LOGGING INDUSTRY RESEARCH ASSOCIATION
NEW ZEALAND

REPORT

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REDUCING LOG-TRUCK DELAYS

INTRODUCTION

Efficient utilisation of high cost equipment is important in any operation. This is particularly so for log trucking in New Zealand where the use of premium quality, higher priced trucks is common.

LIRA PHOTO

Figure 1. The Log Landing - A common Area for Truck Delays

Improving truck utilisation can make a significant contribution to reducing overall log transport costs, and this can be achieved by:

1. Minimising truck standing time during operation.
2. Maximising scheduled truck use.
3. Maximising average truck travel speeds.

Maximising truck use and truck speed involves important safety considerations and these are still being studied by LIRA for future publication. This report looks at reducing truck standing time and details a method of reducing delays.

ACKNOWLEDGEMENTS

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TRUCK STANDING TIME AND DELAYS

Total time for a log truck can be progressively broken down and one method is shown below:

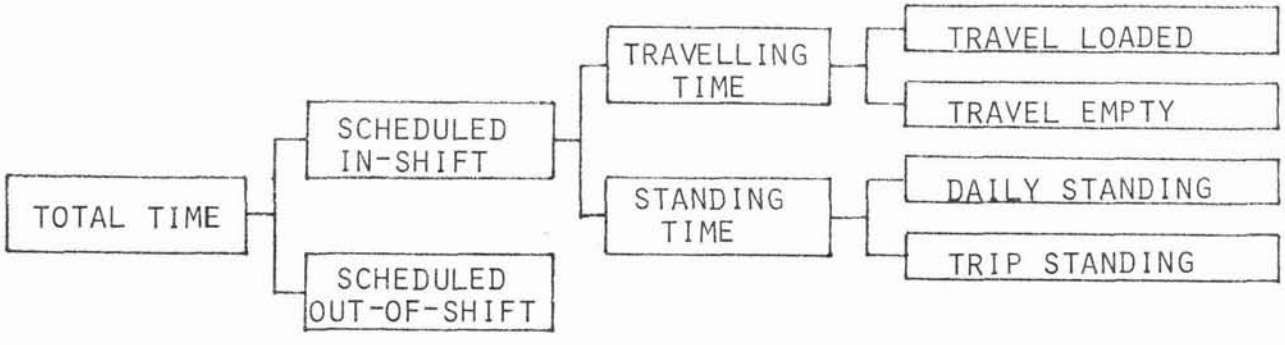


Figure 2. A Breakdown of Total Truck Time

It is important to note that any log truck is only fulfilling its primary function during the "travel loaded" element. This is the element which must be maximised, and to achieve this standing time must be minimised.

Standing time can be categorised as follows:

(a) Daily Standing Time. This is independent of lead and generally occurs at the start and end of the scheduled in-shift time (e.g. truck preparation, garaging, lunch break).

(b) Trip Standing Time. This is dependent on lead and occurs during the scheduled work time (e.g. loading, unloading, queuing, mechanical delays).

Scheduled in-shift time per day varies between operations, from as low as 6 hours to as high as 22 hours per 24 hour period, however, 10 to 12 hours is most common in New Zealand. A typical breakdown of the scheduled in-shift time per day is shown below for 50 km and 150 km payload lead distances.

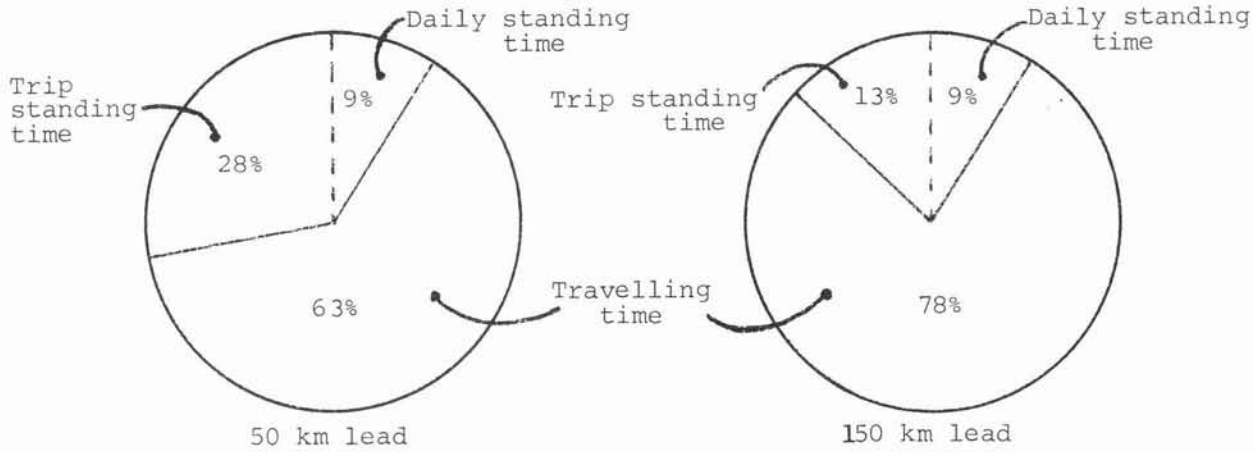
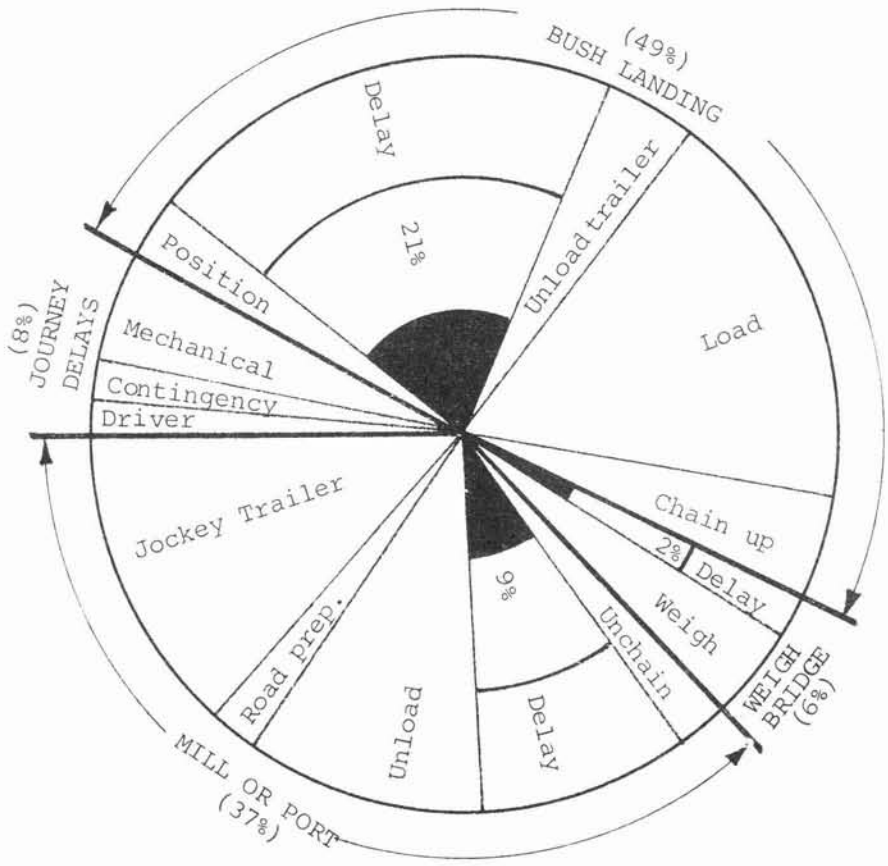


Figure 3. Typical Breakdown of In-Shift Time per Day



Trip standing time occurs in the main at the bush landing during loading and at the mill or port during unloading. A more detailed breakdown for a typical operation is shown in *Figure 4*. The major elements in this are based on loading with a rubber-tyred front-end loader, weighbridge scaling, and unloading with a log stacker. The major time elements will, of course, vary considerably with the different methods used for loading, measuring, and unloading logs.

Figure 4. Typical Breakdown of Trip Standing Time

As indicated in *Figure 4* a significant portion of trip standing time (approximately one-third in this operation) is delay time and most of this occurs at the bush landing. Generally this delay time is due to either another truck being loaded, the loader not operational, or logs not available to load. This delay time (valued at $0.20 to $0.40 per minute in lost truck earnings) can be reduced by effective truck scheduling and communication of trucking requirements. It must be noted though that co-operation of the interfacing operations of loading and unloading are required if significant improvements are to be gained.

SCHEDULING TO REDUCE DELAYS

In order to effectively schedule trucks to reduce delays from a co-ordinating point, such as a weighbridge, it becomes important to know at any time:

(a) Where all trucks are located

(b) Where logs are available for loading

(c) Where logs are required to be delivered

This can be achieved by radio communication between all parties, however, once the number of trucks, loading points or delivery points gets high, then effective scheduling becomes complex.

A very useful aid to assist the planning of truck movement is a Truck Control Board that accurately and continuously simulates the locations of trucks. Such a board presents a moving picture of truck location and this considerably simplifies and assists truck scheduling.

With truck location pinpointed by such a device, and logs available and logs required continually updated by radio, the important factors are continually known to effectively schedule trucks.

A Truck Control Board built by N.Z. Forest Products Limited and operated effectively for the past 15 years simulates truck positions using numbered magnetic markers (representing trucks) which travel on slow moving wires (representing particular routes) as shown in *Figure 5*.

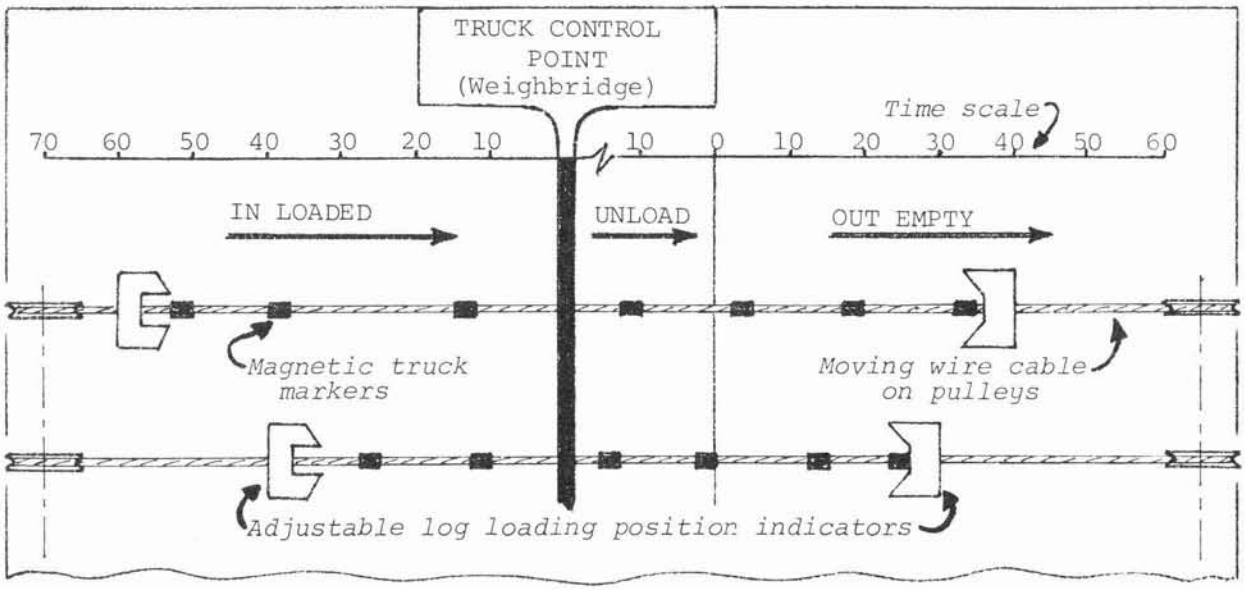


Figure 5. A Truck Control Board Layout

Each moving wire is moved at a constant rate to simulate truck travelling time. Any number of moving wires can be run on the same board to represent the different truck cycles involved. The wires (flexible curtain wire) are mounted on pulleys driven by an electric motor.

Locations of loading and delivery points are represented by adjustable indicators positioned on the time scale. These markers can also indicate other information, by chalk mark, such as the current number of truck loads available for loading.

Some important advantages of such a system are:

Trucks can be scheduled so that neither trucks nor loaders spend time waiting

Trucks can be rescheduled if problems occur, such as a loader or truck breakdown

The rate at which truck loads arrive at delivery points can be controlled

TYPICAL TRUCK TIME ELEMENT DATA

Setting up a Truck Control Board to simulate particular routes requires an estimate of the travelling and standing time elements for the routes involved. Once operating, the board can be adjusted to more closely represent actual truck locations.

Some typical loading and unloading element times and average truck travel speeds for different operations are as follows, these being based on a wide range of N.Z. information.

LOADING ELEMENT TIMES	Position, prepare truck and unload trailer		5 mins
	Load truck with logs (25 tonnes) - all loaders		
	- long length x large diameters		15 - 30 mins
	- long length x small diameters		30 - 45 mins
	- short length x large diameters		20 - 35 mins
	Secure load and docket		5 mins
UNLOAD ELEMENT TIMES	Measuring load of logs		
	- weighbridge		2½ mins
	- scaling		7½ mins
	Unloading truck		
	- stackers and gantries (single pass)		2½ mins
	- rubber-tyred loaders (multiple pass)		5 - 20 mins
	- drop skids		5 - 10 mins
	Prepare truck and load trailer		5 mins
TRAVEL SPEEDS		Winding/Rolling	Straight/Flat
	Unladen - seal	60-65 kph	75-80 kph
	- gravel	40-55 kph	55-60 kph
	Laden - seal	50-55 kph	65-70 kph
	- gravel	30-35 kph	35-40 kph

Figure 6. Typical Truck Time Element Data

SUMMARY

Log truck delays can be significant in some operations. Effective truck scheduling can minimise delays and for larger operations, a truck control board assists scheduling. Reductions in delays can mean:

(a) Fewer trucks required for the same quantity of wood and thus cost savings for the employer of trucks
(b) Increased productivity by the trucks employed thus giving them a better earning capacity

Given the high value quality trucks as commonly used in N.Z. logging, effective utilisation of their time is essential to minimise log transport costs.

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