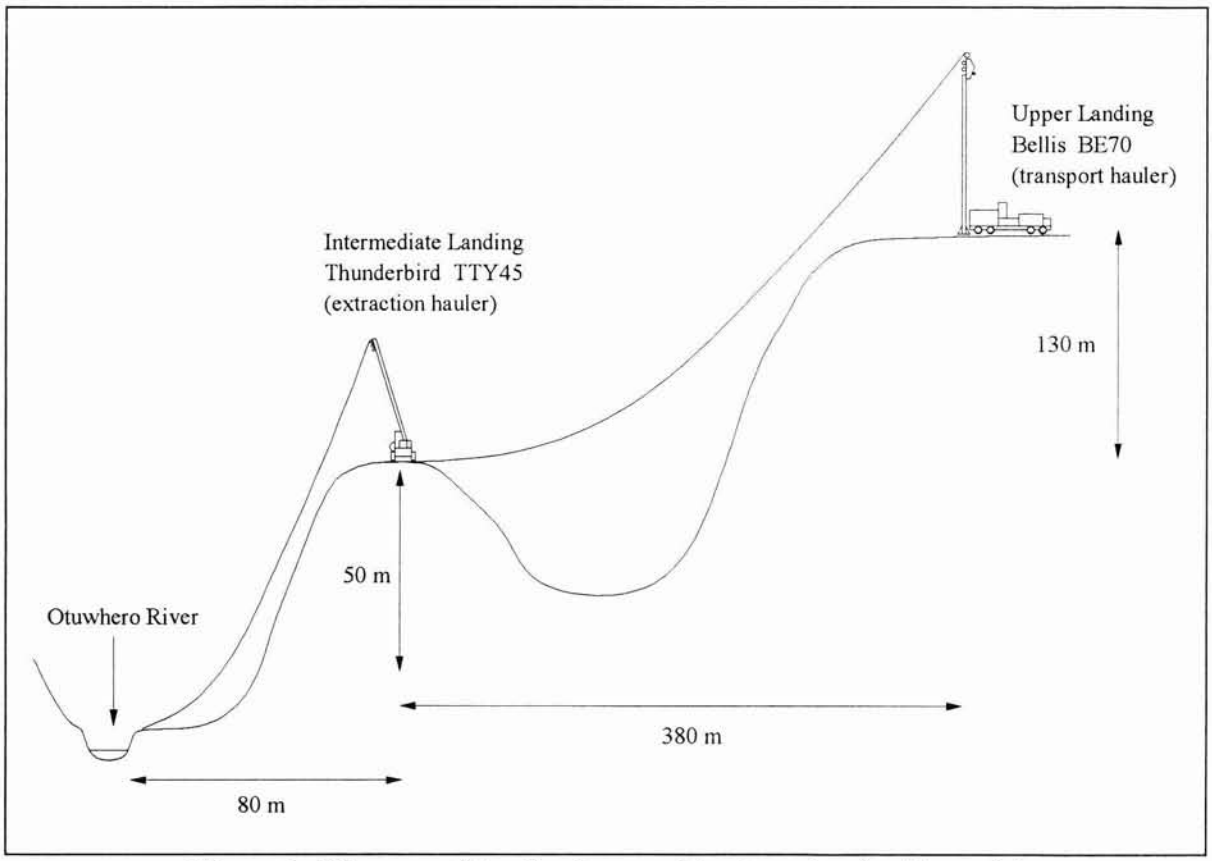

Figure 1- Diagram of two haulers working in series (not to scale)

SUMMARY

A cable logging operation using two haulers (yarders) in series is described. This system was used to log a stand which was unable to be reached by a single hauler from the existing road. The stand was of insufficient size to justify the cost of establishing a new access road for logging. Logs were extracted to an intermediate landing by a Thunderbird TTY45 using the Highlead system. This machine was driven down a steep track to an intermediate landing, assisted by a crawler tractor. The logs were transported from the intermediate landing to an upper (roadside) landing by a Bellis BE70 hauler using the North Bend system. Average daily production for the setting was about 150 m³. With no recent inventory data available, the piece size was estimated at about 1.2 m³ and the yield about 700 m³/ha. This report describes the harvest planning objectives, operational techniques and equipment used.

INTRODUCTION

When Rayonier New Zealand Limited obtained cutting rights to Marahau Forest, near Nelson, much of the area overlooking the Otuwhero River had been logged but there were some small areas next to the river which were considered too difficult to log by the previous owner. These remaining stands were concealed from the landings by intermediate ridges and the terrain did not suit the use of intermediate supports.

The remaining stands were mainly on steep terrain, so the area required cable logging with landings near the top of the intermediate ridges. To transport the wood from the landings using either trucks or a ground-based two stage system, about one kilometre of end-haul road from the valley floor plus a new road into the valley over farmland would need to have been constructed. Constructing tracks presented a risk of erosion as the soil is highly erodible (based on Separation Point Granite). The slopes are steep and high intensity rainfall events are common. The costs of constructing the required tracking could not be justified for recovering the volume of wood in the remaining stands.

It was recognised that it would be possible to walk a small track-mounted hauler down a steep track to an intermediate landing from where the stand could be logged. This access track would be too steep for a ground-based two stage system, so a second hauler was used to transport logs from the intermediate landing to a landing next to the existing road.

With no recent inventory data available, the piece size was estimated at about 1.2 m^3 and the yield about 700 m^3/ha. The average branch size was about 50 mm.

ACKNOWLEDGMENTS

LIRO acknowledges the assistance of Rayonier New Zealand Limited and Bryant Logging during this study.

SYSTEM DESCRIPTION

Extraction Hauler (and activities on the intermediate landing)

Machines Used:
- Thunderbird TTY45 (extraction hauler)
- Komatsu PC200

Personnel:
- hauler operator
- loader operator
- one or two skid workers unhooking, delimbing and hooking on

During the period that the operation was observed, logs were being recovered from a flat area next to the river, at the base of a steep, rocky, convex slope. There were no suitable skyline anchor locations available so the Highlead system was used. (The crew prefers to use the North Bend system where possible). Two chain strops were used to attach the logs. Due to the shape of the slope, most of the felled trees had landed on the flat at the bottom of the slope in a fairly random pattern. The convex slope caused the drags to "ground lead" over much of the inhaul distance. The stumps on the slope had been cut off almost flush with the ground in order to reduce hang-ups of incoming drags, but hang-ups were still caused by protruding rocks. The trees overhanging the river were "back pulled" away from the river with the assistance of the hauler.

At the landing, the chute was quite steep so logs often needed to be held by the loader during unhooking to prevent them from sliding away. The loader cleared and moved them to a processing area beside the chute. After delimbing and removal of slovens, the logs were placed by the loader in the hook-on area. The secondary hauler was capable of handling larger drags than the extraction hauler often delivered, so drags were accumulated. No cutting to length was done on this landing. When each drag left the landing, the loader was used to guide the logs to prevent them from swinging into the

processing or chute area. The reasons for partial processing at this landing were that ground conditions were better than at the upper landing (as the ground surface was firmer and there were fewer moving machines) and to utilise the skid worker (whose main duties were unhooking and hooking on) more effectively.

Transport Hauler (and activities on the upper landing)

Machines Used:
- Bellis BE70
- Cat 950B wheeled loader
- Bell Logger

Personnel:
- hauler operator
- Bell operator
- two skid workers/logmakers

The hauler used the conventional North Bend system. The skyline tailhold was near the intermediate landing, where the drags were hooked on.

All of the logmaking, log storage and truck loading was carried out on this landing.

The wheeled loaders caused the ground surface to become very boggy in wet weather. There was a large flat area in front of the hauler so that drags could usually be landed and unhooked without machine assistance. (A large flat area is of particular benefit for landing drags when using the North Bend system with no tagline attached.)

WALKING THE TTY45 HAULER ON TO THE INTERMEDIATE LANDING

An existing firebreak down a ridge top was used as an access track for the TTY45. The track was 410m long with an average grade of 30% and a maximum grade of 47%.

A Cat D6 tractor assisted the hauler down the track to the landing (Figure 2(a)). Lugs (Figure 2(b)) attached to the corners of the hauler chassis enabled a wire rope strap to be attached to each side of the hauler at the uphill end. The straps were joined by a steel ring which was also attached to the rope from the tractor. This arrangement helped the hauler to point straight downhill.

When logging was completed, the tractor assisted the hauler uphill in the same way, although the hauler had sufficient traction and power to climb most of the way without assistance, despite the soil being damp.

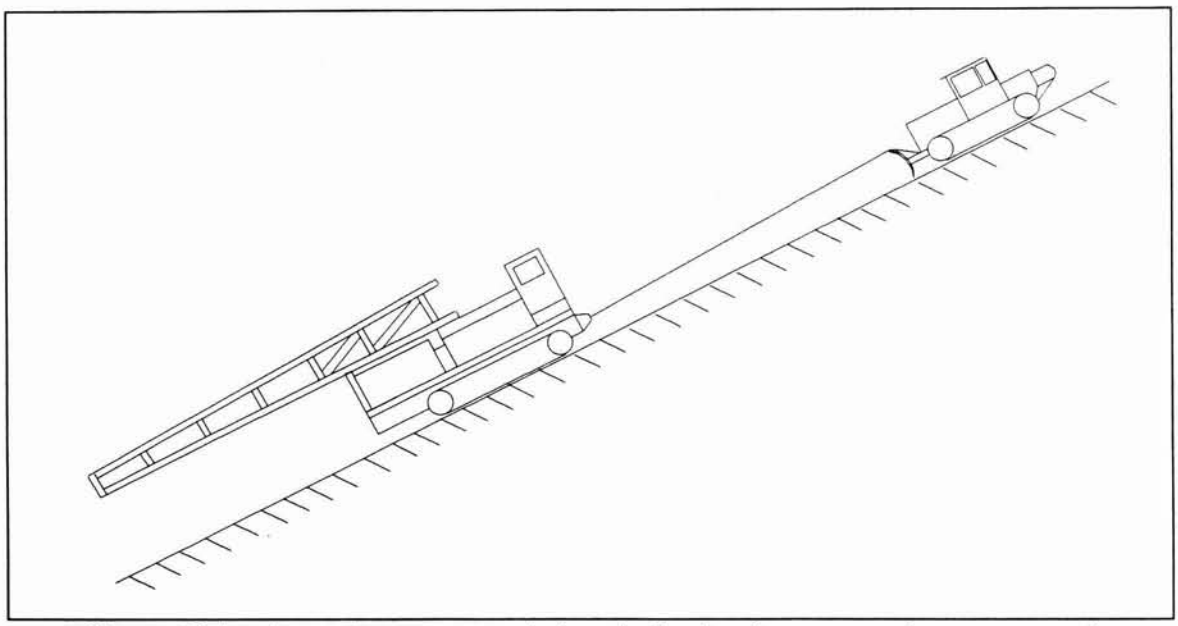

Figure 2(a) - A crawler tractor assisting the hauler down or up the access track

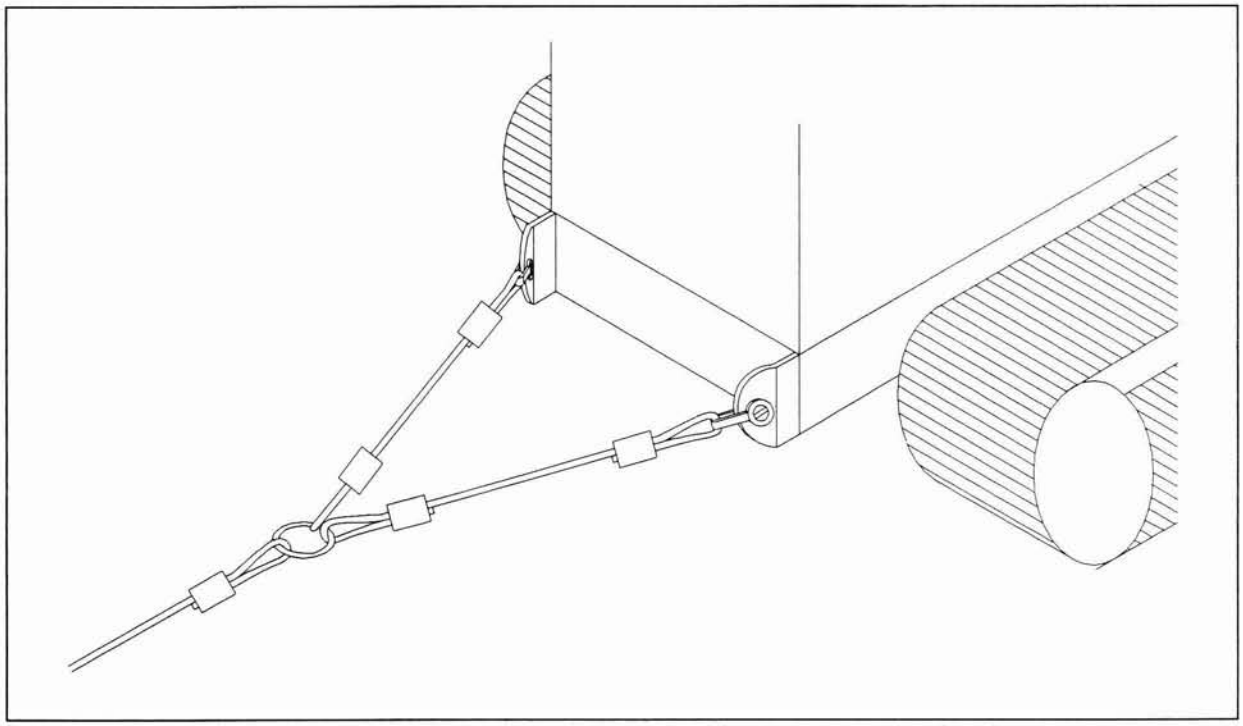

Figure 2(b) - Lugs and rigging to attach tractor rope to hauler

PRODUCTIVITY

The drag size for the transport hauler (Bellis BE70) was observed to be considerably larger than that of the extraction hauler. The system was limited by the production of the breaking out conditions. The extraction hauler, because of the poor deflection and difficult breaking out conditions, had considerable wait time while sufficient drags were accumulated. For the setting, average daily production was about 150 tonnes per day. The loader on the intermediate landing had plenty of idle time; it could keep up with a much higher production rate. The crew stated that when production was above average, the transport hauler could not keep up with the extraction hauler.

PLANNING CONSIDERATIONS

Because the production rate of haulers can be highly variable within a stand (depending on terrain, crop characteristics, and haul distance), exactly matching the production rates of two haulers is difficult. It should therefore be expected that haulers and other parts of the logging system will be idle for a greater proportion of their time than for single hauler systems.

Although it may appear that using two haulers in series will result in an unusually high logging cost, it may represent the most cost effective or the only physically and environmentally feasible logging method in some difficult situations.

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