



REPORT

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NEW ZEALAND

LOG TRUCK AXLE LAYOUTS – 1985

(AN ECONOMIC COMPARISON OF LONG LOG TRANSPORT LAYOUTS)

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Figure 1 - How does this unit compare with the many long log options available today?

INTRODUCTION

In 1980, LIRA completed extensive work on an economic comparison of various log transport layouts. This work included establishing a standard costing approach for comparison purposes. Since that time, a number of changes have taken place in industry conditions. While gross combination weight limits have remained the same, the costs of fuel, oil, and road user charges have risen dramatically. Capital and spare parts costs have increased. With these disproportionate cost escalations, some different layouts have become more attractive for both economic and other reasons.

This Report briefly summarises an economic comparison based on the 1985 annual costs of various long log transport layouts. LIRA Project Report No. 24 contains the full costing details used for this comparison, as well as a comparison of short log transport layouts. (Note that LIRA Project Reports are available to LIRA members only).

COST COMPARISON

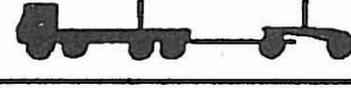
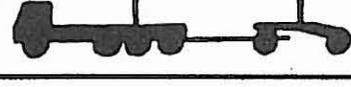
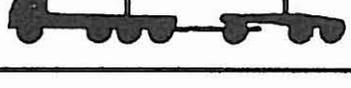
A number of assumptions have been made in the comparison :

- (1) Truck units are 3 or 4 axle, powered by a 260 kW (350 hp) engine, and suitable for logging work.
- (2) Information on costs and weights pertains to January, 1985. Road user charges are, however, based on the schedule effective 1 February, 1985. Any estimates are due to averaging results of a survey investigating current costs, or the updating of previous data.

Table 1

ITEM	LOGGING RIG CONFIGURATION	PURCHASE COSTS (\$)		TRUCK OPERATING COSTS PER YEAR		TRAILER UNITS - OPERATING COST PER YEAR						TOTAL RIG OPERATING COST PER YEAR
		TRUCK UNIT	TRAILER UNITS	STANDING COSTS	RUNNING COSTS	STANDING COSTS (\$)	INTEREST	REPAIRS & MAINT.	TYRES	ROAD USER CHARGES		
A		161400	22400	53148	86120	2240	611	1680	1800	2971	4634	153200
B		161400	23660	53148	86120	2366	641	1775	1800	2971	6743	155600
C		161400	26000	53148	86120	2600	696	1950	2300	2971	8326	158100
D		161400	33750	53148	86120	3375	877	2531	3200	4457	4525	158200
E		153000	36750	51975	81988	3675	947	2756	3700	4828	11510	161400
F		171400	26000	54545	86616	2600	696	1950	2300	2971	11101	162800
G		171400	26000	54545	89149	2600	696	1950	2300	2971	8326	162500
H		171400	33750	54545	86616	3375	877	2531	3200	4457	4525	160100
I		171400	33750	54545	89149	3375	877	2531	3200	4457	4525	162700

Table 2

ITEM	LOGGING RIG CONFIGURATION	GROSS WEIGHT LIMITS FOR RIG (tonnes)			TARE WEIGHTS (tonnes)		PAYLOADS (tonnes)			LOG CARTAGE COSTS (Dollars per tonne)		
		OFF HIGHWAY	CLASS I	CLASS II	TRUCK UNIT	TRAILER UNITS	OFF HIGHWAY	CLASS I	CLASS II	OFF HIGHWAY	CLASS I	CLASS II *
A		45.0	34.4	30.0	10.6	2.8	31.6	21.0	16.6	4.30	7.30	8.90
B		45.0	35.4	31.0	10.6	3.3	31.1	21.5	17.7	4.40	7.25	8.45
C		45.0	36.3	32.1	10.6	3.6	30.8	22.4	17.9	4.45	7.05	8.45
D		45.0	39.0	36.5	10.6	5.1	29.3	23.3	20.8	4.80	6.80	7.45
E		45.0	39.0	39.0	10.6	5.9	28.5	22.5	22.5	4.80	7.15	7.15
F		45.0	39.0	37.1	11.4	3.6	30.0	24.0	22.1	4.75	6.80	7.25
G		45.0	39.0	34.6	11.7	3.6	29.7	23.7	19.3	4.85	6.85	8.15
H		45.0	39.0	39.0	11.4	5.1	28.5	22.5	22.5	5.10	7.10	7.10
I		45.0	39.0	39.0	11.7	5.1	28.2	22.2	22.2	5.25	7.35	7.35

* Based on road user charges incurred for Class II limits only

- (3) The annual distance travelled is 80,000 km based on an average payload haul distance of 40 km, carrying 4 loads per day and operating 250 days per year.
- (4) 75% of the distance run is on-highway. The 2 and 3 axle trailers are piggybacked when empty (50% of annual distance).

These assumptions are based on averages from industry operations at the present time (i.e. from 1979 to 1985 average engine sizes have risen from 216 kW to 260 kW).

BEST OPTIONS

Based on economics alone, the best options are shown in the table below. For either Class I or II operations, the most suitable option appears to be layout "F" (twin steer truck and two axle trailer). This combination also ranked high in the 1979 report. In light of the recent road user charge increases, the two axle trailer (in layout "C") has fared well, suffering the smallest percentage cost increase in charges of all other trailer configurations in the comparison.

<u>Operation</u>	<u>Best Options</u>		
Off highway			
Class I			
Class II			

Table 3 - Layouts showing lowest cost/tonne

There are factors outside economics which affect one's choice. Layout "H" (twin steer truck and 3 axle trailer) has no payload loss under Class II conditions. With the future possibility of increased gross weight limits, this layout could become more attractive.

Since the 1979 report (Ref. 1), transport costs have increased an average of 95% (based on annual rig operating costs reported by LIRA). It is important to note where this increase originates. Truck running costs rose an average of 139% while standing costs rose only 56%. Within the costs attributed to running the truck, fuel and oil costs rose most sharply, from \$9,680 (1980) to \$36,048 (1985) or 272%. This increase was mainly due to movements in fuel and oil prices but was also due to the higher fuel consumption (59.5 l/100 km up to 65 l/100 km) of today's heavier, more powerful truck units. The average road user charge rose by 188%, with tyre costs doubling over the five year period. This highlights the fact that, regardless of what type of unit you operate, close attention to reducing fuel, oil, and tyre costs will yield the greatest benefits.

Selection of the number of axles for trailer options is made difficult by the lack of sound figures on repair and maintenance. In the case of trailers with 3 or more axles, it is also complicated by the compromise between; higher operating costs and reduced payload capacity, versus reduced road user charges under Class I conditions. Clearly, under Class II conditions, more axles are beneficial (layout "H" vs. "F" or "G").

Ref. 1 Gordon, R.D. "Log Truck Axle Layouts", LIRA Report, Vol. 4 No. 10 1979

Ref. 2 Stulen, J.A. "Log Truck Axle Layouts - 1985 (An Economic Comparison of Log Transport Layouts)", LIRA Project Report No. 24, 1985.

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