

LOG TRUCK AXLE LAYOUTS – 1985

(AN ECONOMIC COMPARISON OF SHORT LOG TRANSPORT LAYOUTS)

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Figure 1 - Is this one of the more economic short log transport units?

INTRODUCTION

LIRA first compared the economics of different log transport layouts in 1980 (Ref. 1). Since that time there have been disproportionate increases in fuel, oil and road user charges. The comparison was updated in 1985 (Ref. 2). LIRA Report, Vol. 10 No. 8 1985 (Ref. 3) summarised the findings with respect to long log transport layouts. This Report looks at short log transport layouts.

BASIS OF COMPARISON

A number of assumptions have been made in the analysis :

- (1) Truck units are 3 or 4 axle, powered by a 260 kW (350 hp) engine and are specified to suit logging.
- (2) Information on costs and weights are as at January, 1985 except that Road User Charges (RUC's) have been incorporated at 1 February, 1985 scheduled rates. Any estimates are due to averaging surveyed values or to updating previous data.

Ref. 1 Gordon, R.D. "Log Truck Axle Layouts", LIRA Project Report No. 10, 1980

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

Ref. 3 Stulen, J.A. "Log Truck Axle Layouts - 1985" (An Economic Comparison of Long Log Transport Layouts), LIRA Report, Vol. 10 No. 8 1985.

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 (\$)			RUNNING COSTS (\$)			
						DEPRECN.	INSUR. & REGISTR.	INTEREST	REPAIRS & MAINT.	TYRES	ROAD USER CHARGES	
J		161400	26000	53148	86120	2600	696	1950	2300	2971	8325	161100
K		161400	35000	53148	86120	3500	906	2625	3200	4457	4525	155000
L		153000	36750	51975	81988	3675	947	2756	3700	4828	11510	161400
M		171400	26000	54545	89149	2600	696	1950	2300	2971	8325	162500
N		171400	35000	54545	86976	3500	906	2625	3200	4457	4525	160700
O		171400	26000	54545	86616	2600	696	1950	2300	2971	8325	160000
P		171400	35000	54545	86616	3500	906	2625	3200	4457	4525	160400
Q		153000	50000	51975	85416	5000	1257	3750	4200	8914	6814	167300
R		153000	50000	51975	85416	5000	1257	3750	4700	8914	9050	170100
S		171400	40000	54545	84443	4000	1023	3000	4100	8914	5216	165200

TABLE 1 : SHORT LOG UNITS - COSTS

ITEM	LOGGING RIG CONFIGURATION	GROSS WEIGHT LIMITS FOR RIG (tonnes)			TARE WEIGHTS (tonnes)		PAYLOADS (tonnes)			LOG CARTAGE COSTS (Dollars per tonne)		
		QFF HIGHWAY	CLASS I	CLASS II	TRUCK UNIT	TRAILER UNITS	OFF HIGHWAY	CLASS I	CLASS II	OFF HIGHWAY	CLASS I	CLASS II*
J		45.0	36.3	32.1	10.7	3.7	30.6	21.9	17.7	4.60	7.35	8.75
K		45.0	39.0	36.5	10.7	5.2	29.1	23.1	20.6	4.85	6.70	7.35
L		45.0	39.0	39.0	10.5	6.1	28.4	22.4	22.4	4.95	7.20	7.20
M		45.0	39.0	34.6	11.8	3.7	29.5	23.5	19.1	4.90	6.90	8.25
N		45.0	39.0	39.0	11.8	5.2	28.0	22.0	22.0	5.30	7.30	7.30
O		45.0	39.0	37.1	11.5	3.7	29.8	23.8	21.9	4.75	6.70	7.15
P		45.0	39.0	37.1	11.5	5.2	28.3	22.3	20.5	5.15	7.20	7.20
Q		45.0	37.4	32.5	10.5	6.6	27.9	20.3	15.4	5.30	8.25	10.50
R		45.0	39.0	36.5	10.5	6.7	27.8	21.8	19.3	5.35	7.80	8.65
S		45.0	39.0	39.0	11.5	5.8	27.7	21.7	21.7	5.50	7.60	7.60

TABLE 2 : SHORT LOG UNITS - WEIGHTS AND SPECIFIC COSTS

* 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 four 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 assumed to be piggybacked on return trips (50% of the annual distance). Should loader capacity not be sufficient to unload trailers, a different economic result may be achieved.

These assumptions are based on average values surveyed from industry as at early 1985 (e.g. from 1979 to 1985 the average truck engine power increased from 216 kW to 260 kW).

BEST OPTIONS

Based on economics alone, the best options are shown in the table below :

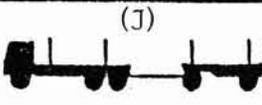
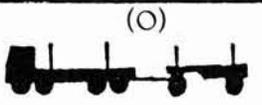
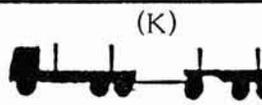
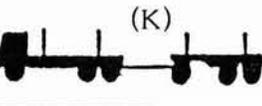
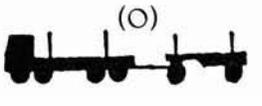
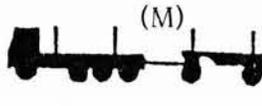
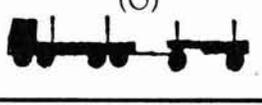
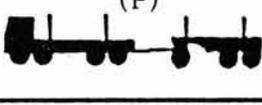
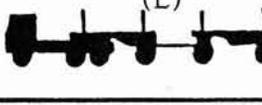
OPERATION	BEST OPTIONS		
OFF HIGHWAY	(J) 	(O) 	(K) 
CLASS I	(K) 	(O) 	(M) 
CLASS II	(O) 	(P) 	(L) 

TABLE 3 - LAYOUTS SHOWING LOWEST COST/TONNE

While Table 3 shows the best configurations for each of the normal operating situations, a choice of layout will normally require further consideration, i.e. the mix of Class I and II roads and possibly operational factors excluded by this analysis. The most economic rig for operation on both Class I and II roads is option "O". However, options "L" and "P" should be considered because of similar costs on both road classes.

The choice of trailer, or more generally the number of axles under the rig, is made more difficult by a lack of sound information on repair and maintenance costs. There are some obvious trends from increasing the number of axles. Tare weight, operating cost and possibly gross weight increase while RUC's reduce. Current figures indicate that a six axle rig is most economical but this will need reappraisal if RUC's or road weight limits change. (Note : It is probable that gross road weight limits will increase but that individual axle weight limits will remain unchanged. This change is not expected to happen for at least two years but its implementation would increase the number of axles required.).

In addition to information on layouts, the LIRA survey provided comparative data on trends in various factors making up total transport costs over the last five years :

Standing costs	up	56 %
Running costs	up	193 %
e.g. Fuel and oil costs	up	272 %
Road User Charges	up	188 %
Tyres	up	100 %
Total transport costs	up	95 %

Transport costs have increased considerably more than the Cost of Living Index (75%) over this period, making it even more important to operate efficiently. If any one factor is to be given attention in the effort to reduce costs, it should be fuel and oil usage, which now comprises around 23% of total costs (up from 12% in 1980).

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