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COLCO - A COMPUTER PROGRAM FOR LOGGING COSTING

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INTRODUCTION

Costing of a logging contract has been seen by many contractors as something which can only be done by their accountant. While recognising the requirement for the final analysis to be checked by a qualified professional, much of the basic work can and should be done by the individual contractor.

Costing of a logging contract manually can be tedious and the number of different calculations necessary increases the risk of making mistakes. Any such mistake may make the difference between a successful tender and missing the contract, or financial success and bankruptcy.

In 1981, LIRA produced a Costing Handbook for Logging Contractors (Ref.1). That handbook attempted to lay out in a logical sequence the steps which should be taken when costing. It doesn't, however, solve the problem of calculation error nor the time consuming nature of hand calculations. COLCO is a computer program based on the procedures used in the handbook. This report introduces the program which was developed as an attempt to further reduce the possibility of calculation errors and to simplify the process of costing.

The program has been designed as a tool for industry. This is a service offered to industry by LIRA and those wishing to use this facility should contact John Gaskin at LIRA. You can use this program yourself or we can help you. No special knowledge of computers in general or programming in particular is required.

BACKGROUND

As the program uses the principles explained in the handbook, two important points from that should be re-emphasised :

- (1) *The methods used in this handbook indicate a reasonable approach to cost problems for logging contractors. They do not represent the only method, nor are they necessarily the best method to use in every case. Personal judgement should be exercised and expert advice sought on what are the best methods to use for a particular contractor's situation.*
- (2) *In the handbook a number of tables are presented giving information which can be used in costing logging operations. Because of lack of data, especially about logging machines, this data may not apply in a specific situation. It must be stressed that the approach used in this handbook is based on guidelines and approximations. They are no substitute for keeping detailed records about an operation for use in that situation.*

COLCO

The program is written in BASIC computer language for a digital PDP 11/23 computer. The program has been split into three sections : machine costing, labour costing and total job costing.

On starting the program, the user is asked which section he wishes to use. On inputting his decision, the computer goes to the starting point of that section. At the end of each section an option exists to either run it again, thus enabling different values to be used, to go on to another section decided by the user, or to terminate the program.

Throughout the program, the user is prompted for inputs by questions on the screen,

e.g. capital cost of machine ?
life in years ?

Clear, simple instructions are printed on the screen at each point in the program where a decision is necessary. As a result, there is no need to refer to any accompanying text while running the program.

MACHINE COSTING

This establishes the daily cost of owning and operating a logging machine. Specific machine types, which can be costed at present, are skidder, tractor, hauler, rubber-tyred loader, and F.M.C.-type machines. Although the loader option is based on rubber-tyred equipment, a tracked loader could easily be costed, using the tractor option.

Inputs follow a similar pattern to those used in the handbook. Basic information - derived from the owner's experience - such as machine cost, resale value, life in years and hours worked per day, are all entered by the user. The more complex information, such as fuel and oil usage or rigging costs, is available from tables screened as guidelines. Of course, some users may have estimates from their own records which they can use instead.

Calculations in the program all follow those in the handbook. Depreciation is based on the straight line method, i.e.

$$\text{Depreciation per hour} = \frac{\text{Delivered price} - \text{cost of tyres, rigging} - \text{resale value}}{\text{Service life in hours}}$$

At the end of the machine costing section, the user can printout the machine's daily cost. An example is in Table 1 :

MACHINE DAILY COST			
VARIABLES USED			
CLARK RANGER 664D 26 JULY, 1983			
COST OF MACHINE	= \$ 85,000	RESALE VALUE	= \$ 35,000
LIFE OF MACHINE IN YEARS	= 4		
PROD. HRS./YEAR	= 1,400	PROD. HRS./DAY	= 6.5
RATE ON INVESTMENT	= 15%	INSURANCE	= 2 %
FUEL CONSUMP.	= 9.1	FUEL COST	= \$.58
OIL CONSUMP.	= .34	OIL COST	= \$ 2
R & M FACTOR	= 75 %		
STROP COST	= \$278.65	STROP LIFE	= 200
MAINROPE COST	= \$200.26	MAINROPE LIFE	= 450
CLARK RANGER 664D 26 JULY, 1983			
OWN COST/HR		OPERATING COST/HR.	
DEPRECIATION	= 7.14286	FUEL	= 5.278
RETURN INV.	= 7.09821	OIL	= .68
INSURANCE	= .946429	TYRES	= 4
		MAINROPE	= .445022
		STROPS	= 1.39325
		R & M	= 5.35714
TOT. OWN \$/HR	= 15.1875	TOT. OP \$/HR	= 17.1534
TOTAL COST PER DAY	= \$210.216		

LABOUR COSTING

The second section of the program calculates the cost per man per day. Again, the tables from the handbook are screened as guides although figures from these tables don't have to be used. The option exists for the user to input his own figures based on his experience.

Factors which are part of the daily cost of a worker include travel pay, bonus payment (optional), overtime allowance (optional) and the cost of annual holidays. Accident compensation levy has been set at 4.7% of total basic pay, plus holiday pay, and will be updated as required. Protective equipment allowance is input as a total cost per worker per year, e.g. \$250. There is also the option to include worker's supplementary insurance and to add the owner's salary, if that has not already been included as part of the gang's.

Once the labour cost has been calculated, the following options exist : print results, re-run the section using different variables, or select another section if required.

JOB RATE

The final section combines the machine, labour and other incidental costs involved in running a logging gang, and gives a total cost per day. This cost, divided by the daily production, will give a cost per tonne or per cubic metre.

Machine daily cost and labour daily cost are required from the previous sections. Other inputs in the final section are number of chainsaws to be used and their allowance per day, kilometres travelled each day, and the cc rating of vehicle used. The kilometre rate (\$/km travelled) is based on the Government schedule and will be updated as required. A further opportunity exists to enter owner's salary, if not already included in labour or overhead costs.

The last two inputs are the most difficult to assess. Operating supply costs include such things as fire fighting equipment, gang shelter, safety and first aid equipment, tools, etc. The program asks the user to put his cost in as a dollar per day figure (usually between \$20-\$60 per day). The second input is overheads - accountant's fees, stationery and postage, office space, etc. It can be input as a dollar figure per year or as a percentage of the total daily cost (e.g. 2-4%).

At the end of the final section, a printout is automatically produced. An example of this is shown in Table 2 :

JOB RATE SUMMARY SHEET	
COST ITEM	DAILY COST
1. MACHINES	
SKIDDER	210.216
TOTAL MACHINE COSTS	210.216
2. CHAINSAWS	
5 SAWS @ \$ 10	50
3. LABOUR	
5 MEN @ \$ 92.52	462.6
4. PERSONNEL TRANSPORT	
150 Km @ \$.407	61.05
5. OPERATING SUPPLY COST	37.54
6. OVERHEADS	
3% OF DAILY COSTS	24.6422
TOTAL GANG COST PER DAY	\$ 846.048

DISCUSSION

Given the highly variable nature of individual cost elements, every attempt possible has been made to maintain a high degree of flexibility. For this reason, the program uses some 130 different variables. Where costs have been quoted, the date they relate to is given, and they will be updated periodically.

No provision for including profit has been made, nor for the preparation of a cash flow budget which is essential to ensure income will meet expenditure.

To reiterate the point made at the beginning of the report, this is only one method of costing a logging contract. It is considered to be a reasonable approach but by no means the only one. Nor is it intended as a substitute for personal judgement or expert advice.

Costing a skidder, loader and six men to derive a total daily cost takes approximately 12 minutes. This is considerably faster than can be done using pen, paper and calculator.

Ref. 1 - Wells, G.C. "Costing Handbook for Logging Contractors", LIRA, 1981

Appendix

List of requirements before running the program :

- Cost of machine
- Resale value of machine
- Life of machine in years
- Productive hours per year
- Productive hours per day
- Interest rate on borrowed capital
- Insurance rate as %
- Mainrope size, length and life in hours (for haulers all drums)
- Strop size, length and life in hours
- Cost of set of tyres and life in hours
- Travel hours/day
- Number of chainsaws and daily rate
- Kilometres travelled per day

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