

LOG TRUCK COST ESTIMATES

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INTRODUCTION

Reliable cost estimates are an important part of the successful management of a transport business. When estimates of cost and productivity are combined, a job rate can be determined, either on a cost "per tonne" or cost "per tonne kilometre" basis.

TRUCKAAI and TRUCOST are log truck cost estimate computer programs for "Rate Estimation" and "Cash-flow Analysis" respectively. The program is written on SUPERCALC4, but is also available on SUPERCALC3 and LOTUS 1, 2, 3.

Some specific applications of cost estimates are :

1. Analysis of equipment purchases
2. Estimation of contract transport rates
3. Evaluation of changes in work methods. For example, changing hours worked per day or the type of rig used.

This Report is an introduction to the Log Truck Cost Estimates Handbook (Goldsack, 1988) which describes the costing method and the operation of the costing programs.

The Process of Cost Estimation is to:

- break the overall operation into its cost components.
- calculate a cost for each component.
- add the cost components back together to arrive at a total operating cost.

Owning Costs : Depreciation
 Return on Investment
 Insurance
 Registration

Operating Costs : Fuel and Oil
 Tyres
 Repairs and Maintenance
 Road User Charges
 Overheads
 Wages

Owning Costs
 and
Operating Costs = Total Costs

This process can be done by hand calculator using the best information obtained on each component. If, however, a number of estimates are required or you wish to test how sensitive the result is to changes in inputs, then a computer is desirable.

RATE ESTIMATION

TRUCKAAI is a computer programme developed by LIRA for use on IBM compatible personal computers. It calculates truck cartage rates for log transport using the average annual investment method, with one trucking operation being costed at a time. All the costs incurred by the truck, plus profit, are distributed over the productive work done.

The programme is divided into three main sections :

- data input
- calculations
- output data

TRUCKING RATES BASED ON AAI

INPUT DATA *****	YEAR
(i) FINANCIAL	1
CAPITAL COSTS: TRUCK (\$)	235000.00
TRAILER (\$)	40000.00
INTEREST RATE	20.00
LIFE: TRUCK (Years)	5.00
TRAILER (Years)	7.00
RESIDUAL VALUES: TRUCK (% of purchase price)	55.00
TRAILER (% of purchase price)	15.00
 (ii) UNIT RATES AND PERFORMANCE	
DIESEL COST (\$/litre)	.61
OIL COST (\$/litre)	2.30
CONSUMPTION: FUEL (litre/100km)	45.00
OIL (litre/100km)	.50
TYRE COSTS: NEW (\$/tyre)	450.00
RETREAD (\$/tyre)	215.00
TYRE LIFE: NEW (km/tyre)	80000.00
RETREAD (km/tyre)	65000.00
DISTANCE ON NEW TYRES (%)	10.00
NUMBER OF TYRES: TRUCK	10.00
TRAILER	12.00
ROAD USER CHARGES: TRUCK (\$/km)	.31
TRAILER (\$/km)	.26
MAINTENANCE: TRUCK (\$/km)	.09
TRAILER (\$/axle pa)	1000.00
TRAILER (\$/turntable pa)	500.00
No of T/Tables	1.00
MULTIPLIER (ENTER 1 OR OWN No)	1.50
(For unsealed running)	
OVERHEADS (% of total costs)	5.00
INSURANCE (2.35% of CAPITAL or OWN FIGURE)	2.50
 (iii) OPERATIONAL DETAILS	
AVERAGE HAUL DISTANCE (km loaded direction)	75.00
TRIPS/DAY	3.00
PRODUCTIVE DAYS Per Annum	235.00
PAYLOAD (Tonnes)	27.00
GARAGE DISTANCE/DAY (km both ways)	20.00
DISTANCE: TRAILER PIGGYBACKED (%)	50.00
ON HIGHWAY (%)	80.00
ON SEAL (%)	85.00

Figure 1 : Example data input

(iv) CALCULATIONS

DISTANCES Per Annum (km):	TOTAL	110450.00
	ON HIGHWAY	88360.00
	OFF SEAL	16567.50
PAYLOAD Per Annum (Tonnes)		19458.00
PAYLOAD * DISTANCE Per Annum (tonne-km)		1459350.00
AVERAGE ANNUAL INVESTMENT (AAI)		218128.57

COSTS Per Annum (\$)

INTEREST	43625.71
INSURANCE	5453.21
REGISTRATION (Enter your cost)	400.00
WAGES (Enter your cost)	30000.00
FUEL	30381.53
OIL	1270.18
TYRES	6254.87
REPAIR & MAINTENANCE	15518.23
ROAD USER CHARGES	38878.40
OVERHEADS	6642.04
TOTAL COSTS	178361.16
DEPRECIATION (Straight line)	24335.71
PROFIT (Enter your own after tax value)	10000.00

(v) OUTPUT

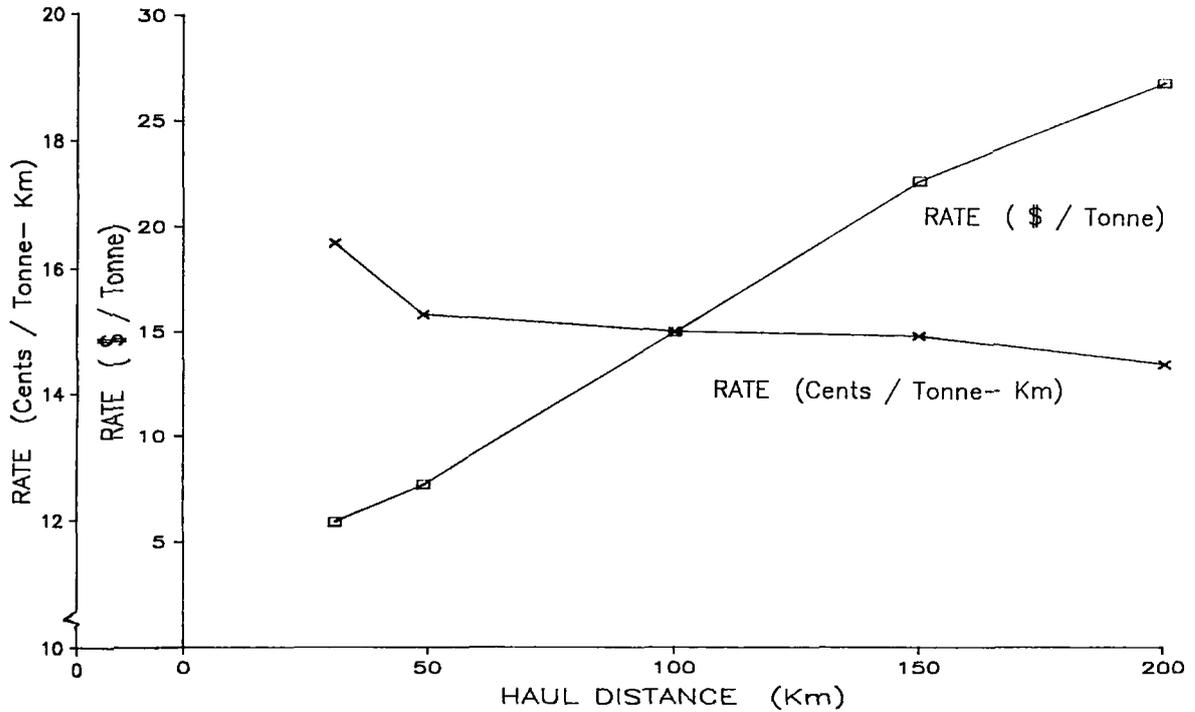
TRUCKING RATES AND INCOME

* TRUCKING RATE (\$/Tonne-km)		.1457476770
* (\$/Tonne-trip)		10.93
* TRUCKING INCOME (\$)		212696.87

REVENUE UTILISATION

*	(%)	(\$)
* OVERHEADS	3.12	6642.04
* DEPRECIATION	11.44	24335.71
* INTEREST	20.51	43625.71
* INSURANCE	2.56	5453.21
* REGISTRATION	.19	400.00
* WAGES	14.10	30000.00
* FUEL & OIL	14.85	31588.70
* TYRES	2.94	6254.87
* R & M	7.30	15518.23
* ROAD USER CHARGES	18.28	38878.40
* PROFIT	4.70	10000.00
* TOTOAL	100.00	212696.87

Figure 2 : Example Calculations and Output Data

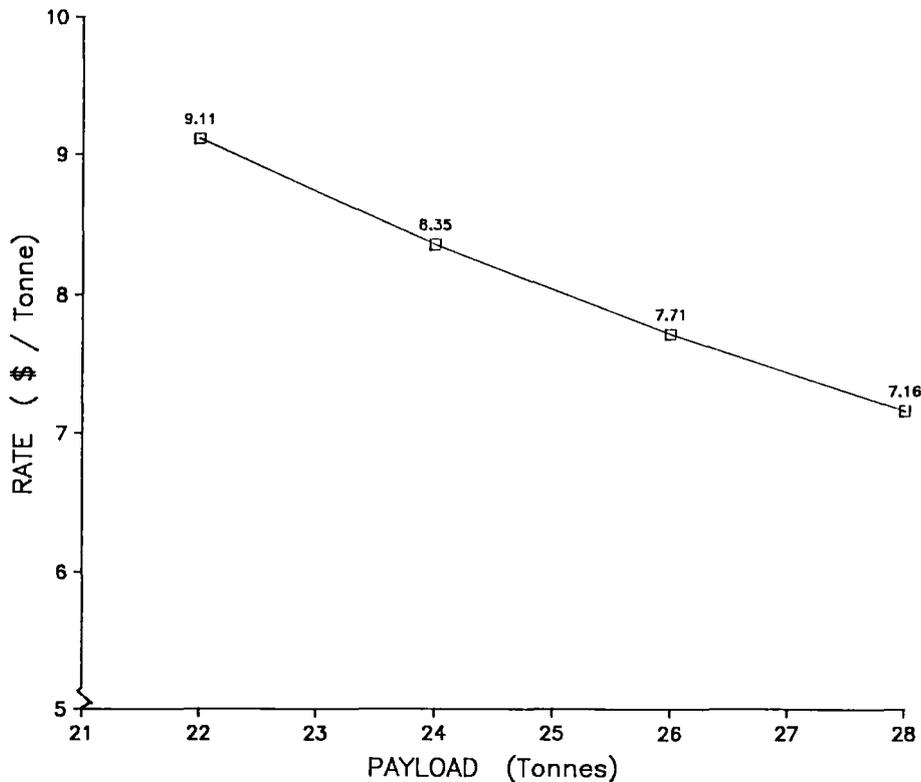


**Figure 3 : Trucking Rate versus Haul Distance
(Highway Operation - 11-13 Hour Day - 25 tonne Payload)**

The rate is calculated from the finance and operating values which make up the input data to TRUCKAAI (Figure 1). The effect of haul distance on cartage rates can be seen in Figure 3.

a high rate or rate per tonne-kilometre is required to allow for the extra time taken up with loading, unloading and delays. At longer haul distances, the advantage of working a longer day to maintain the number of trips per day is also shown.

With relatively short haul distances of 20 to 30 kilometres,



**Figure 4 : Trucking versus Payload
(Highway Operation - 11 hour Day - 50 km Haul)**

Figure 4 shows the advantage of increasing payload by loading to the maximum legal load and/or reducing tare weight. There is a limit to the extent the latter can be pursued as very light trailers and trucks can result in increased maintenance and time off the road. Lost revenue and repairs and maintenance costs could outweigh gains achieved through tare weight reduction.

As would be expected, the more days worked per year the lower the rate required to meet the costs involved. A figure of 235 days is commonly used. However this represents most of the available working days. If days are lost through climatic conditions or unexpected breakdowns, the operator will need to find additional work if he is to meet his costs. Weekend work and extended days can counter days lost elsewhere.

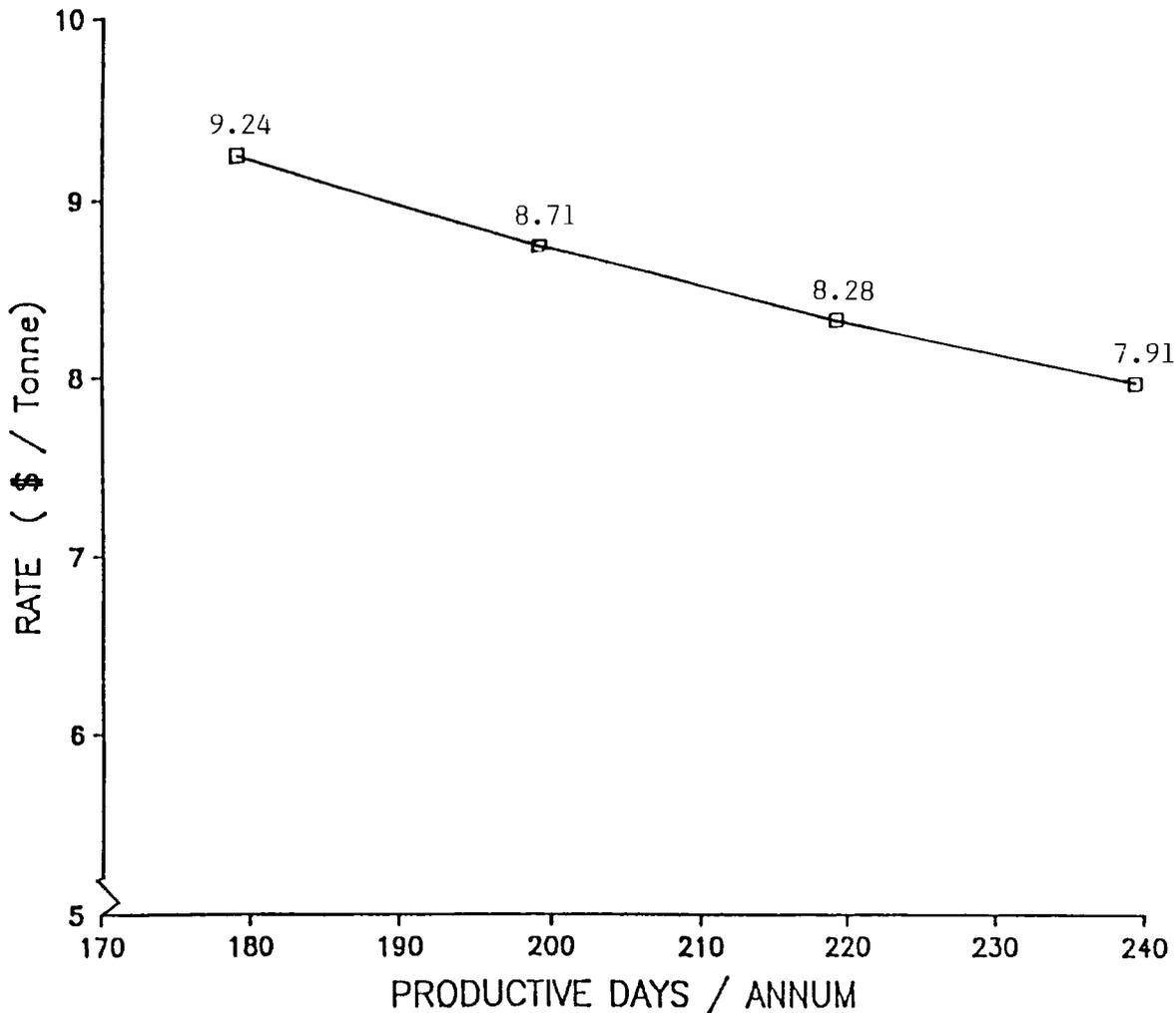


Figure 5 : Trucking Rate versus Days/Year
(Highway Operation - 11 hour day - 50 km haul - 25 tonne Payload)

CASHFLOW

TRUCOST utilises the trucking rate produced by the TRUCKAAI program to calculate the cashflow over the vehicle's life. The program accounts for all the revenue and expenditure incurred during the

year as received or paid in cash. From the input values, the TRUCOST cash flow program is able to realistically predict future business trends and expected performance.

	YEAR	YEAR	YEAR	YEAR	YEAR
(i) FINANCIAL	1	2	3	4.00	5.00
TRUCKING RATE (Cents/Tonne-kM)	.145	.145	.145	.145	.145
CAPITAL COSTS:TRUCK (\$)	235000				
TRAILER (\$)	40000				
OWN INVESTMENT (In Rig) (\$)	25000				
INVESTMENT RATE (% p.a.)	15.00				
LOAN CAPITAL (\$)	250000				
INTEREST RATE (% p.a.)	20.00				
LOAN TERM (Years)	5				
LIFE: TRUCK (Years)	5	5	5	5	5
TRAILER (Years)	7	7	7	7	7
RESIDUAL VALUES: TRUCK (% of purchase price)	55	55	55	55	55
TRAILER (% of purchase price)	15	15	15	15	15
TAX RATE (%)	28.00	28.00	28	28.00	28.00
TAX DEPRECIATION RATE %	20.00	20.00	20	20.00	20.00
(ii) UNIT RATES AND PERFORMANCE					
DIESEL COST (\$/litre)	.61	.61	.61	.61	.61
OIL COST (\$/litre)	2.30	2.30	2.3	2.30	2.30
CONSUMPTION: FUEL(litre/100km)	45.00	45.00	45	45.00	45.00
OIL (litre/100km)	.50	.50	.50	.50	.50
TYRE COSTS: NEW (\$/tyre)	450	450	450	450	450
RETREAD (\$/tyre)	215	215	215	215	215
TYRE LIFE: NEW (km/tyre)	80000	80000	80000	80000	80000
RETREAD (km/tyre)	65000	65000	65000	65000	65000
DISTANCE ON NEW TYRES (%)	10	10	10	10	10
NUMBER OF TYRES: TRUCK	10	10	10	10	10
TRAILER	12	12	12	12	12
ROAD USER CHARGES: TRUCK (\$/km)	.31	.31	.31	.31	.31
TRAILER (\$/km)	.26	.26	.26	.26	.26
MAINTENANCE: TRUCK (\$/km)	.09	.09	.09	.09	.09
TRAILER (\$/axle p.a.)	1000	1000	1000	1000	1000
TRAILER (\$/turntable p.a.)	500	500	500	500	500
No of T/Tables	1	1	1	1	1
MULTIPLIER (ENTER 1 OR OWN No) (For unsealed running)	1.50	1.50	1.5	1.50	1.50
OVERHEADS (% of total costs)	5.00	5.00	5	5.00	5.00
INSURANCE (2.35% of CAPITAL or OWN FIGURE)	2.50	2.50	2.5	2.50	2.50
(iii) OPERATIONAL DETAILS					
AVERAGE HAUL DISTANCE (km loaded direction)	75	75	75	75	75
TRIPS / DAY	3	3	3	3	3
PRODUCTIVE DAYS Per. Annum.	235	235	235	235	235
PAYLOAD (Tonnes)	27.60	27.60	27.6	27.60	27.60
GARAGE DISTANCE /DAY (km both ways)	20	20	20	20	20
DISTANCE: TRAILER PIGGYBACKED (%)	50	50	50	50	50
ON HIGHWAY (%)	80	80	80	80	80
ON SEAL (%)	85	85	85	85	85

Figure 6 : Example data input for TRUCOST program

DISTANCES Per. Annum. (km): TOTAL	110450	110450	110450	110450	110450
ON HIGHWAY	88360	88360	88360	88360	88360
OFF SEAL	16568	16568	16568	16568	16568
PAYLOAD Per. Annum. (Tonnes)	19458	19458	19458	19458	19458
PAYLOAD * DISTANCE Per. Annum. (Tonne-km)	1459350	1459350	1459350	1459350	1459350
FACTORS FOR LOAN CALCULATION					
INTEREST / MONTH	.0166666667	.0166666667	.01666667	.01666667	.01666667
TERM IN MONTHS	60	60	60	60	60
COSTS Per. Annum. (\$)					

NO PERIODS	12	24	36	48	60
REPAYMENTS (p.a.): TOTAL	79482	79482	79482	79482	79482
CAPITAL STILL TO PAY	217660	178225	130138	71501	0
CAPITAL PAID THIS YEAR	32340	39435	48087	58637	71501
INTEREST PAID THIS YEAR	47142	40046	31395	20845	7981
INSURANCE	6875	6267	5658	5050	4441
REGISTRATION (Enter your cost)	400	400	400	400	400
WAGES (Enter your cost)	30000	30000	30000	30000	30000
FUEL	30319	30319	30319	30319	30319
OIL	1270	1270	1270	1270	1270
TYRES	6255	6255	6255	6255	6255
REPAIR & MAINTENANCE	15518	15518	15518	15518	15518
ROAD USER CHARGES	38878	38878	38878	38878	38878
OVERHEADS	8506	8476	8445	8415	8384
TOTAL COSTS	217503	216864	216225	215586	214948
DEPRECIATION TRUCK	20250	20250	20250	20250	20250
DEPRECIATION TRAILER	4086	4086	4086	4086	4086
DEPRECIATION TOTAL (Straight line)	24336	24336	24336	24336	24336
VALUE OF OWN CAPITAL IF INVESTED	28750	31855	35295	39107	43331
TOTAL ASSETS FROM INVESTMENT OPTION (After TAX)	27700	30692	34006	37679	41748

Figure 7 : Example calculations for TRUCOST program

***** TRUCKING FINANCIAL PERFORMANCE *****					
TRUCKING RATE (\$/Tonne-km)	.145	.145	.145	.145	.145
(\$/Tonne-trip)	10.88	10.88	10.875	10.88	10.88
TRUCKING INCOME (\$)	211606	210721	209800	208836	207823
COSTS (NO DEPRECIATION) (\$)	217503	216864	216225	215586	214948
DEPRECIATION (Straight line)	24336	24336	24336	24336	24336
DEPRECIATION (Tax)	55000	44000	35200	28160	22528
TAX (\$)	-7996	-10994	-9185	-2541	9176
FUNDS (\$)	-5897	-12040	-18465	-25215	-41516
OPERATORS CAPITAL IN TRUCK (Excludes tyres) (\$)	23104	38204	53951	96256	143421
OPERATORS TOTAL ASSETS (\$)	17207	26164	35486	71041	101906
INVESTMENT ALTERNATIVE ASSETS (\$)	27700	30692	34006	37679	41748
(Interest Rate) (%)	15.00	15.00	15.00	15.00	15.00
***** REVENUE UTILISATION *****					
	(\$)	(\$)	(\$)	(\$)	(\$)
OVERHEADS	8506	8476	8445	8415	8384
FINANCE	79482	79482	79482	79482	79482
INSURANCE	6875	6267	5658	5050	4441
REGISTRATION	400	400	400	400	400
WAGES	30000	30000	30000	30000	30000
FUEL & OIL	31589	31589	31589	31589	31589
TYRES	6255	6255	6255	6255	6255
R&M	15518	15518	15518	15518	15518
ROAD USER CHARGES	38878	38878	38878	38878	38878
FUNDS (CURRENT YEARS INCOME ONLY)	-5897	-6143	-6425	-6750	-16300
TAX	0	0	0	0	9176
TOTAL INCOME	211606	210721	209800	208836	207823

Figure 8 : Example output data from TRUCOST program

DISCUSSION AND CONCLUSIONS

Record keeping is an essential part of any good business and a log transport business is no exception. Both TRUCKAAI and TRUCOST rely on the quality of their inputs. More accurate inputs will mean better business management. Improved profitability through a reduction in costs is the main aim of any transport operator. However, these costs can only be reduced when they have been identified. TRUCKAAI and TRUCOST give the transport operator the ability to identify these costs and provide the flexibility to alter any inputs as the "on job" conditions change.

A hand calculator will produce the same results. However, the speed and ease of computer calculation makes it a more attractive proposition.

The manual that accompanies the program is comprehensive and not only details the input and the degree of accuracy required, but also explains the formulae and calculations within the programme. The program disks and handbook are available from LIRA.

REFERENCES

Goldsack, R.W. (1988) : "Log Truck Cost Estimates" (Operators Handbook), LIRA.

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