ISSN 0111-4743

LOGGING INDUSTRY RESEARCH ASSOCIATION
NEW ZEALAND

REPORT

Vol. 14 No. 7 1989

CLEARING THE TOWER WITH A BELL LOGGER

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ABSTRACT

A Bell 220 Logger was used to clear the Madill 071 tower in a tree length clearfell hauler operation. Eight log sorts were being produced in the 0.6m³ piece size radiata pine.

The Bell Logger was introduced to to clear the landed wood away from the tower in order to reduce landing interference.

Through the elimination of interference at the landing, daily productivity increased in excess of 20% and the unit logging cost decreased by 6%.

INTRODUCTION

The effect of log accumulation under the tower has been recognised previously as a major source of interference to cable logging operations (Galbraith, 1986). This interference is compounded by the use of a short tower hauler (such as the Madill 071) which must be situated close to the edge of the landing to obtain sufficient deflection.

As a result of irregular truck scheduling and having to load out up to ten trucks per day, the rubber-tyred loader was not available to clear the tower for long periods. The stockpiles which accumulated under the tower, created difficulty when landing drags and denied access for the skiddies to process logs.

Figure 1 : Clearing the Tower with a Bell 220 Logger

The inability of the loader to keep up was recognised by the contractor as the main limitation on increased productivity. A Bell 220 Logger was introduced to clear the landed wood away from the tower, thereby reducing the interference to the haul cycle.

The objective of the study was to determine the effect the Bell Logger had on hauler productivity.

ACKNOWLEDGEMENTS

LIRA acknowledges the assistance of contractor Tony Hardy and his crew and the staff of Timberlands Nelson.

OPERATING PROCEDURE

General

The hauler was studied extracting uphill, operating both scab skyline and highlead systems. The scab skyline was the preferred system but as deflection became limited the scab block was removed and the line completed by high-lead. Throughout the study four strops were attached to the butt rigging via two 4 metre drop lines.

The trees were felled across slope and left untrimmed. The high stocking (Table 1) enabled the two breakerouts to average five pieces per drag (80% long length, 20% shorts). Eight log sorts were produced.

Table 1 : Stand Details

Stand age (years)	*25*
Stocking (sph)	*1027*
Average piece size (m^3)	*0.56*
Volume per hectare (m^3)	*536*

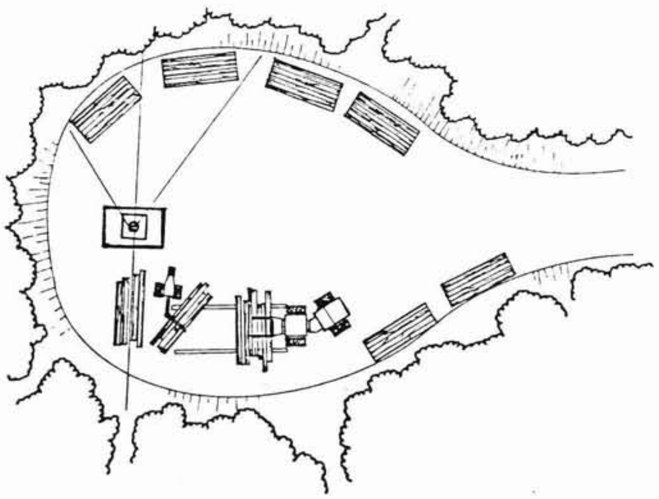

Figure 2 : Landing Layout

Bell Logger

On the landing the Bell Logger operator unhooked the drags, with occasional assistance from a skiddy.

The landed logs were initially picked up by the butt, usually in bunches of two or three, and stacked on to a runner log close to the hauler (Figure 2). The Bell Logger then moved to the centre of the bunch and aligned them on the second runner. This provided the skiddies with a clear view of the logs and enabled a high standard of trimming and log making to be undertaken.

Loader

A Cat 950 loader removed the processed logs from the opposite end of the runners and sorted them into their respective stacks. Prior to the introduction of the Bell Logger, the loader had to drive around the hauler to clear under the tower.

STUDY METHOD

Long term productivity, based on weighbridge records, was collected for a 7.7 ha setting both before and after the introduction of the Bell Logger. A three day continuous time study of the hauler was also undertaken in conjunction with an activity sample of the Bell Logger, the Cat 950 loader and the two skiddies. The activity of each was recorded at 30 second intervals. The large end diameter (LED) of each landed log was measured and used to calculate drag volume.

Figure 3 : Stack logs on Runners for Processing

RESULTS

A shift level analysis for the setting was undertaken and the productivity of the hauler, before and after the introduction of the Bell Logger, was compared. There was no significant difference in haul distance or piece size between areas compared and 4 strops were flown throughout the logging at the setting.

The introduction of the Bell Logger was found to increase daily productivity from 125 tonnes to 150 tonnes, a 20% increase. A summary of the hauler cycle times, with haul distances standardised to 200m, are provided in Table 2.

During the study the Bell Logger spent 57% of the day clearing the tower and was idle 24% of the time (Figure 4). Interference to the hauling cycle was nil as each drag was cleared from under the tower as it arrived.

Analysis of the loader activity confirms the demands placed on the loader. After spending 88% of the time fleeting and loading, only 5% (the wait time) was potentially available to clear the tower. During the three days eight trucks were loaded each day.

A 73% level of utilisation was achieved by the hauler. This level of utilisation is in the high range when compared to other New Zealand hauler operations (McConchie 1988). It was confirmed by long term data collected by the hauler operator and reflects high crew motivation and skill. The mechanical availability for the hauler, over a 15 day period, was assessed at 97%.

Table 2 : Hauler Element Time

Element	*Time/ Cycle (mins)*	*% of Cycle Time*
Raise Rigging	*0.12*	*1.4*
Outhaul	*0.84*	*9.8*
Breakout	*3.02*	*35.0*
In haul	*1.55*	*18.0*
Lower Rigging	*0.08*	*0.9*
Unhook	*0.68*	*7.9*
Line Shifts and Rigging Changes	*0.61*	*7.1*
Operational and Misc. Delays	*1.72*	*19.9*
Total Cycle Time	*8.62*	*100.0%*
Drag Size (t)		*2.70*
Productivity (t) per available machine hour		*18.75*
Daily Production (t) (assuming 8 available hrs)		*150*

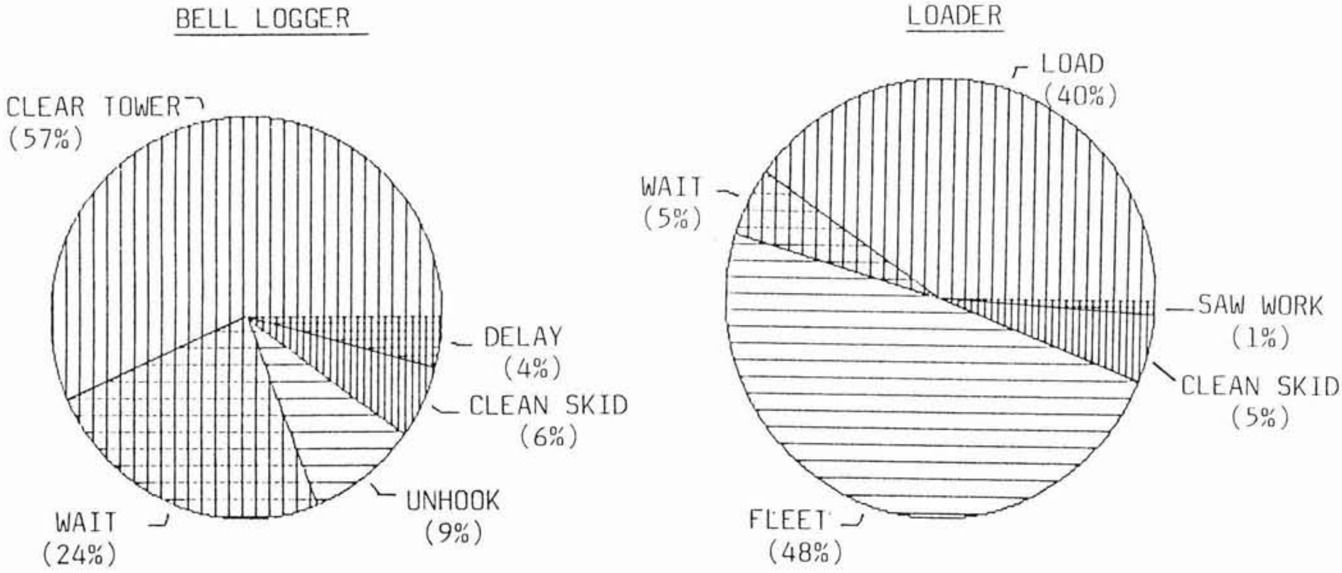

Figure 4 : Daily Activities of Bell Logger and Cat 950 Loader

Table 3 : Costs and Productivity

Gang Configuration	Daily Cost ($)	Daily Production (tonnes)	Unit Rate ($/tonne)
Hauler, loader, 8 men	2,800	125	22.40
Hauler, loader, Bell, 9 men	3,160	150	21.00

DISCUSSION

With the hauler positioned 17m from the edge of the landing, most of the tree heads hung over the edge of the landing. The loader was unable to clear the tower without getting tree heads caught up in the rigging. This impeded clearance and posed a potential danger to the breakerouts working below. The Bell Logger was able to clear the trees by initially pulling the butts off to the side of the hauler so that the heads did not become entangled in the rigging.

Prior to the introduction of the Bell Logger, the work method for the loader involved driving around the hauler to pick up the logs and continuing through the chute area. Had the loader been used in the particular setting being worked, access would have been restricted to one side of the chute (Figure 2). This would have required the loader to move the trees further to a processing area which would restrict the sorting and loading area available.

The Bell Logger also had the capacity to bunch processed logs for the loader since it was waiting for 24% of its time.

COST AND BENEFITS

To quantify the gains from the introduction of the Bell Logger to clear the tower, a gang cost was calculated using the LIRA costing format (Wells, 1981).

Overall productivity increased by 20% and cost decreased by 6%. In this operation, the Bell Logger was operated by the prime contractor. However, the costing (Table 3) includes the addition of a Bell Logger operator for comparison.

CONCLUSIONS

The Bell Logger was well suited to clearing the tower in a multiple log sort, small piece size operation. Daily productivity increased by 20% (125 tonnes to 150 tonnes) and unit logging cost decreased by 6%. By concentrating on clearing the tower, interference to the haul cycle was eliminated. Also the problem of tree heads becoming entangled in the rigging, and possibly endangering the breakerouts, was reduced. At a 200m haul distance, the Bell Logger was found to have 24% excess capacity, some of which could be used for bunching processed logs for the loader.

REFERENCES

Galbraith, J.E. (1986) : "Processing Operations : In the Bush or at the Roadside". A Paper presented to the FIME Conference, Albury, NSW, Australia.

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Wells, G.C. (1981) : "Costing Handbook for Logging Contractors". LIRA.

The costs stated in this Report have been derived using the procedure shown in the LIRA Costing Handbook for Logging Contractors. They are only an estimate and do not necessarily represent the actual costs for this operation.

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