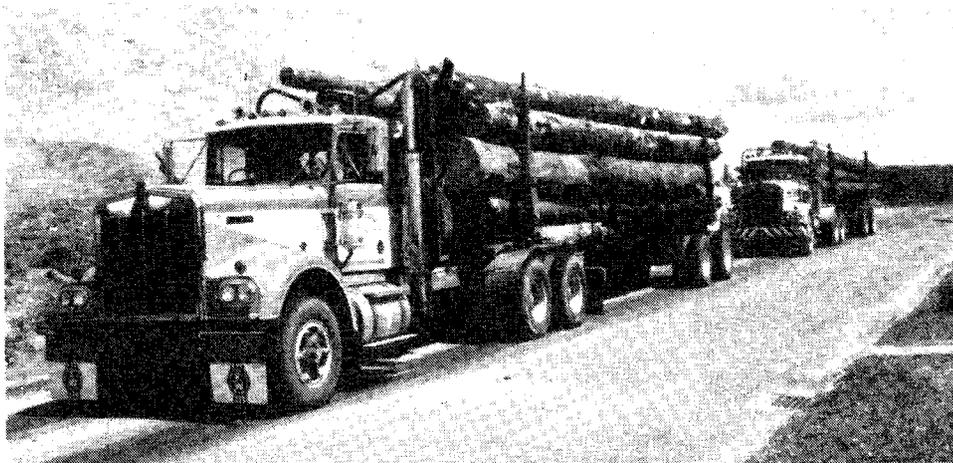




LOG TRUCKING STUDIES

(Reducing Industry Log Transport Costs)

The Road Transport phase of logging contributes approximately 50% towards total log harvesting costs. Research in this area is thus important, and during 1977 LIRA carried out studies aimed at identifying the particular areas in transport where research has greatest potential to reduce costs.



LIRA Photo

This report summarises LIRA's study of the industry cost elements in trucking and of the factors that influence log truck productivity. It also outlines the future research areas selected.

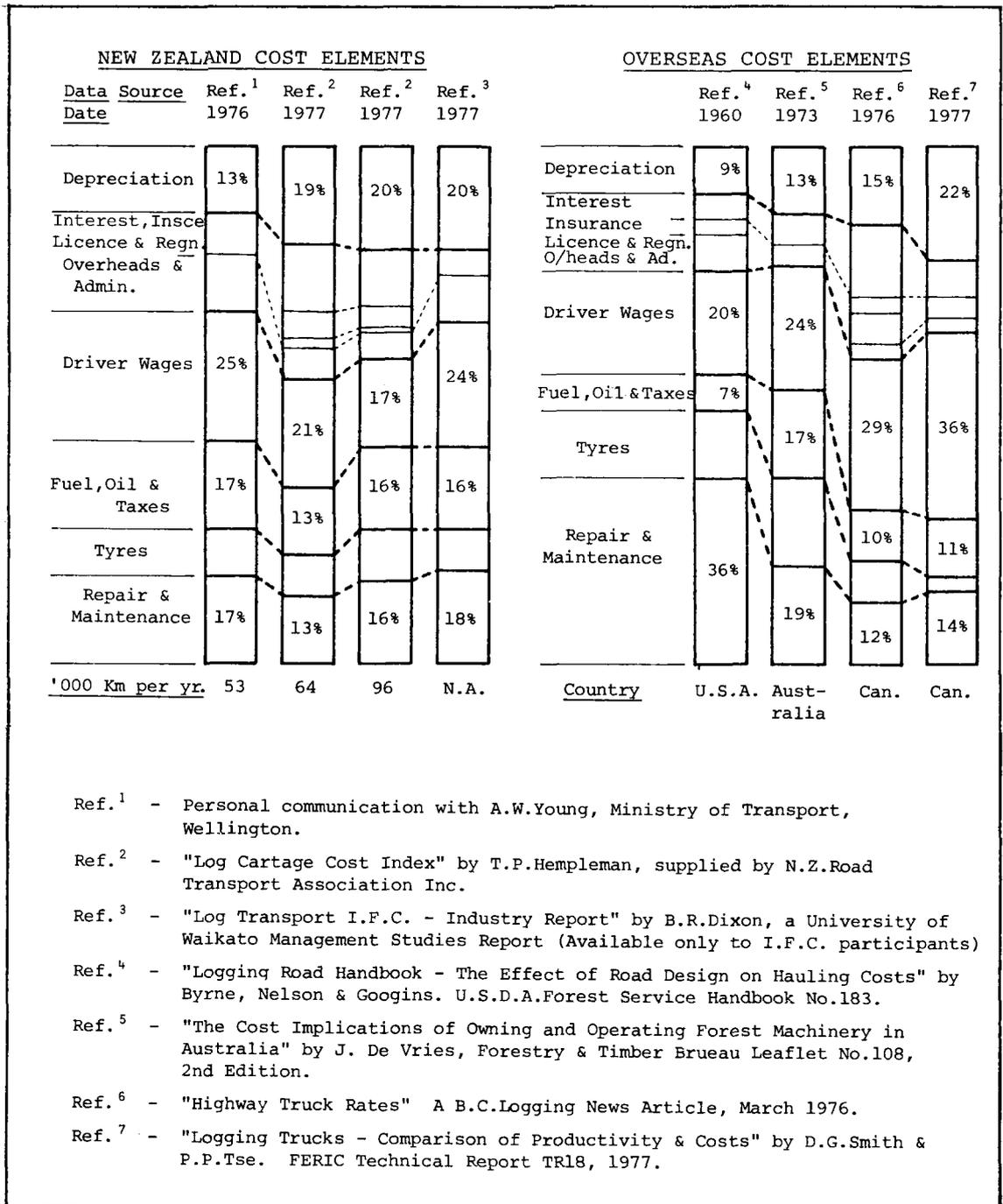
(LIRA's full Project Report titled "Log Truck Studies" P.R.7, 1978 is currently being prepared.)

ACKNOWLEDGEMENTS: For this study specific cost data was supplied by the N.Z. Road Transport Association Inc. and the Ministry of Transport. As well, reference was made to numerous other sources of information and these are acknowledged in the full project report.

THE MAIN COST ELEMENTS IN LOG TRUCKING.

Broad statistics were obtained from three different N.Z. sources, plus a range of overseas sources. The total truck operating costs were divided into the basic elements to identify the general significance of each.

The N.Z. sources of data, each of which were made up from separate surveys, indicated similar major elements of cost in log trucking, and this pattern was generally confirmed by overseas references.



- Ref.¹ - Personal communication with A.W.Young, Ministry of Transport, Wellington.
- Ref.² - "Log Cartage Cost Index" by T.P.Hempleman, supplied by N.Z.Road Transport Association Inc.
- Ref.³ - "Log Transport I.F.C. - Industry Report" by B.R.Dixon, a University of Waikato Management Studies Report (Available only to I.F.C. participants)
- Ref.⁴ - "Logging Road Handbook - The Effect of Road Design on Hauling Costs" by Byrne, Nelson & Googins. U.S.D.A.Forest Service Handbook No.183.
- Ref.⁵ - "The Cost Implications of Owning and Operating Forest Machinery in Australia" by J. De Vries, Forestry & Timber Brueau Leaflet No.108, 2nd Edition.
- Ref.⁶ - "Highway Truck Rates" A B.C.Logging News Article, March 1976.
- Ref.⁷ - "Logging Trucks - Comparison of Productivity & Costs" by D.G.Smith & P.P.Tse. FERIC Technical Report TR18, 1977.

The major industry cost elements in log trucking, in order of importance, are:

- Driver wages (Commonly 17% to 25% of total costs in N.Z.)
- Vehicle Depreciation (Commonly 13% to 20% of total costs in N.Z.)
- Repair and Maintenance (Commonly 13% to 18% of total costs in N.Z.)
- Fuel, Oil and Taxes (Commonly 13% to 17% of total costs in N.Z.)

The other cost elements and their size are as follows:

- Tyres (Commonly 8% to 10% of total costs in N.Z.)
- Overheads and Admin. (Commonly 5% to 11% of total costs in N.Z.)
- Interest Charges, Insurance, Licensing and Registration } (Commonly 5% to 20% of total costs in N.Z. are incurred by this group, with variations in Interest charges causing the wide range.)

REDUCING THE COST OF CARTING LOGS.

Industry's aim, for the efficient transporting of logs from forest to mill, must be to minimise the cost of doing so. Logs are available at forests for transporting to fixed location mills, and the log transport distances may thus vary considerably. An accepted manner of comparing transport system efficiencies when operating under such conditions is to monitor the cost per tonne-km of logs carted.

While it is considered most difficult to significantly reduce the distances logs have to be transported, it is generally much easier to make changes to the transport system. The system can be manipulated in terms of the equipment used, or the efficiency of equipment utilisation, to effect the resulting cost per tonne-km of transporting logs.

LIRA's study further analysed the four major cost elements and, in particular, their respective contributions to cost per tonne-km. The study concluded that the most effective means of reducing their contributions to overall log transport costs per tonne-km, in order of significance, is to:

- Maximise distance run per unit time of operation
- Maximise vehicle usage time per year
- Maximise payload size per trip
- Minimise cost of each repair
- Maximise distance run between repairs
- Minimise vehicle purchase price
- Maximise vehicle life in years.

THE FACTORS INFLUENCING LOG TRUCK PRODUCTIVITY.

Any move to vary an aspect of trucking to influence costs may also influence truck productivity, the basic measure of which is payload tonne-km per day.

From N.Z. studies of log truck operations, and a range of recent overseas reports, the major factors influencing truck productivity were identified. Truck payload tonne-km per day is determined directly by the number of loads achieved per day, the average payload size (tonnes), and the average haul distance the loads are transported (km). On any fixed haul distance, improved productivity is obtainable by increasing either the number of loads achieved per day or the average payload size.

The number of loads per day, although strongly influenced by the haul distance, is also determined by the truck travel time over the particular hauls, as well as the truck standing time incurred during the trucking cycles. The major influence on truck travel time over a distance (or speed) is road standard, with achievable speeds being higher on good surfaces, minimum grade and good alignment. Log truck speed is also influenced, but to a lesser extent, by the truck characteristics of power and payload size.

Truck standing time can be productive such as when loading, or unproductive as caused by delays. Delays can occur in every element of the trucking cycle, the major causes being waiting for loading and unloading. Other major causes include mechanical downtime of truck or loader, and driver performance.

Depending on whether the trucking operations are on-highway or off-highway, the average truck payload is determined mainly by truck design considerations, road design considerations, or aimed loads per day. Truck design considerations that influence payload size are numerous and include tare weight, axle configuration, axle capacities, drive train capacity, engine power, etc. Road considerations that influence payload size are permissible grouped axle loads.

CONCLUSIONS AND FUTURE RESEARCH AREAS.

The primary aim of this study was to identify the main elements of cost in the N.Z. log trucking industry and to examine the sensitivity of these costs to industry changes such that future research could be directed to these areas for improvement.

The study indicated that the best potential for reducing the major log-transport costs per tonne-km, at the same time favourably affecting productivity, exists with:

- (a) Improving truck utilisation through increasing truck distance run per year. This requires maximising average truck speed, minimising truck delays and maximising scheduled truck use.
- (b) Optimising the capital investment in a log truck by balancing the cost savings achieved through minimising truck purchase price, maximising truck life and minimising maintenance needs, whilst still achieving the truck use required.
- (c) Increasing truck payload capacity within the vehicle design rating and within legal restrictions.

LIRA's future research studies of the log trucking sector will thus be in these three areas outlined above.

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