

Methods of Keeping Cost Records

and Their Application

in the Logging Industry

by

Morton Fillmore

A Thesis

Presented to the Faculty

of the

School of Forestry

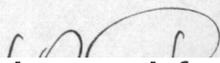
Oregon State College

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Science

June 1945

Approved: 

Redacted for privacy

Professor of Forestry

TABLE OF CONTENTS

	Page
Introduction	1
Classification of Costs and Means of Application	4
Methods of Showing Fixed Capital Costs	8
Methods in Obtaining Annual Burden or Overhead	13
Methods of Showing Current Operating Costs	15
Total Production Cost	29
Summary	37
Index	39

TABLES

- I Entry of Stumpage in Purchase Ledger
- II Supplement of Equipment Account in Purchase Ledger
- III Sample Timesheet of Employee
- IV Office Expense Account in Overhead Journal
- V Sample Expense Account
- VI Sample Scale Sheet
- VII Felling and Bucking Record
- VIII Equipment Repair and Maintenance Record
- IX Construction Cost Record
- X Rigging Ahead Account
- XI Maintenance Record of Roads
- XII Monthly Supply Journal
- XIII Yearly Labor Cost Account
- XIV Yearly Maintenance and Repair Account
- XV Yearly Supply Account

METHODS OF KEEPING COST RECORDS AND THEIR APPLICATION
IN THE LOGGING INDUSTRY

INTRODUCTION

There are many logging operators, small and large, perhaps a majority, who do not keep, or at least have available, adequate cost records of their operations. Many small operators know only that it costs them so many dollars and cents to get the logs from the trees to the water or mill. Many large operators, whose operation includes several sides and is spread over a wide area, know that their total felling and bucking cost or their total yarding and loading cost is so much, when in all probability, if they would break down their felling and bucking or their yarding and loading cost into areas or merchantable and unmerchantable timber, they could reduce their costs immensely, consequently lowering their total cost and increasing their profit. Hence the purpose of this thesis is to show and explain the various methods of cost analysis, which can be applied to any operation, small, medium or large and to illustrate how the operators can apply the results to their own benefit.

The logging industry is perhaps one of the most unpredictable industries, due to the many factors and conditions which affect its production. There are never two operations alike, and even on one operation there are never two settings

alike, The ground, the size of the timber, the predominating species, or the quantity of timber will always be different on one setting than on another, although they may appear to be similar. There might be two settings each with two million board feet on them and nearly the same size timber, but if both were logged by the same machine and the same crew, one might take twenty-five working days to log while the other only twenty or less. Consequently the various costs of each setting will vary, hence the importance of knowing what the individual operations cost, so that they can be increased or lessened as the case may be.

From proper cost records we have the means to improve management practices, lower the various costs, increase profit and perhaps, also, increase production making it more uniform.

The methods of cost analysis which should be used on any one operation will be determined by the size and kind of operation. For a one side operation it is not necessary to go into the detail and break-down system that would be applicable to a five or six side operation. On a one side operation ordinarily, there is only one operation going at a time; that is, the fellers and buckers are on one setting at a time and, of course, yarding and loading is located in one setting. On the other hand on a large operation, operating five sides, for instance, two sets of fellers might be felling a predominating hemlock setting while two

other sets would be felling a setting of large yellow fir. If this is the case it is easy to see that the operator will have to take each of these settings separate in obtaining felling and bucking costs if he is to maintain the required accuracy. The total cost of the two taken together might look alright, but when you separate the two settings you might find that the hemlock setting was costing you over and above what it should and the yellow fir stand less than you had estimated or vice versa. In any operation the operating costs should be broken-down to, at least, the various operations that are necessary in getting the log from the tree to its destination.

The data found in this thesis has been obtained from research books on various costs in the logging industry, from text books, and thesis previously written on different phases of costs. In the writers four years experience in the logging industry he has come into contact with many operator's versions of how far it is necessary to carry cost records in order to have a successful operation. In this thesis the writer will attempt to explain and illustrate the various methods for different operations in order to make them more proficient.

CLASSIFICATION OF COSTS AND MEANS OF APPLICATION

For all general purposes costs may be classified into two broad classes; Fixed and Variable. Fixed costs are those whose total amount is set and whose unit amount varies with output¹. Variable costs are those whose unit amount is set and whose total amount varies with output². There are many classes of costs which come under these two general classes which will be explained later.

FIXED COSTS:

Fixed costs are determined at time of expenditure and are those that have to be met regardless of production. An operator purchases a new donkey for \$5,000.00, the price of which is determined by the seller. This is a fixed cost as the donkey cost the operator \$5,000.00 whether it logs a thousand board feet or fifty million board feet. Wages paid to salaried employees should be considered as a fixed cost and wages paid per hour or for piece work should be considered as variable costs. The salaried employee ordinarily is paid the year around regardless of shut downs or other non productive periods, while the employee who is paid by the hour or by the piece is not paid except when he is on the job productin goods.

VARIABLE COSTS:

Variable costs are determined by production. These

1. Matthews, Donald - Cost Control in the Logging Industry
2. Ibid

costs are affected by the various conditions which determine output such as weather, ground conditions, size of timber, thickness of stand and etcetra. Yarding costs on a setting may be two dollars per M board feet, while on another setting they might be two dollars and a half per M board feet. In other words, in the first case it cost the operator two dollars for each M board feet of logs that came off the setting, while in the second case it cost the operator two dollars and a half for every M board feet of logs that came off the setting.

In the explanation of the methods and their applications that should be employed by the different operators, it would be advisable to divide the costs into three groups: (1) Fixed Capital Costs, (2) Annual Burden and Overhead, and (3) Current Operating Costs. The writer will use this grouping in the explanation of the various logging costs and their application toward the procurement of a more efficient operation.

FIXED CAPITAL COSTS:

Fixed capital costs are those costs which are expended in the effort to obtain production. They include the costs of initial investment prior to actual production from the operation and, also, the capital costs incurred during production. They include the stumpage cost if purchased outright, property taxes from time of purchase, cruising cost, advance engineering cost, cost of building camp and facilities, cost of building transportation facilities to the area of the operation, and the cost of all equipment.

The above costs, as can easily be seen are expended on the anticipation of production and have to be met regardless of production. The total amount expended for each item depends, of course, on the amount of timber to be logged, length of the operation, and anticipated size of the operation. In other words a large operator who has five hundred million board feet of timber and expects to log it in ten years will have to spend much more money previous to actual operation than the small operator who has one million board feet of timber and plans to log it in one summer. The contractor, on the other hand, will be interested in only part of the above named fixed capital costs depending on what he has contracted to do.

ANNUAL BURDEN OR OVERHEAD:

Annual burden or overhead includes the ownership and management costs, which are the costs of owning and managing the operation. These expenses have to be met regardless of production but occur with the operation in production.

The ownership cost includes insurance on the felled and bucked timber and equipment, property taxes accruing after operation is begun, and fire protection.

Management costs include those costs which are necessary for production but are not a direct cost of production or, in other words, do not apply to production. They include the salaries of the supervisors, (superintendent, office employees, scaler, and etc.), office expenses, legal services, and other administrative costs.

All operators from the contractor to the large companies have these cost items to include in their final cost of production and many neglect to consider them as fully as they should. Many operators, small ones in particular, consider their particular policies as the most economical without due consideration as to whether they should be decreased or increased in order for more perfect management policy.

CURRENT OPERATING COSTS:

Current operating costs are those expenses which are directly related to production or upon which production is dependent. They include the cost of; (1) felling and bucking, (2) yarding and loading, (3) transportation, (4) construction, (5) rigging ahead, and (6) maintenance and repair. These costs are incurred only during production and are eliminated when production ceases.

These expenses are the variable costs and are the easiest to adjust should adjustment be necessary. They are the ones which are the most likely to be "out of line" and, this is the place where the management policies are reflected. With poor management these costs may become excessive, while with proper management the current operating costs may be kept at a minimum. If total cost of production is thought to be excessive, the most logical place to look for improvement is in the current operating costs. If total cost of production gradually increases over a period of time, the cause can probably be traced to

the operating costs.

In order to be able to correct or check these costs it is necessary for the operation to keep continuous cost records in a practical concise manner whereby proper analysis of them will divulge the location of the rising costs. Also if cost records are kept in the proper manner any noticeable change in costs will be noticed at the time of occurrence and proper steps can be taken immediately to correct the error. An operator's felling and bucking costs might be between \$2.00 per M board feet and \$2.25 per M board feet for several months and then in a short period rise to \$2.50 per M board feet or even \$2.75 per M board feet. If improper or insufficient methods of costs are kept, this sudden change in costs might not be detected for a period of time and even when detected no means would be available to show where the change in cost originated.

It is the purpose of this paper to show the simple concise method of keeping cost records that will be of value for good management and to show how the data shown by the methods can be applied to the many everyday problems that occur in every logging operation.

METHODS OF SHOWING FIXED CAPITAL COSTS:

As previously explained fixed capital costs are costs whose total amount is set and whose unit cost depends upon production⁽¹⁾. For this reason these costs may seem complicated to reduce to forms whereby they show what they should. They have to be depreciated, amortized, and

adjusted over a period of time or on output of production. The amount expended on the various items, which are classified under capital costs, is a set amount which has been paid before production starts. They may be called pre-production costs.

It may be said that these costs become less as production proceeds, as they are charged off the book over a period of time or on a per M board feet basis. The costs which are included under Fixed Capital Costs are as follows:

- (1) Stumpage (if purchased outright)
 - (a) Property taxes to the time when production is begun.
 - (b) Cruising cost.
 - (c) Advance engineering expenses.
- (2) Camp costs (building and maintenance until
production begins).
- (3) Mainline road cost to area of production.
- (4) Equipment purchases.

These costs must be kept from the start of preparation to put the operation into production. Cost methods must be started and kept in good order from the time the actual work begins in the anticipation of removing logs from any area, as these costs must be included in total production costs. Consequently any operator should begin at the start with proper methods of showing the costs so that at a later date his actual costs of production will be of value to him. Many operators believe these to be necessary costs that must

be expended in order to produce the logs and consequently do not keep adequate records of their capital costs. Hence, their production costs after production begins will not be a true picture of what they desire.

The above items will first appear in a purchase ledger, which is a book that will show the total cost of each item individually and adjustments made during production. In order to have the purchase ledger accurate, the cruising cost and advance engineering cost must be kept as they accrue so that the total entered in the purchase ledger will be the actual amount expended for the various items and not merely an estimate.

The purchase ledger shows the total amount of each capital cost and the amortization of each item during production and at the close of the operation or end of production the balance on the ledger will be zero theoretically. Table 1 is an example of how each item can be shown and of what it should consist.

In Table 1 stumpage is shown amortized equally over the entire period of operation, which is the simplest method that can be used and is adequate for later use in determining production costs. Some operators, however, prefer to diagnose the future market trends and amortize their stumpage accordingly. If they believe that the market will decline during production and it is at a high level at the start of production, they may charge off the first hundred million board feet at \$7.00 per M board feet, the second hundred million board feet at \$5.00 per M board feet, and the last hundred

STUMPAGE

INITIAL COST:

100,000 M BD. FT. AT \$ 5.00 PER M-1933			\$ 500,000 00
PROPERTY TAXES 10 YRS. AT \$ 1000 PER YR.			1 0,000 00
CRUISING COST (1942)			2,000 00
ADVANCE ENGINEERING (1942)			3,000 00
TOTAL STUMPAGE COST			\$ 515,000 00
DEPLETION RATE $\$515000 \div 100000 = \5.15 PER M			
OUTPUT 1943-15,000 M BD. FT. AT \$ 5.15 M	\$ 77,250	00	
OUTPUT 1944-22000M " " " " "	113,300	00	
OUTPUT 1945-20500M " " " " "	105,575	00	
OUTPUT 1946-22000M " " " " "	113,300	00	
OUTPUT 1947-19000M " " " " "	97,850	00	
OUTPUT 1948- 1500M " " " " "	7,725	00	
	\$ 515,000	00	\$ 515,000 00

TABLE I ENTRY OF STUMPAGE IN PURCHASE LEDGER

million board feet at \$3.00 per M board feet or vice versa if they believe the market trend to be the opposite. There are always various ways of accomplishing the desired results, which are satisfactory as long as the results obtained are in the proper form to be used in determining production costs.

The method used may be determined by the size of the operation. A large operation that will extend over a period of several years requires more complete information than a short operation which will be completed in one season. Every operator, however, should keep a Purchase Ledger in complete form in order to show what he has expended in order to reach the final production cost, which is the ultimate aim.

Fixed Capital Costs should be amortized or depreciated either directly or indirectly on the total volume of the tract which is to be logged. Stumpage, property tax, cruising cost, advance engineering cost, camp cost and mainline road cost pertain to the area as a whole and their cost is equally represented on the entire area, hence they should be amortized directly on the total volume of the tract. On the other hand the item of equipment is made up of several different parts and should be amortized or depreciated against the part to which it applies and is therefore indirectly amortized or depreciated on the entire tract. For instance, a tractor is depreciated on the basis of years. It is purchased to build the mainline to the area of production and also, after production begins, to

build the mainline and spurs of the production area. The tractor is, therefore, depreciated by the number of days it is operated on building the individual roads. From this it is seen that the cost of the mainline as shown in the Purchase Ledger includes depreciation of the tractor for the days it was operated in building the mainline. As previously stated the cost of the mainline to the production area is charged against the total volume to be logged, hence, it can be seen that the tractor is depreciated indirectly on the total volume to be logged.

The logging equipment is similarly depreciated on the timber each piece of equipment produces. A yarder, for instance, is depreciated at a predetermined rate per M board feet, on the footage it yards.

Because of the complications in arriving at the total cost of some of the capital costs, it is necessary to make a work sheet or journal for the parts which make up the total cost. To arrive at the total equipment cost, for instance, it would be very worth while and beneficial to keep a journal on each piece of equipment similar to those shown in Table II. From the various journals it is a simple matter to derive at the depreciation, that is to be charged to the various items.

The cost of the mainline road and the cost of building the camp include many items: such as, salaries and wages, depreciation of equipment, maintenance and repairs of equipment, materials, clearing and etc. In order to accumulate these costs properly, it is advisable to keep a

D8 CATERPILLAR-DOZER AND SINGLE DRUM

PURCHASED DECEMBER 1942

TOTAL COST \$ 10,500.00

DEPRECIATION PERIOD 4 YEARS

YEAR	D E P R E C I A T I O N	M A I N T E N A N C E - R E P A I R	S U P P L I E S	T O T A L
1943	\$ 2625 00	\$ 500 00	\$ 750 00	\$ 3875 00
1944	2 625 00	1 500 00	850 00	4 975 00
1945	2 625 00	900 00	900 00	4 425 00
1946	2 625 00	600 00	700 00	3 925 00
1947	---	1 500 00	6 50 00	2 150 00
1948	---	2 00 00	50 00	250 00
TOTAL	\$ 10,500 00	\$ 5200 00	\$ 3900 00	\$ 19,600 00

TABLE II YEARLY COST RECORD TO SUPPLEMENT
EQUIPMENT ACCOUNT - PURCHASE LEDGER

separate journal on each and at the end of each month post the money spent during the month to its proper place. For instance the salaries and wages in the building of the mainline road can be taken directly from the payroll each month and posted to the mainline road journal. When the road has been completed, you will have complete data on the total cost of the road as well as the total cost of each item.

From the preceding discussion the reader can see that in order to have the proper data available when he attempts to arrive at production costs at various stages of operation, it is necessary to begin at the start of the operation to obtain each cost that is expended.

METHODS IN OBTAINING ANNUAL BURDEN OR OVERHEAD

The amortization of the annual burden is perhaps the most difficult to accomplish as each item has to be charged to each part of the work. It is difficult to ascertain what proportion of the item should be charged to logging, road construction and etc. The annual burden includes the items which are necessary in maintaining production, but they are not directly connected with production. The annual burden includes the following items:

1. Insurance equipment and felled and bucked timber.
2. Property taxes.
3. Fire Protection
4. Salaries (Superintendent and other supervision).
5. Office expenses

BUNYON LOGGING COMPANY

OCCUPATION SUPERINTENDENT

DATE MARCH 1945
 SOC. SEC. NO. 507-10-4296
 NAME JOHN H. DOE

CLASSIFICATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTAL	RATE	AMT.		
LOGGING (SIDE A)	4				3				4			2	4	4	4	3				2		2	3			4			6		4	49	MON			
LOGGING (SIDE B)	2		1		3		2	2	1	3		2	3				3			2	2	4					4	2		5			41			
CONST. SPUR CI		4	3			2	4	4				2			2						3	2		2		4			2		2	36				
CONST. MAINLINE		2	2			4			3			2	4		2				4	2			3				4			2			34			
MAINTENANCE	2		2			2				3			3		2				4		3			3						3			27			
OFFICE		2				2		2	2	2			2			2	2			2			2	3					6				29			
TOTALS																																		216		

TABLE III EMPLOYEE'S TIMESHEET SHOWING CLASSIFICATION OF WORK

6. Legal services
7. Administrative costs
8. Association dues and fees.

The above items accrue annually and are not dependent on production. The amount of each item is set and payment must be made regardless of production.

As in all accounting there are several ways in which these expenses may be handled, depending upon what is desired and the relative importance of the item. The item of salaries should be charged to its proper place as it accrues. This can be done by a payroll classification system, which should be used on each employees timesheet. Table III is a sample timesheet as they should be kept. If the timesheets for every employee, including the superintendent and other supervisors, are kept in this manner, the proper labor cost can be charged to each division as it should be.

For instance 49/216 of the superintendent's salary should be charged to Side A, 41/216 to side B, 36/216 to Spur C1, 34/216 to mainline, 27/216 to maintenance and 29/216 to office expense. This method of payroll distribution is easily kept and is specific in showing the exact labor cost for each job.

The remaining items should be kept in an overhead journal or book of some kind where sufficient space for each item can be provided and entries made as they occur with explanation as to what they apply if it is divisional. Table IV is an example of how the item of office expenses

may be shown in the overhead journal.

The other items which are included in the annual burden or overhead classification can be shown in a similar manner. If the items are kept in this manner they will be available when the operator attempts to get his production cost. For instance if he desires to know his production cost for March, he can get his annual burden cost for March from the journal by taking the total expended in March for the various items or in the case of those items whose cost only appears once a year, he can take a proportion of them.

METHODS OF SHOWING CURRENT OPERATING COST

Current operating costs are those that are expended in the effort of production. They are the direct costs of getting the logs from the stand to their destination. All monies which are expended directly in the process of production are current operating costs and are classified as variable costs. They vary according to the size of timber, ground conditions, accessibility of stand, species and ~~etc.~~etra.

The costs which are included under the classification of current operating cost are as follows:

- (1) Felling and Bucking
- (2) Yarding
- (3) Loading
- (4) Transportation
- (5) Construction (building and maintenance of roads)

- (6) Rigging Ahead
- (7) Maintenance
- (8) Scaling

These items are the different procedures which are necessary to complete in order to get the timber from the stand to the point of destination, such as the mill. The cost of each item is variable as to the management procedures of the operation. From this we can see that the cost of these eight items are the ones the operator is primarily interested and that any change in management procedure will lessen or increase his cost of production accordingly. It is true that the total production cost, which is the ultimate aim of any cost system, is made up of fixed capital costs plus the annual burden plus the current operating cost. However it is the operating cost which is most easily changed and consequently where changes in cost will most generally occur whether favorable or unfavorable. These current operating costs accrue everyday that the process of production is in operation. This makes it hard to obtain the accurate costs unless proper methods are used whereby each days costs are properly kept and posted. For the purpose of explanation each item will be taken separately and methods for keeping it's cost will be discussed.

FELLING AND BUCKING COST

The felling and bucking costs make up approximately one third the logging costs and are probably the most

variable of the operating costs. This is due to the fact that most operators prefer the piece rate system rather than the day rate system. And also because at the present time there are a very few fellers and buckers who will work on a day rate basis. Because of the fact that the felling and bucking is usually on a piece rate basis, it is the operating cost that can most easily get out of hand, and, unless the actual costs and conditions are closely watched, they may become exorbitant as they have in the past few years.

The item of felling and bucking consists of several unit costs which, for obvious reasons, should be kept separate. These would include tools, felling labor cost, bucking labor cost, overhead, and supplies.

The tool cost will include the cost of the necessary tools for the fellers and for the buckers. Table V is a method by which the tool cost can be kept in a precise simple way.

From the table we see that 12 bucking saws were purchased on March 3rd at the cost of \$120.00, also on the same day the operator purchased a dozen power saw chains at the cost of \$144.00 and 36 axes (24 bucking axes and 12 felling axes) for \$72.00. As 12 of these axes were felling axes and the other were bucking axes, they were charged \$24.00 and \$48.00 respectively. At the end of each month, at the conclusion of cutting a setting, or at any period desired the correct proportion can be taken from the totals of the above table and applied to the

FELLING AND BUCKING

DATE	QUANTITY	ITEM	AMOUNT
MARCH 3	12	BUCKING SAWS	\$ 120.00
" 3	12	POWER SAW CHAINS	144.00
" 3	36	AXES	72.00
" 16	200 LBS.	SLEDGES	20.00
" 26	2 HANKS	SASH GORD	5.00
		TOTAL	\$ 261.00

TABLE V DAILY SUPPLY JOURNAL
FOR FELLING AND BUCKING

cost of the period being considered.

Cost sheets such as that shown in Table V serve several purposes other than determining cost. The operator may want to know when a certain item was purchased or the quantity purchased. He can readily determine this by looking on his cost sheets. The operator might have accumulated two or three brands of axes and would like to know which brand has given the best service. From his cost sheet this information can be easily obtained.

The labor cost for felling and bucking may be taken together or separately depending upon the operator or size of operation. If only the total labor cost is desirable, it would be advisable to include them together. However on most operations it would be better to keep the cost of each, in order to have facts available for the solution of problems which may arise.

In the piece rate system of wages, which is the universal system, both the hours worked and the cut of each employee has to be determined. The hours worked by each employee must be classified on the payroll sheet both by setting and the classification of his job. This is most easily done as shown in Table III. In the column headed classification the employee's time would be classified as felling setting A, B, or C as the case may be. At the end of each month the hours each employee worked on each setting can be easily determined.

There are various ways in which the scale of logs cut

NAME <u>JOHN DOE</u>		NO. <u>15</u>			
SETTING <u>G--SPUR D2</u>		DATE <u>MAR. 6</u>			
PRICE <u>55¢</u>		<u>BUCKER</u>			
REMARK	TREE NO.	LENGTH	DIA.	FEET	
	1	190	46	46	4742
	2	193	40	44	3620
	3		30	41	2496
	4		48	35	2856
	5	196	42	42	3614
	6		38	36	2257
LB	7	197	32	43	2754
	8		42	37	2789
	9	198	54	20	1036
	10	204	40	38	2660
	11		44	34	2469
LB	12	206	32	49	3594
	13		40	43	3442
	14		32	39	2248
	15	209	32	26	976
	16	211	32	35	1794
	17		44	29	1805
	18		34	27	1122
	19	212	36	49	4044
LC	20		32	45	3024
	21	215	40	46	3952
28'	22		32	44	2896
X	23		32	38	2128
	24		36	32	1682
LC	25	217	32	24	824
TOTAL					64,824

TABLE VI DAILY SCALE SHEET AS SCALED BY WOOD'S SCALER

by each employee can be kept. The method to be used is dependent on the bookkeepers wishes. However, whatever method is used, certain items should be available. The scale should be kept on each setting separately. Further divisions, such as merchantable and unmerchantable timber, may be kept from day to day or merely shown on scale sheet turned in to the office by the scaler, so that if it is necessary to determine it on a certain setting it can easily be added. The job of the bookkeeper can be made much easier if well written scale sheets are turned in for each employee each day. Table VI is a form of a scale sheet used by many operators and is a very precise form from which any item desired can easily be obtained.

If a sheet such as shown in table VI is kept for each buckler and each set of fellers every day by the scaler and given to bookkeeper, it is a simple matter for him to credit the scale to proper employee and post it under proper setting. Table VII shows a means of keeping scale by settings, which gives all necessary information. If it is desirable to keep the merchantable and unmerchantable timber, the column for scale may be subdivided into additional columns, however these minute details are not required on all the felling and bucking and if it is desired on a particular setting it can be determined from scale sheet similar to Table VI.

If the felling is done with power saws, the cost of them will be kept in the fixed capital cost book and supplies for them can be kept as is done for the other

FALLERS MARCH 1943

DATE	JOHN DOE	PRICE	SETTING	DATE	HENRY SMITH	PRICE	SETTING	DATE	WM. JONES	PRICE	SETTING	DATE	DAVID BROWN	PRICE	SETTING
2	15 0732	25 ¢	C	2	15 0732	25 ¢	C	1	9 0845	22 ¢	B	1	9 0845	22 ¢	B
4	12 0155	"	"	4	12 0155	"	"	3	14 0622	"	"	3	14 0622	"	"
6	9 0157	"	"	6	9 0157	"	"	6	14 5716	"	"	6	14 5716	"	"
8	16 0858	"	"	8	16 0858	"	"	8	4 5816	"	"	8	4 5816	"	"
11	133 982	"	"	11	133 982	"	"	10	126 842	"	"	10	126 842	"	"
14	8 9990	"	"	14	8 9990	"	"	12	135 756	"	"	12	135 756	"	"
16	14 5440	"	"	16	14 5440	"	"	14	90125	"	"	14	90125	"	"
19	17 5480	"	"	19	17 5480	"	"	16	15 6825	"	"	16	15 6825	"	"
21	4 0244	"	"	21	4 0244	"	"	19	135 236	"	"	19	135 236	"	"
23	65 982	"	"	23	65 982	"	"	21	12 2145	"	"	21	12 2145	"	"
26	16 5452	"	"	26	16 5452	"	"	24	16 0392	"	"	24	16 0392	"	"
28	11 0105	"	"	28	11 0105	"	"	26	12 3810	"	"	26	12 3810	"	"
31	17 8440	"	"	31	17 8440	"	"	28	96 455	"	"	28	96 455	"	"
								31	14 5685	"	"	31	14 5685	"	"
	16 27017	25 ¢			16 27017	25 ¢			17 16270	22 ¢			17 16270	22 ¢	

TABLE 7 FELLERS AND BUCKERS MONTHLY RECORD

equipment.

The cost of overhead can be kept by the time sheet classification. The log markers and scalers time can be posted each day to the particular setting on which they spent the day and the head bucker and saw filer's time can be divided proportionly to the settings where the employees are working.

If the items of cost are kept in the manner herein explained, the total felling and bucking cost as well as the individual costs can be easily obtained.

YARDING COST

The yarding cost on an operation is the cost of bringing the logs from their place in the woods to the landing on each setting. It is the cost of assembling the logs in one place from where they can be easily loaded. As in the case of the other divisions of logging, the yarding cost is made up of several variable costs which can become irregular unless proper cost records are kept. The yarding cost includes the items of overhead, labor, depreciation of equipment maintenance and supplies.

The overhead and labor cost can be kept in the same manner as previously explained; that is by the payroll classification system. The time of each employee who is directly connected with the yarding of a setting, such as the hooktender, head rigger, engineer and others, should be classified on his time sheet by the setting on which he is engaged so that at the end of the month or

at the completion of a setting the labor and overhead cost for the setting can be obtained by running through the payroll and adding the amount paid each employee for the time he was engaged on the setting. The depreciation of equipment can be obtained for each setting from the fixed capital cost book.

The cost of maintenance and repairs is one of the most difficult to keep because of its irregularity and small items which it includes. This cost can be kept sufficiently in a maintenance and repair journal where each machine can be kept separately and properly itemized. The amount of each invoice for parts should be posted to the cost for the machine for which it is purchased. The labor cost can be posted each month or quarterly from the payroll sheets. Table VIII shows the manner in which the maintenance and repair record for each machine may be kept.

From this table the maintenance and repair cost can be obtained for any period desired, and at the end of a year or two years the average maintenance and repair cost can be obtained very accurately.

The cost of supplies can be kept separately or can be included in the maintenance cost for the machine for which they are purchased. The most important thing to remember is to post every expenditure in its proper place in order that it will be included when arriving at the various costs.

The total yarding cost over a period of time or for a particular setting can therefore be easily and accurately

MAINTENANCE AND REPAIR JOURNAL 1943

MONTH	D8 CAT#1	D8 CAT#2	YARDER	LOADER	TRUCKS	TOTAL
JANUARY	\$ 25.00	\$ 30.00	\$ 35.00	\$ 15.00	\$ 975.00	\$ 1150.00
FEBRUARY	25.00	32.50	45.00	17.50	1035.00	1300.00
MARCH	32.50	27.50	47.50	12.50	950.00	1200.00
APRIL	50.00	40.00	55.00	20.00	950.00	1250.00
MAY	40.00	65.00	52.50	25.00	890.00	1250.00
JUNE	75.00	82.50	57.50	27.50	950.00	1250.00
JULY	80.00	62.50	60.00	27.50	1200.00	1300.00
AUGUST	70.00	30.00	75.00	25.00	1250.00	1350.00
SEPTEMBER	35.00	25.00	65.00	22.50	950.00	1150.00
OCTOBER	27.50	35.00	57.50	17.50	810.00	1050.00
NOVEMBER	37.50	-----	42.50	15.00	1040.00	1200.00
DECEMBER	2.25	45.00	32.50	12.50	1000.00	1200.00
TOTAL	\$ 500.00	\$ 475.00	\$ 625.00	\$ 237.50	\$ 12000.00	\$ 14650.00

TABLE VIII MAINTENANCE AND REPAIR ACCOUNT

obtained by accumulating the various items from where they have been posted.

LOADING COST

The cost of loading is the cost of placing the logs on the means of transportation, railroad or truck. It is similar to and closely connected with the yarding cost and the two are often combined which is alright in many cases. When this is done the equipment cost and maintenance cost is taken together and added to the labor cost for the yarding plus the labor cost for the loading. In most cases this will provide the necessary data with which the operator is concerned as the labor cost is variable and that is already separate and has to be combined to obtain the labor cost for yarding and loading.

When it is desirable to keep each separate, the cost records for loading should be kept in a similar manner as the yarding cost records as has been explained.

TRANSPORTATION COST

The transportation cost is the cost of moving the logs from the landing to the mill or other selling point. For the purpose of explanation the transportation cost will be divided into two parts; land haul and water haul. All operations have some kind of land haul while only a part have a water haul cost as many operators transport their logs by truck or railroad directly to the mill pond.

The land haul cost differs probably more between operations than any other item. Consequently much attention

should be paid to the land haul cost. It is a rare case when two operators have similar enough land hauls whereby their costs can be compared. The land haul of different operation's varies from one to a hundred miles or more with many differences in mileage of private and public roads or woods and highway. The problems vary widely between a haul of ten and thirty or a hundred miles. In this respect each operator is required to make a study of his own haul to determine if his procedures are most economical and practical.

The land haul cost includes the items of depreciation of equipment, maintenance and repairs, labor and supplies. The cost of depreciation can be computed from the fixed capital cost ledger. The depreciation cost is computed by dividing the total cost of the equipment by the period of depreciation; three, four, ten years, whatever depreciation period is being used. As an example, if an operator purchases ten logging trucks and trailers at a cost of \$7,000.00 each and depreciates them over a period of five years, the yearly depreciation cost would be \$70,000.00 divided by five which would be \$14,000.00 per year. From this figure the operator can determine his depreciation cost for any period of time. His cost for a year would be \$14,000.00. If the operator is determining the depreciation cost on a particular setting he should divide the yearly cost by operating days per year and multiply by working days on the setting. If he operates 240 days a year and is on a setting 25 working days his depreciation cost would

be \$14,000.00 ÷ 240 x 25 or \$58.33 per day and \$1458.25 for the setting. From this he can determine his cost per M board feet by dividing \$1458.25 by the board feet removed from the setting.

The maintenance and repair cost should be kept in the same manner as shown in Table VIII. Invoices for parts should be posted regularly in the maintenance and repair journal or supply journal under the proper heading. It is often advisable to keep each kind of truck separate if two or more kinds are in the operation. However for all general purposes the trucks can be kept together as a unit when they are the same kind.

The labor cost can be determined as explained previously that is by the payroll classification system (Table 4). At the end of each month the labor cost for the maintenance of the equipment can be taken from the payroll and posted under the transportation cost.

The supply cost can be kept separate or, as shown for the yarding cost, it can be included in the maintenance and repair journal. However if it is kept in the maintenance and repair journal, it should be kept in a separate column. The tire cost should be included in the supply cost but kept separately from the rest of the items as it represents a large percent of the transportation cost and requires special study when it is advisable.

CONSTRUCTION COST

The construction cost includes all costs in the building of the roads, mainline and spurs. The construction

cost begins with the preliminary engineering and includes all the costs until the road is completed. It includes the following items:

- (1) Engineering
- (2) Right of way cutting and clearing
- (3) Building roadbed, bridges, trestles and ecetra
- (4) Surfacing

The cost of each road, mainline and spurs must be kept separate as the cost of each will vary according to the terrain and ground conditions. As each road must be amortized by the timber which is removed over it it is necessary to have the total cost of each. The best method to accomplish this is to keep a construction cost book. Sufficient space can be given to each spur as it is being constructed and the various costs can be posted as they accrue. Table IX shows one way this can be kept. From this table it is easily determined how much is being spent on each road at anytime.

The engineering costs are easily obtained by the number of days the crew worked on each spur each month, which will be shown on the timesheets of each employee of the crew.

The cost of right of way includes the felling and bucking and clearing. It includes the labor cost, supply cost and machine cost. The labor cost can be obtained from the payroll and the supply cost can be taken from the invoices as the supplies are purchased. In the case of large purchases such as blasting supplies, a monthly

MAINLINE ROAD

MONTH	LABOR	SUPPLIES	DEPREC. OF EQUIP.	MAIN.-REP OF EQUIP	TOTAL
JANUARY	\$ 1200.00	\$ 500.00	\$ 450.00	\$ 56.00	\$ 2206.00
FEBRUARY	900.00	460.00	450.00	75.00	1885.00
MARCH	200.00	-----	-----	-----	200.00
APRIL	350.00	28.75	90.00	15.60	484.35
MAY	-----	-----	-----	-----	-----
JUNE	200.00	21.00	130.00	-----	351.00
JULY	-----	-----	-----	-----	-----
AUGUST	-----	-----	-----	-----	-----
SEPTEMBER	100.00	7.50	24.00	10.65	142.15
OCTOBER	100.00	15.00	32.00	-----	147.00
NOVEMBER	-----	-----	-----	-----	-----
DECEMBER	50.00	10.50	24.00	-----	84.50
TOTAL	\$ 3100.00	\$ 1042.75	\$ 1200.00	\$ 157.25	\$ 5500.00

TABLE IX PORTION OF ROAD CONSTRUCTION COST ACCOUNT

inventory should be kept by the powder man showing the location of the use of the powder, caps and fuse. The machine cost can be determined by the number of days the machines are used on the clearing and multiplying by the depreciation cost and maintenance and repair cost per day.

The road building cost includes the labor cost, machine cost and supply cost, and can be kept in the same manner as they were for the right of way cost. The surfacing cost includes the same items and can be determined in the same manner.

RIGGING AHEAD COST

The rigging ahead cost is the cost involved in moving equipment from one spar pole to another and the cost of rigging the spar pole preparatory to the start of logging on the setting. It is the cost required in preparing a setting for production. It includes the items of depreciation of equipment, labor cost, maintenance and supplies. The cost of each can be obtained as has been shown previously and can be setup as shown in Table X.

In arriving at the figures to be posted on the cost sheet for rigging ahead, it may be advisable to keep a cost sheet for each item however ordinarily these items are not so complicated but what they can be posted from time to time from the payroll and invoices.

MAINTENANCE COST

The maintenance cost is the expense required to keep

RIGGING AHEAD

MONTH	DEPREC. OF EQUIP.	LABOR	MAIN. AND REPAIR	SUPPLIES	TOTAL
JANUARY	\$ 90.00	\$ 540.00	-----	\$ 28.75	\$ 658.75
FEBRUARY	54.00	324.00	16.85	19.40	414.25
MARCH	54.00	324.00	14.60	18.75	411.35
APRIL	108.00	648.00	29.15	47.80	832.95
MAY	-----	-----	-----	-----	-----
JUNE	90.00	510.00	-----	32.50	632.50
JULY	45.00	270.00	12.45	30.00	357.45
AUGUST	108.00	595.00	65.00	56.80	824.80
SEPTEMBER	18.00	108.00	----	10.00	136.00
OCTOBER	45.00	270.00	----	20.00	335.00
NOVEMBER	27.00	162.00	23.50	16.50	229.00
DECEMBER	27.00	162.00	----	16.50	205.50
TOTAL	\$ 666.00	\$ 3913.00	\$ 161.55	\$ 297.00	\$ 5037.55

TABLE X RIGGING AHEAD ACCOUNT

the equipment, roads, camp and other capital investment in good working condition. It is the cost required after the initial cost has been established. It is one of the most important costs and one not to be regarded lightly. From maintenance cost records many facts can be determined; which kind of trucks are most serviceable, which type of yarder is most practical on the operation, whether it is more important to keep the roads in good shape or just passable. These and many other questions can be answered if proper maintenance and repair records are kept. The most practical method to record these costs is in a maintenance cost book, journal or ledger, divided into the individual parts that include maintenance cost. These would be the cost of maintenance of the following: office building, family houses and other camp buildings; roads and spurs; equipment (yarding, loading, transportation, power saws, and others). For example, the maintenance cost record for roads and spurs can be kept in a manner such as is shown in Table XI. The others may be kept in a similar manner, in order to have the facts available when determining the various individual costs as well as the total costs.

In this cost record we have the labor cost available for each road classification as well as the other items and the total cost. In figuring the cost of logging a setting located on Spur D, we have the maintenance cost available and can secure the proper proportion to be used by the timber being hauled over the road. For instance

if during the month of March the operator was running two sides the output of which was nearly equal, and he wanted to determine the cost of production for the side, which is located on Spur D, he would have for his road maintenance cost \$268.20 plus \$21.60 divided by two plus \$325.00 divided by 2. This would be \$268.20 plus \$10.80 plus \$162.50 or \$441.50. If the output for the side for the month was two million board feet, his cost per M would be \$441.50 divided by 2000 or .44¢. Similarly many other costs can be determined without having to look for various costs.

Permanized
INTERNATIONAL BOND
WAS CONTENT

TOTAL PRODUCTION COST

The total production cost is the final cost of producing the logs. It tells the story of the operation. Whether it is a going concern or not and how much profit is made per M board feet. The items which make up the final cost are all the items herein explained, which the operator has on his operation. All operations will not be confronted with all the costs. Some will have part of these various costs, and others will have other different costs. For the purpose of explanation, the following operation will be set up and costs determined. From this can be seen the costs that occur in certain operation, and while different operations may have different costs, the procedure is the same. The small operator of course will not be concerned with the complicated costs that a large operation will be concerned.

The costs which make up the total production cost are (1) Felling and Bucking, (2) Yarding and Loading, (3) Transportation, (4) Dumping, Rafting, and Scaling, (5) General and Administrative, and (6) Stumpage, which are the current operating costs. The Fixed Capital Costs and Annual Burden are of course amortized to these costs, hence they are not found as a unit in final cost.

Let us assume that an operator purchased a hundred million board feet of timber in 1933 at a cost of \$5.00 per M board feet. He decides to log it in 1942, and actual production begins in 1943. His property taxes from 1933

to 1943 amounted to \$1,000.00 per year. The cost of cruising and advance engineering amount to \$5,000.00.

The operator builds a small office building for \$2,500.00 and the furniture and fixtures amount to \$1,000.00. The cost of building a shop is \$5,000.00 and equipment amounts to \$3,000.00. Other miscellaneous buildings are constructed at a cost of \$2,500.00.

The area of production is located adjoining a county road, hence there is no road construction cost to the area of production.

The operator plans on a one side operation with a production of twenty million board feet per year. He plans to log his timber in five years. More timber is available if he wishes to continue after that time, however the present operation is based on his present holdings. An oil company has installed a gasoline pump and an underground tank at their own cost and will keep possession. No rent is to be charged for the equipment. The operator has a 30 mile haul directly to a mill, hence he has no booming and rafting charge.

The equipment purchased for the operation is listed below:

(1) Two D8 Caterpillar Tractors equipped with a dozer and single drum, \$10,500.00 each.

(2) One Yarder, 200 HP, with a Torque Converter, \$12,000.00.

(3) One Loading Donkey, \$4,000.00.

(4) Eight Logging Trucks and Trailers at a cost of

YEARLY LABOR ACCOUNT 1943

MONTH	FELLING AND BUCKING	YARDING AND LOADING	TRANSPORTATION	GENERAL AND ADMINISTRATIVE	TOTAL
JANUARY	\$ 3200.00	\$ 3625.00	\$ 1200.00	\$ 850.00	\$ 8875.00
FEBRUARY	3800.00	3485.00	1140.00	850.00	9275.00
MARCH	4000.00	3895.00	1265.00	850.00	10010.00
APRIL	4200.00	3950.00	1295.00	950.00	10395.00
MAY	4400.00	3950.00	1410.00	950.00	10710.00
JUNE	3600.00	4025.00	1425.00	950.00	10000.00
JULY	3600.00	4180.00	1465.00	950.00	10195.00
AUGUST	4200.00	4130.00	1450.00	950.00	10730.00
SEPTEMBER	3400.00	3970.00	1390.00	950.00	9710.00
OCTOBER	3600.00	3965.00	1375.00	850.00	9790.00
NOVEMBER	3500.00	3835.00	1360.00	850.00	9545.00
DECEMBER	4000.00	3740.00	1325.00	800.00	9865.00
TOTAL	\$ 45500.00	\$ 46750.00	\$ 16100.00	\$ 10750.00	\$ 119100.00

TABLE XIII TOTAL LABOR COST FOR YEAR

\$7,000.00 each.

(5) One 3/4 yard shovel, \$3,000.00.

(6) One used Ingersoll Rand Compressor mounted on rubber, \$1,700.00.

(7) Two pickups and a 1½ ton truck for general purposes, \$4,000.00.

(8) Three Power Saws, \$1,000.00 each.

The operator purchases his Wire Rope requirements for one year based on his 20,000 estimated output. This amounted to \$3812.20. He purchased blocks and miscellaneous rigging at a cost of \$2500.00.

The operator decides to depreciate his equipment on the following basis:

Buildings, 10 years

Donkeys, 8 years

Cats, Shovel and Pickups, 4 years

Trucks, 5 years

Power Saws, 3 years

At the end of the first year he wants to find his production cost for the year, which is based on the selling scale. The net selling scale at the end of the year totaled 15,000 M Board feet, or 5,000 M board feet less than his estimate at the beginning of the year. This was due to the fact of it being a new operation, with adjustments to make and other items which cut down the production. Following is the method which he could use in determining his production cost for the year. The figures used are merely assumed and should be considered as such.

FELLING AND BUCKING COST:

From his felling and bucking records, an example of which is shown in Table VII, the operator finds that for the year the timber cut was 25,000 M board feet woods scale. Inventory at the end of the year was 5,000 M board feet. Therefore the amount cut which was logged during the year was 20,000 M board feet. The wages for the fellers and buckers amounted to \$26,500.00 and overhead \$19,000.00. Therefore the total labor cost would be \$45,500.00 for the 25,000 M board feet cut. However only 20,000 M board feet woods scale was logged, making the labor cost for the year equal to 80% of \$45,500.00 or \$36,400.00.

From his felling and bucking tool and supply cost record, (Table V) he finds that for the year his tool and supply cost amounted to \$445.80. Of this only 80 percent was used during the year, which would be \$356.64.

The depreciation of the Power Saws on a three year basis would be \$3,000.00 divided by 3 or \$1,000.00.

From this the operator has his total felling and bucking cost figures, which would be \$36,400.00 plus \$356.64 plus \$1000.00 or a total of \$37,756.64. The selling scale for the year was 15,000 M board feet, hence his total cost for felling and bucking would be \$37,756.64 divided by 15,000 or \$2,517.00 per M board feet.

YARDING AND LOADING COST:

In determining his yarding and loading cost for the year the operator has all the facts necessary in the cost

YEARLY MAINTENANCE--REPAIR ACCOUNT 1943

MONTH	FELLING AND BUCKING	YARDING AND LOADING	TRANSPORTATION	TOTAL
JANUARY	\$ 22.50	\$ 295.00	\$ 975.00	\$ 1292.50
FEBRUARY	18.75	310.50	1035.00	1364.25
MARCH	38.50	297.25	950.00	1285.75
APRIL	115.50	350.65	950.00	1416.25
MAY	76.50	333.60	890.00	1300.10
JUNE	68.70	366.80	950.00	1385.50
JULY	124.90	372.50	1200.00	1697.40
AUGUST	93.40	338.30	1250.00	1681.70
SEPTEMBER	42.75	346.50	950.00	1339.25
OCTOBER	38.40	322.10	810.00	1170.50
NOVEMBER	72.65	362.50	1040.00	1475.15
DECEMBER	37.35	304.30	1000.00	1341.65
TOTAL	\$ 750.00	\$ 4000.00	\$ 12000.00	\$ 16750.00

TABLE XIV TOTAL MAINTENANCE--REPAIR COST FOR YEAR

accounts for yarding and loading, as examples show in Tables VIII and X.

His labor cost consists of wages to men directly connected with the yarding and loading plus a percent of the Superintendent's salary. From his yarding cost record and loading cost record, he determines his labor cost for the year to be \$43,000.00 plus 50% of the Superintendent's salary or \$3,750.00 or a total of \$46,750.00.

The cost of wire rope will be based on a lifetime of 10,000 M board feet. His original purchase was for 20,000 M board feet and only 15,000 M board feet were logged during the year, therefore only 75% of the original expenditure of \$3,812.20 should be taken as wire rope cost. This would equal \$2,859.15. His supply cost can be obtained from the yarding and loading supply cost record, which shows the amount of \$2,500.00.

The depreciation of the equipment can be obtained from the Capital Cost Ledger. This would show \$16,000.00 depreciated on a 10 year period. The depreciation cost would therefore be \$1,600.00 per year.

The maintenance and repair cost can be taken from the maintenance and repair account. We will assume this to show \$4,000.00 for the year. This cost of Rigging Ahead can be determined from the Rigging Ahead account. We will assume this to be \$3,000.00.

From the above figures the operator can secure his total yarding and loading cost by adding the individual costs and dividing by 15,000. This would be \$46,750.00

plus \$2,859.15 plus \$2,500.00 plus \$4,000 plus \$3,000 plus \$1,600.00 or a total of \$60,709.15 divided by 15,000 M board feet for a total cost of \$4,047.00 per M board feet.

TRANSPORTATION COST:

The transportation cost can be obtained from similar records to those of the yarding and loading. The labor cost record for the trucks shows \$16,100.00. The depreciation cost can be secured from the capital cost account and would show \$56,000.00 divided by 5 or \$11,200.00 per year. The gas and oil expense, tires and other supplies can be secured from the supply cost record and would amount to \$17,860.00. The license fees can be taken from the expense account and would approximate \$2,320.00. The maintenance and repair cost for the year can be taken from the maintenance and repair account. We will assume this to be \$12,000 for the year. We will assume that the first mile of the mainline was constructed and used during the year at a cost of \$5,500.00. As there is 100,000 M board feet to be removed over the road the per M charge for it would be \$5,500.00 divided by 100,000 or .055 per M board feet.

From these figures the operator can secure his total transportation cost by adding the various items and dividing by the output, 15,000 M board feet. This would be \$16,100.00 plus 11,200.00 plus \$17,860.00 plus \$2,320.00 plus \$12,000.00 or \$59,480.00. This total divided by

15,000 would equal \$3,965.00 per M plus \$.055 for the cost of road or a total transportation cost of \$4.02.

SCALING EXPENSE:

The operator sells his logs directly to a mill and is confronted only by the charge for selling scale, which is done by a bureau. This cost we will assume to be \$.05 per M board feet.

GENERAL AND ADMINISTRATIVE COST:

The General and Administrative cost can be obtained from the accounts as previously explained. The labor cost as taken from the general account we will assume as \$7,000 plus 50% of the Superintendent's salary or \$3,750.00. The total labor cost would therefore be \$10,750.00. The cost of supplies is obtained from the supply account and we will assume this to be \$250.00 for the year.

The Compensation Insurance is determined from the payroll. It is a set percent of the various payroll classifications. It is determined by the risk rate of the operation, which is determined by the number of accidents that occur on the operation. We will assume this sum to be \$5,955.00.

The insurance on the buildings and other equipment is also determined by the operation and the policy which the company holds. We will assume this sum to be \$2,000.00 for the year. The taxes are determined by the fixed assets of the operation, which we will assume to be \$1,000.00 for the year.

YEARLY SUPPLY ACCOUNT 1943

MONTH	FELLING AND BUCKING	YARDING AND LOADING	TRANSPORTATION	GENERAL AND ADMINISTRATIVE	TOTAL
JANUARY	\$ 80.56	\$ 180.00	\$ 1460.00	\$ 22.80	\$ 1743.36
FEBRUARY	93.85	215.00	1420.00	18.75	1747.60
MARCH	133.90	202.50	1495.00	20.60	1852.00
APRIL	65.10	206.00	1535.00	24.30	1830.40
MAY	95.65	208.25	1570.00	22.65	1896.55
JUNE	123.40	224.50	1590.00	21.90	1959.80
JULY	110.49	240.90	1590.00	26.45	1967.84
AUGUST	83.60	230.70	1555.00	19.40	1888.70
SEPTEMBER	72.85	212.60	1540.00	22.35	1847.80
OCTOBER	93.25	192.30	1455.00	21.60	1762.15
NOVEMBER	85.65	197.25	1400.00	18.60	1701.50
DECEMBER	46.50	190.00	1250.00	10.60	1497.10
TOTAL	\$ 1084.80	\$ 2500.00	\$ 17860.00	\$ 250.00	\$ 21694.80

TABLE XV TOTAL SUPPLY COST FOR YEAR

The depreciation of the buildings and fixtures can be taken from the Fixed Capital Cost account. This will show \$3,500.00 plus \$8,000.00 plus \$2,500.00 divided by 10 (years to be depreciated over). This would be \$14,000.00 divided by 10 or a total depreciation cost of \$1,400.00 per year.

Other miscellaneous expenses for the year we will assume to be \$500.00. The total General and Administrative Costs would thus be \$10,750.00 plus \$250.00 plus \$5,955.00 plus \$2,000.00 plus \$1,000.00 plus \$1,400.00 plus \$500.00 or a total of \$21,855.00 divided by 15,000. This would show a per M board foot cost of \$1,457.

STUMPAGE COST:

The stumpage cost would be the original outlay for the timber added to the taxes to the start of the operation plus the cruising and advance engineering cost to the start of the operation. This depletion charge would thus be as follows:

Purchase of timber-100,000 M bd. ft. @ \$5.00	\$500000.00
Property taxes- 10 years @ \$1000.00 per year	10000.00
Cruising and advance engineering	5000.00
	<u>\$515000.00</u>

The total cost of \$51,5000.00 divided by the timber on the stand, 100,000 M board feet would give a depletion cost of \$5.15 per M board feet.

The Total Production Cost could then be determined as follows:

Felling and Bucking	\$ 2.517
---------------------	----------

Yarding and Loading	4.047
Transportation	4.020
Scaling	.050
General and Administrative	1.457
Stumpage	<u>5.150</u>
Total Cost per M Bd. Ft.	\$ <u>17.241</u>

Thus the operator knows that every thousand board feet of logs he produced during the year cost him \$17.241 to place at the selling point. From this he can determine his net profit by deducting the total cost from the gross receipts.

SUMMARY

From the various methods shown in this thesis or by similar ones, any operator can determine what his individual costs are as well as his total cost for any period. The cost for a setting can be obtained in the same manner as the yearly cost. The felling and bucking costs or any other individual cost can be determined at any time from the various accounts.

Each operator can study his various costs and if two or three methods are used, for instance, he can determine which is most practical. He knows at any time approximately what each item is costing him and can make changes accordingly. From his records he can determine all the variable costs on different areas or by different methods of operation and can therefore change his management procedures to be the most practical and economical. If different kinds or types of equipment are used, he can

determine which is most economical and practical. The value of cost records are thus explained both in the determination of the best management practices and the most economical. It is hard for the writer to see how many operators know what they are doing without the use of adequate cost records.

Permanized

INTERNATIONAL BOND

INDEX

39

	Page
Annual Burden or Overhead	6
Costs included	13
Construction Cost	24
costs included	25
Current Operating Cost	7
costs included	15
Felling and Bucking Cost	16
costs included	17
Fixed Capital Cost	5
amortization	11
Fixed Cost	4
Loading Cost	22
costs included	22
Maintenance Cost	26
Purchase Ledger	10
Rigging Ahead Cost	26
Total Production Cost	29
Transportation Cost	22
costs included	23
Variable Cost	4
Yarding Cost	20