

SOME SIGNIFICANT APPLICATIONS
of
ACCOUNTING TO AUTOMOTIVE PRODUCTION

A Case Study for the Industrial Management Student

by
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A THESIS

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I. INTRODUCTION

Many college students do not decide what their major endeavor will be until the time that they must decide upon the elective courses that they will have to take in order to fill in their complete schedule. Assuming that a student decides he wants to major in the industrial management field, most colleges allow him a certain group of background courses to be filled in with selections from outside departments. These may or may not aid him along the line of his particular endeavor. His adviser will attempt to keep him enrolled in practical subjects that have a bearing upon industry, management, or business, but too often the average student will attempt to avoid recommended courses, because he has heard that they are too difficult or too theoretical, perhaps because he thinks he won't like the professor as someone else has prejudiced him, perhaps because he just wants a change from business courses or is interested in discovering a way to some easy credits -- "the any old thing just so I get to graduate" philosophy.¹

It was because of this attitude of uncertainty on the part of the student and in order to lend a little more weight to characteristic suggestions of advisers that the author of this thesis made a survey of top men in the management field as well as key personnel in the cost accounting field in this section of Michigan. He hoped to ascertain what they would recommend in the way of courses for students to take that would help them most in case they should go into industry as potential managers.

Many questions were posed concerning how much accounting the industrial management student should have. They were given copies of the questionnaires shown on pages three and four. Cost accountants were consulted because of the fact that it is up to them to work with industrial management people in an attempt to show them the efficiency of their operations. The breadth of knowledge displayed by the latter in the accounting field has a direct bearing upon the amount of effort a cost accountant has to put out in order to explain efficiencies, budgeting, and other pertinent accounting facts useful for management purposes.

The results tabulated from one hundred questionnaires and interviews are indicated in the following table:

RECOMMENDED SKILLS	TYPE OF MANAGEMENT	
	Accounting	Manufacturing and Selling
Elementary accounting	50	50
Statement preparation & analysis	4	32
Accounting terminology	4	16
Budgeting	38	22
Cost accounting	38	26
Break-even analysis	12	20
Premising (Long range forecasting)	4	12

This table indicates that fifty men in the accounting field and fifty in the manufacturing and selling field recommend that industrial management students take elementary accounting, while but four accounting men feel that they need knowledge of statement preparation and analysis.

In general the survey reveals that management executives believe these students need more work in cost accounting and

budgeting. The cost accountants tended even more heavily toward the same point. It should be stated that an extensive knowledge of cost accounting is most desirable for a thorough knowledge of budgeting, premising, and break-even analysis. The accounting terminology will automatically become a part of the industrial management students' vocabulary if he takes the additional work in the accounting fields mentioned. By the same token, a knowledge of these areas will result in more familiarity with statement analysis. This would arise from the fact that management people receive their reports, usually, in a complete statement form of one type or another.

Some of the remarks made by the executives filling out the questionnaires bear repeating:

Mr. Earle Edmunds, a former plant superintendent, stated, "Successful shop management in the past needed, and will need even more in the future, a greater and greater knowledge of cost accounting."

The owner of the Lansing Pattern and Manufacturing Company, Mr. Gordon S. Bygrave, said, "Knowledge of basic cost accounting principles and a mind flexible enough to appreciate the value of changing methods will be a pre-requisite to future Management."

A Princeton graduate with a Master's degree in engineering, Mr. Robert Seyfarth, declared, "The large organization has your work assigned so that an individual is very busy every hour of the working day. Broad backgrounds of management techniques,

particularly those pertaining to accounting, must be obtained through either preliminary college training or night-school courses.

Besides these few selected remarks, there were many general statements that ran all the way from the opinion, "potential industrial managers should have all the college accounting offered," to the statement that "a thorough knowledge of machine tabulation should be given to all potential administrators, whether they be factory or office."

The survey bore out a conviction widespread in industry today that because of competition, governmental controls over wages and materials, and the great number of taxes, the efficient manager must have a more adequate knowledge of accounting.

This conviction is also indicated in the typical training courses given to industrial management people by their executives. Oldsmobile Motor Division sponsored a course of this type during World War II in which a manual was used, called, Control of Manufacturing Costs. The Buick Motor Division ran a Management Conference Program over a period of time in connection with General Motors Institute. In this program they covered the following subjects: suggestion plans, getting along with people and getting the job done, management concepts, factory burden control, fire department, organizational responsibilities to plant protection. Here, too, a very important part of the program was that of accounting controls.

Just prior to World War II, the Chevrolet Motor Division

conducted a management training program, which was open to a few selected Business Administration graduates with a major in accounting.² In this program the subjects included General Motors accounting, time and motion study, plant layout and technique, and machine operation. The latter involved actual work upon the milling, grinding and drilling machines. In addition members of these groups worked in the plants for three months between the two school sessions at General Motors Institute. Again, however, accounting was stressed.

Because of the apparent desire of management people to have their potential trainees more familiar with accounting and budgeting, this paper was written. The General Motors background was chosen because it is the largest of the automotive enterprises and because many of the other plants have adopted several of their management and accounting procedures.³ Judging from the year to year growth and profits of this corporation, it is probably one of the most efficiently managed of all the automobile manufacturers.

In order to understand the principles of budgeting and the problems involved, it is necessary to have a background knowledge of how costs are compiled. The first part of this thesis is, therefore, a brief picture of the automotive manufacturing operation with a tie-in to basic accounting procedures; the second part includes a case study to bring out pertinent points concerning budgeting.

II. PRODUCT ENGINEERING

Before a car can be produced, it must be planned as to design and engineering. The function of the Product-Engineering Department is to present the design-information by means of prints and specifications which will be necessary to produce the parts of an automobile. This may be information needed for the manufacture of a new car for superseding a currently produced part by a new, improved one.

The department is headed by a chief engineer who has under him a group of department heads, namely the Body Engineer, Motor Engineer, Chassis Engineer, Transmission Engineer, Standards' Engineer, Experimental Engineer, Electrical Engineer, and Styling Engineer. Under each one of these men, a particular phase of work is constantly being planned, studied, tested, or built in as much as two years in advance of the current model.

The brunt of the planning is borne by the project engineers who are assigned to some particular part or project to which they devote all of their time and effort. One may, for instance, be assigned to the exhaust manifold. His duties are to design a manifold for a new model or to run tests upon a manifold already in production, checking new inventions and innovations which may be incorporated into the current part and possibly enabling the company to manufacture it more cheaply through using a substitute material or a changed design.

When the project engineer has his idea ready to put into material form, he works through the experimental engineer who has charge of all the shops where the experimental parts are made by hand. The latter also is in control of the proving grounds where all sorts of road conditions, cold rooms, hills, speed tracks, and other devices are used for continuous testing of new and old model cars.

Once the parts have met all prescribed tests, specifications are drawn up and the parts are released to the proper departments so that planning for the production of the part may get under way.

The accounting in the department is handled by the administrative engineer, who, when a new model is to be produced, determines the number of experimental cars to be manufactured and any other costs that may be incurred in connection with the new program. He works with the chief engineer until his cost estimates have been approved.

Costs of this department are charged to current operating expense for the most part and will be explained in the section on burden.

[illegible]



MANUFACTURING COST ESTIMATE

Sheet 1 of 1 Sheets

Req. No. _____

Date 3-16-52

Requested By John Doe

Part Number 2849-C-29

Part Name Shifter Fork (Forging)

Contract W-20-018-ORD-985 Standard Steel Spring Co. Replaces Part # _____

Pieces Required Per Completed Unit _____ Pieces Required Per Hour _____

Estimated Volume 27,418 pieces @ 2,000 per month

Estimated Total Tool Cost \$13,955.55

(See detailed project

Estimated Total Equipment Cost #416-2-3) Est. Total Rearrangement Cost _____

COST SUMMARY

	Comparative Cost	Estimated Cost Per Unit	Estimated Cost Per Completed Unit
Direct Material			0554
Basic Direct Labor			0609
Premiums			0067
Total Direct Labor			0676
Burden (Manufacturing Expense)			2387
Total Cost			3617
Super Burden			2000
Total Cost--Including Super Burden			5617

Remarks:

This estimate based on (2) shifts per day - (26) days per month working schedule.

It is estimated that the total scrap will average 6%.

See Part No. 34892 for Misc. Tongs to be used in handling this forging.

Estimated By _____	Date _____
Cost Detail By _____	
Checked By _____	
Approved _____	Production Sup't
Approved _____	Tool or Die Sup't
Approved _____	Sup'v'r Estimating Dept.
Approved _____	Production Engineer
Approved _____	Factory Manager

III. PRODUCTION ENGINEERING

Production engineering means the whole process of the development of a plant layout and techniques of manufacture to bring an engineered part into production. Plant engineering and production engineering have methods men and layout men who are specialists in planning the manufacture of a part. By looking at the designs and specifications furnished by the product engineers, they can establish a layout for a proposed operation complete with token men, machines, tools, conveyors, and so forth. All layout work is done on a three-dimensional basis and presents a very complete picture of the proposed manufacturing process.

In order to transmit these ideas for use by the planners and approval by management, schedules are drawn up somewhat like the one on the opposite page. This form will familiarize the individual with the detail for portions of the manufacturing cost estimate. The material description of the latter is obtained from specifications prepared by the product engineering division.

The cost of the material for the new part is taken from quotations which are furnished by the purchasing department. This cost has to take into consideration possible changes in market prices, freight charges, type of material, sources of supply, and all other factors which may affect a material price during a production period.

Details of the layout of the plant, tools and equipment to be used, and the amount of production that they can be expected to give under specified conditions are furnished by production engineering. This production expressed in pieces per hour multiplied by standard time and by hourly rate of labor to be used on the job gives the estimated unit direct-labor cost. This time is the standard time -- which is expected time based on time study -- and is used as a basis for initial group routings. These are very important plans and are the key not only to the process, but to the building of costs for the production of the part. They are used by manufacturing supervision to check on operation detail, men required, rate of pay for the operation, production per hour, and the standard time for each operation. The inspection department, on the other hand, uses them to establish the most efficient placement of their man-power and to supply information as to the causes of scrap.

Group routing is used by the material control department to route material through the plant, while the production engineering men use it as a guide for processing, better methods, and plant layout. The standards department utilize it in forecasting man power requirements and developing cost analyses. It is the backbone of the derivation of the labor cost of a part and is used to build the first labor costs on a part in the accounting department.

Corrections to the original group routing may be made and new routings reissued once a part goes into production.

Occasionally an error is made in estimating the time which an operation may take. For that reason, once a part is in production, there will be time and motion studies made on the operations involved, and if they are in need of correction, the original group routings will be superseded by new ones based upon the actual time.

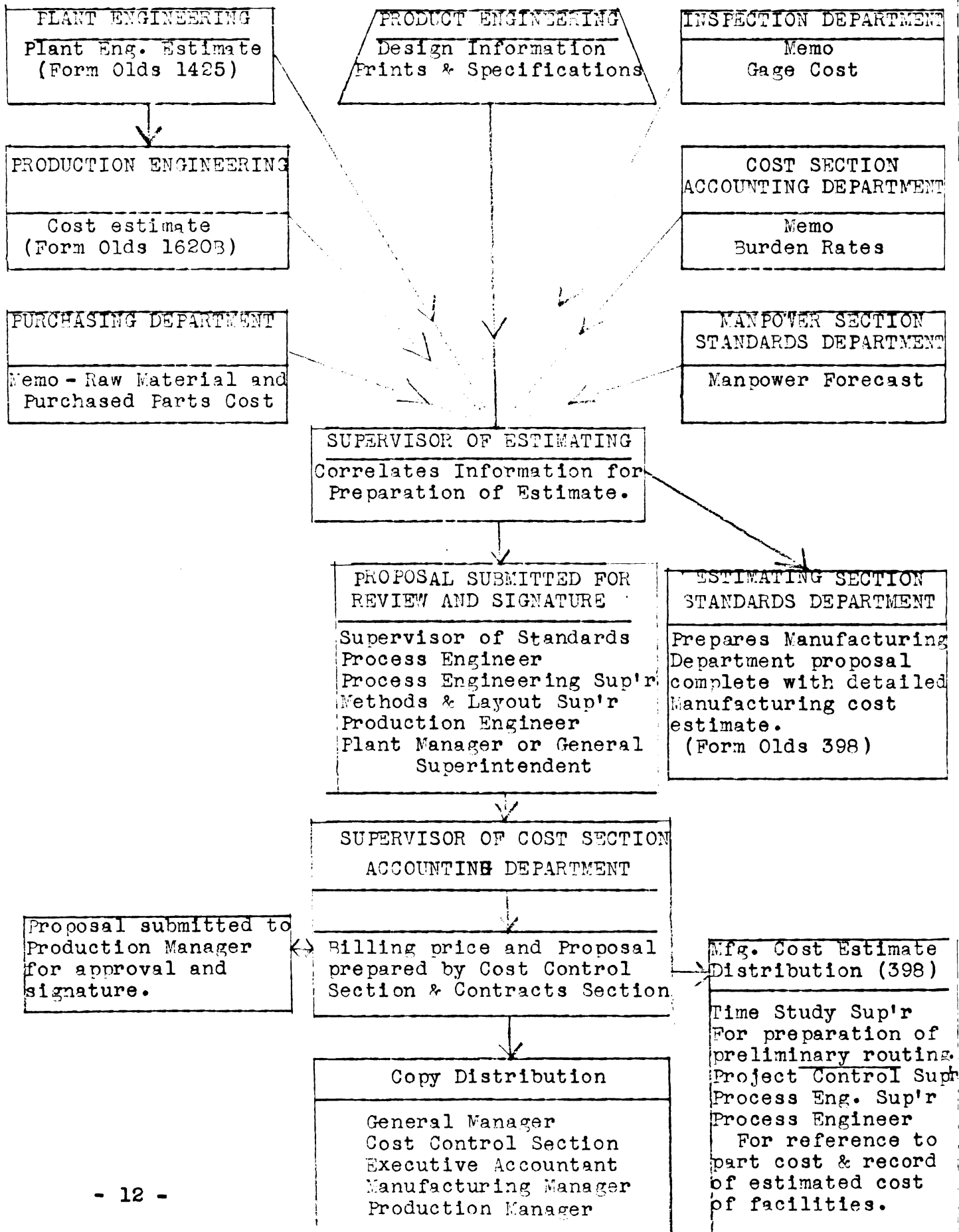
The building of the group routing involves the effort of time-study men experienced in both time and motion study. They know average times and motions for the average worker for all kinds of work performed. These times have been standardized due to years of study so that they can be forecasted very accurately. Of course, these routings would have to be changed a great many times if the layout men did not understand motion study and the principles of operating a machine or a group of machines efficiently.

Another term found upon a manufacturing cost estimate is premiums, which are bonuses that may be paid to workers because of overtime work or night-shift work. These are expressed as a percentage of direct labor. By adding together the cost of direct labor and the premiums in connection with it, we get a total direct-labor cost.

The "burden-rate percentage" is applied to the direct-labor cost, exclusive of any premium time, this amount becoming the share of manufacturing expense which each part produced will be expected to absorb.

Super-burden charges are unit charges per piece, which

FLOW CHART
FOR PROCESSING THE MANUFACTURING COST ESTIMATE AND PROPOSAL



must be absorbed by the piece for such costs as engineering used in the development of the part, costs of special tools to be used in the production of the part, or rearrangement costs in order to set up a portion of the plant for the manufacturing process.

Material, labor, and burden are not described in detail at this point, but questions pertaining to them are discussed in succeeding chapters.

From the many departments and specialists involved in bringing an engineered part into production, one may assume that it is a rather complicated process, as is the computing of its cost. For that reason, the Flow Chart⁵ on the opposite page has been included, as it shows the process used to determine the cost of a new product.

Upon this Flow Chart one can see the contributions of the various departments to the processing of a manufacturing cost estimate,⁶ the purpose of which is to give the anticipated expenditures on a new product, so that they may be compared with the actual cost of subsequent manufacture.

The formulae for determining details of these costs are

Total tool and equipment cost divided by total units produced	
equals	super burden rate per piece
Standard time hours multiplied by maximum hourly rate equal	
unit direct labor rate	
Unit direct labor rate multiplied by premium rate percent	
equals	bonus direct labor rate per unit
Unit direct labor rate multiplied by burden rate equal	
expense absorption rate.	

At this point one may assume that all of the requests for

authorization have been approved by management executives. As a result, the work of tooling up the plant, organizing the production line according to the group routing, and pre-production runs on the new part have been completed. There will be additional explanation of these steps in the sections on burden and super burden, after a discussion of the elements of cost in connection with the manufacturing process, material, and labor.

IV. MATERIAL

In order to realize the importance of material control, the reader should know that expenditures for material in many manufacturing concerns run from approximately forty-five to sixty-five percent of their total costs. The material referred to in this section is what we call direct material, an inherent part of the product: a sheet of steel, a coat of paint, a piece of cloth.

The problem of controlling material and costs in connection with it has been heightened considerably in the past few years because of quotas, extreme competition for available supplies, and government restrictions upon certain types of materials. As a result, more sources of supply are needed in order to keep a steady flow of material coming into the plants. Also, it has resulted in more research for the product engineers in an effort to find suitable substitutes which may be utilized in place of those currently in use that are either short in supply or limited as to availability.

The Production Management Division schedules all direct materials in and finished goods out of the plant. From production scheduled for the year, they can give to the material control group the estimated quantities of direct material needed to meet current production. This group takes these schedules and then by using them determines just how much material is needed for the month.

Because the material control group uses machine tabu-

lation, they can initiate a combined requisition and purchase order on quantities of material which may be sufficient for from six to sixty working days. These records are established and purchases are made against contracts, possibly for as much as a year's supply of steel for one model. Each month they can inform the supplier in advance as to how much is needed for the current month. They can also tell him what has been received by the plant against his contract. Too, contracts are set up so that they may provide for additional quantities over and above committed amounts if it becomes necessary. Hence it becomes very important that all reports prepared by a foreman or supervisor concerning material be very accurate.

Group routings and plant layouts provide for the most efficient handling of this material. Also, in order to keep the production control department operating efficiently, it must be known what material is on hand. A break in routine, careless handling of small parts, thefts, removal of materials and parts for engineering or experimental purposes, scrap, samples, special inspections or repairs can all throw off the accuracy of the material records. Thus the proper use of requisitions and scrap tickets is necessary in order to keep control of direct material.

To trace the control of material in the plant and its relationship to accounting procedures, one may assume that the material is at the docks ready to be unloaded. Material control has ordered it, and it has been scheduled to arrive

in the plant today.

The receiving department checks it; it is probably inspected; then it is moved by the trucking department either to the production lines where it will be put into process or to a storage area where it can be readily controlled. The receiving department writes up a series of receiving slips of which one copy goes to the accounting department and another to material control.

The copy of the receiving slip procured by the accounting department is matched with the supplier's invoice to make sure that the quantity received is the same as the quantity billed. The accounting clerk classifies the invoice as to whether it is productive material for the motor, pressed metal, or whatever plant it may be. In a large concern, this is done by using a numerical classification system. For instance, a 2A - A75 account could be productive material for the assembly plant; 2A - B75, for the motor plant; and 2A - C75 for the pressed metal plant. Expressed as a simple journal entry, this would be

2A - A75 - Productive Material - Assembly
18 - Accounts Payable - Other
To record purchase of material

However, due to the fact that the volume of invoices received from outside concerns as well as from allied concerns runs into the thousands every month, a voucher system is used. This enables the accounting entry to be made from the voucher register as one summary entry at the end of the

month.

In order to get the entry for the cost of sales at the end of the month, it is necessary to make a summary entry based upon the car costs that have been built up during the month. The background for this entry is based, of course, upon the units sold during the month. It is built up by taking the material cost of each individual part on the car, relieving that amount out of the inventory accounts.

Once a year in some plants, in others quarterly, a physical inventory is taken. This gives an actual count of all materials on hand and is used to bring all records up to date. The process is supervised by outside auditors, plant accountants, and material handlers. Over a year's time it is almost unbelievable the number of shortages that will show up, particularly in small parts, such as nuts and bolts. For that reason it is a good idea for each prospective manager to become as fully cognizant of all phases of inventory control as is possible.

V. LABOR

The second element of cost to be considered is that of direct labor, or that labor applied to a productive phase of operation that changes direct material into a finished product. It is the element of cost over which there is probably more control than any other.

Referring back to the section on production engineering, the reader will recall that there was a form called the Group Routing included there. This schedule of production indicated the number of men and machines necessary to turn out a finished part.

Assuming that the factory is making a front fender - a pressed-metal operation - and that it is to be produced in Plant 6, department 76, by group A-1, in order to get the part into production, machines have been rearranged and dies have been installed. Men have been requisitioned from the personnel department, which has job specifications and rates for the various operations on the fender and which hires men to do the work. The men report and are assigned numbers beginning with 676021. This number identifies the employee as to plant and department and is used from that time on as a means of identifying and paying him.

Employee 676021 reports for work along with the other employees assigned to Plant 6, department 76, group A-1, which the group routing indicates is a front fender processing operation. How can one tell whether this individual

and the men working with him are doing a fair day's work? He can check with the standard time allotted for the operation. This is based upon prior time and motion studies. If the fender is the same as that of the prior year, then the standard cost of that fender will probably be used as the correct standard. If it is an entirely new part, the preliminary group routing will provide the standard time which, multiplied by the workers' rates, gives the standard labor cost for current production.

The measurement of a fair day's work by an individual or a group of individuals is then based upon a standard of performance. In order to arrive at accurate standards, one must presuppose that the production process on the fender, or on any other item of production, is based upon the best method of operation, safest and most efficient tools and equipment, material up to specification, and a knowledge of the time required by the average operator to do the job.

Time study gives this information, helped by motion study. It also enables one to ascertain variations of actual labor costs from standard labor costs in order to set up production schedules and determine delivery dates for products.

The time study department also presents to the industrial manager a preliminary group routing, which is released even before his operation goes into production. Thus he may have a thorough knowledge of the operations which he super-

vises. Furthermore the routing gives him

1. a blue print of his operations, explaining each step and the machines used in it
2. the number of men that will be required to perform these operations
3. the standard time for each operation
4. in some cases, the rate of pay
5. the production per hour
6. the point in the operation where a count is taken of all pieces completed or passed by inspection. This is called the credit point.

The information recorded thus far is preliminary information issued prior to the production process. Now imagining that the plant is on an operating basis, how can the efficiency of the employees in the department be measured?

In some of the plants this is accomplished by use of the group credit sheet, a copy of which may be found on the following page. Many parts of it are self-explanatory, but those parts which might prove confusing will be clarified in the ensuing discussion.

The group credit sheet shows the number of pieces produced and the percentage of efficiency for each group. It discloses a daily record and in its entirety covers a period of one week. Production supervision utilizes it as a guide in controlling the efficiency of a group or groups in a department; the inspection department uses it to record the number of pieces produced by each production group; the accounting department makes use of it to compile the reports required

GROUP CREDIT SHEET

GROUP DESCRIPTION M-48 Centering, Rough
Turn and Form Nose

TIME

SHIFT 8:00 TO 4:00

GROUP 22-62-14 FOR PAY ENDING Jan. 9, 1952

Page No. 1 of pages

PART NO.	OPER. NO.	SPECIAL ORDER OR ACCOUNT	GROUP STANDARD HOURS	CREDIT GROUP	PIECES PRODUCED						
					MON.	TUES.	WED.	THURS.	FRI.	SAT.	SUN.
M-48	150		.0266		4536	3600	4536	4536	3000	4536	
M-48	250		.0229		4536	4536	4536	4536	4536	4536	
M-48	260		.0070		4536	4536	4536	4536	4536	4536	
M-48	270		.0176		4536	4536	4536	4536	4536	4536	
M-48	280		.0053		4536	4536	4536	4536	4536	4536	
MEN REQUIRED TO MEET GROUP STANDARD					45	45	45	45	45	45	
ACTUAL MEN WORKING IN GROUP					45	43	45	45	45	45	
ACTUAL HOURS TRANSFERRED					IN OUT 7.5						
ACTUAL HOURS IRREGULARITIES								8			
DAILY GROUP STANDARD HOURS					360	2335	3360	2360.2	3193	3602	
ACCUMULATED GROUP STANDARD HOURS						6955	1055.7	1415.9	1735.2	2095.4	
DAILY ACTUAL HOURS					360	351.5	352	368	360	360	
ACCUMULATED ACTUAL HOURS						711.5	1063.5	1431.5	1791.5	2151.5	
DAILY PERCENT EFFICIENCY					100	95	102	98		100	
ACCUMULATED PERCENT EFFICIENCY						98	99	99	97	97	
FOREMAN'S CERTIFICATION					all	all	all	all	all	all	
CHECK IF LOW OR HIGH EFFICIENCY IS EXPLAINED ON REVERSE SIDE						X		X	X		

REASON FOR LOW OR HIGH EFFICIENCY

MONDAY _ _ _ HRS. GAINED DUE TO _____
LOST _____

TUESDAY _ _ _ HRS. ~~GAINED~~ DUE TO 2 Excello Vertical lathes down 8 hours
LOST _____
Machine and Fixture Repair.

WEDNESDAY _ _ _ HRS. GAINED DUE TO _____
LOST _____

THURSDAY _ _ _ HRS. GAINED DUE TO One man did not punch out Wednesday;
LOST _____
his 8 hours were o.k.'d and charged today.

FRIDAY 40.7 HRS. GAINED DUE TO Nosing Press down 8 hours (broken crank)
LOST _____

SATURDAY _ _ _ HRS. GAINED DUE TO _____
LOST _____

SUNDAY _ _ _ HRS. GAINED DUE TO _____
LOST _____

for cost analysis.

The group standard hours is the standard time on all operations up to a given credit point. It is to be remembered that standard time is the estimated time-study period allowed an employee to perform his operation, while credit point is that in which a count is made of pieces produced by a group.

The line headings in the lower half of the group credit sheet can be explained as follows:

Men required to meet group standard: This figure is taken from the group routing. It is calculated by multiplying group standard hours by group standard.

Actual men working in group: This is taken from a floor-check sheet prepared by the time clerks in the plant. The time department has cost clerks checking the men in the manufacturing groups each day.

Actual hours transferred in or out: The floor-checker picks this up from actual counts of men in the groups or from reports prepared by the foremen.

Actual hour irregularities: Failure to ring a clock card by an employee may throw extra hours into a succeeding^{day} as there might have been a failure by the floor-checkers and timekeepers to pick up the employees' time on the proper day. Irregularities on employees' clock cards are generally not handled until succeeding days, as any time extended where there is a failure to ring, for instance, will have to be authorized by the plant superintendent.

Daily group standard hours: These figures are calculated by multiplying the number of pieces produced on each operation by the group standard hours and then adding together the time of all operations.

Accumulated group standard hours are the total group standard hours for the week.

Daily actual hours are those worked by the men in the group, plus or minus irregularities of time during the day.

Accumulated actual hours are the actual hours worked by the group and others transferred in or out.

Daily percent efficiency shows efficiency of the group. This figure is arrived at by dividing daily group standard hours by daily actual hours.

Accumulated percent of efficiency is computed by the time department the same as the daily percent efficiency.

The back of the sheet gives spaces in which the foreman can explain why he has low or high efficiency.

This sheet is issued in triplicate by the time study department preceding the week in which it is to be used. One copy goes to the superintendent of the plant, who, in turn, forwards it to the inspection department. The time department picks it up each day and makes it out when it goes back to the superintendent and then to inspection. It also prepares the other two sheets each day and sends reports on time worked daily to the payroll and cost sections of the accounting department. At the end of the week when all copies of the

group credit sheet are complete, the original goes to the plant superintendent, one copy is sent to the cost and factory accounting sections, and the other copy is returned to the time study department.

A study of the group credit sheet will reveal just how closely one's efficiency as a manager in a plant can be checked. This sheet, of course, refers to direct labor only.

With the preceding information well in mind, one may now consider the third phase of cost - burden - which the industrial manager has to control.

VI. BURDEN

In order to understand the subsequent chapter on budgeting, it is very important to be familiar with the types of costs that go into factory expenses. These costs may be called manufacturing expense burden, factory burden, or sometimes overhead, but they are all costs incurred by, or as a direct result of, a manufacturing operation. If one is to be able to analyze his expenses, he must have some means of segregating them. This is done by classification. General Motors Corporation has a standard accounting system which classifies all factory expenses under a control account, number 12, with nine sub-title accounts, namely

100	Indirect labor and salaries
200	Operating supplies
300	Expense tools
400	Utilities
500	Maintenance, repairs, and rearrangements
600	Employee insurance and taxes
700	Losses, errors, and defects
800	Fixed charges
900	Sundry manufacturing

A discussion of these items and how they may be controlled now follows:

Indirect Labor and Salaries - 100

The more information one wants about anything, the more classifications he provides in his accounting system. The item, 12A - 110, doesn't mean much to a foreman, but when it is explained that the 12 account is manufacturing expense, that the A is for the assembly plant, and that the 110 signifies supervision (which might mean plant superintendents,

foremen of departments, or general foremen), then the numerical system of classification begins to mean something.

However, there is also a great deal of clerical help in the plants. An account coded 12 B - 120 would indicate motor plant clerical help, including production control clerks, typists, and so forth. On the other hand, an account coded 12 C - 130 might indicate material-handling labor such as truckers and crane-operators, while the C would refer to pressed metal plants.

In addition to the above accounts, the following ones under the one hundred series of manufacturing expense are standard classifications throughout the corporation.

140 - Building and property attendants, which include janitors, plant protection men, fire department personnel, yardmen, and elevator operators.

150 - Machine and tool and die-setting labor, including any other labor charged to this account, even though it may concern productive men that have been transferred to a non-productive operation.

160 - Unapplied drafting and engineering costs which are due to the work of tool, equipment, process, and research engineers and designers.

180 - All costs of inspection of supplies, tools, materials, and assemblies.

190 - Sundry indirect labor which may cover costs of the tool crib attendants, hospital attendants, safety engin-

eers, student wages, and time-study men.

The reader will notice that here there are broken down and readily available for analysis all types of labor. Now the question arises: What actions can be taken to control these types of cost by the plant superintendents or factory supervision?

Probably one of the first things is to have the services of "top-notch" efficiency and time-study men. They can give information not only upon factory processes but on any type of work whatsoever. Also clerical jobs should be checked regularly to make certain that they are really necessary. Clerks should be trained properly and kept busy all of the time. Unnecessary reports should be eliminated. A continual effort should be made to improve methods of handling material through use of conveyors, hoists, and racks. Poor house keeping and utilization of space should be continuously corrected.

Operating Supplies - 200

The second series of accounts, the operating supplies in the 200 series, is broken down into eight captions, as follows:

210 - Fuel: This might be gasoline, coal, natural gas, and fuel oil.

220 - Lubricants and cutting compounds: These may include greases, hydraulic oils for machines, and all types of special cutting oils and coolants.

230 - Mill supplies: These include gloves, aprons, towels, rags, and protective clothing.

240 - Stationery and office supplies.

250 - Testing supplies: Included are all samples and supplies used in laboratories and experimental engineering.

260 - Packing and shipping supplies: Here one finds the usual nails, cartons, lumber, and twine.

270 - Processing supplies: These are anodes for plating, pickling acids, fire brick and clay for foundry cupolas, welding flux, and cleaners for productive materials.

290 - Sundry materials: This covers such items as safety signs and prizes, police uniforms, rest room supplies, commissary and restaurant equipment, and reading material.

Now what can a supervisor do to control the costs of these operating supplies? As far as fuel users are concerned, he can be sure that burners are clean and properly adjusted. Too, furnaces, ovens, and trucks should be carefully maintained. The flow of material should be planned so that furnaces can be operated to capacity and not cooled and heated alternately. Employees should be schooled, watched, and reminded of the necessity for the proper use of supplies and the elimination of waste.

Furthermore, one should watch the requisitions that are written by the members of his department, so that he indicates an awareness of the relationship between what is used and what should be used. Supplies should be selected for giving the greatest unit value for funds expended upon them.

Leaks in pipes, machinery, and containers should be repaired. It would pay to continuously educate employees as to the proper utilization and handling of supplies.

Expense Tools - 300

Included in the third main account are such items as cutters, drills, grinding wheels, wrenches, diamonds, punches, files, chucks, hammers, screw drivers, shovels, pliers, hones, scrapers, and steel-marking stamps. Many of these items, though small, are very expensive and unless special means of checking are employed, they tend to disappear. In most cases these tools are passed out of tool cribs to the men who are then responsible for their return. If they are lost, the employees have their cost deducted from their pay checks.

In addition to this precaution, there are other means of controlling tool expense. One should endeavor to keep tools in the plant and not permit the men to take them home. Also he should keep a continual watch upon the operations where they are used and make certain that they are not receiving excessive usage, abuse, or mishandling. Machines using them should be checked for most efficient speed and feeding rate, and the operator should be trained accordingly. In most cases men in the tool crib can be made responsible for regrinding tools that need it. A continual check should be made to see to it that specified lubricants and coolants are used on cutting jobs.

Part of training the new worker for his job is educat-

ing him as to the correct use and maintenance of his tools.

Utilities - 400

The costs of utilities are found in the 400 series of accounts, which are broken down into electric power, number 410, and electric lights, account number 440. This breakdown is made because the former might refer to the 440 volt circuits and the latter to the 110 volt circuits. Each building in a plant generally has its own meter, and the allocation of cost to the proper production groups can be quite an accurate process. Supervisors can aid in cutting costs on electricity by watching the use of lights and by maintaining as steady a flow of production as possible. It costs just as much to run an empty draw-die on a front fender as it does to have a sheet of steel in it.

Account 430 carries the charges for water, which in some cases is pumped in from the plant's own wells and in other instances is purchased from the city. Continual checks for leaks in the plumbing and the use of recirculating systems in manufacturing operations have cut down on the total amounts used.

Accounts 440 and 470 cover the costs of steam heat and steam for processing, respectively, high pressure steam for processing generally being metered to the departments using it. Loss of heat in the plant can be cut by proper control of pipes and radiators, immediate repair of broken windows, and refusal to allow open windows or doors.

Account 450 covers the costs in connection with the compression of air, a good deal of which is used in the manufacturing process. Because air is readily lost through leaks in pipes and equipment, it has been found through cost studies that air loss through improper maintenance of lines or machines is the most expensive of all utility losses.

One finds that account 490 includes all expenses of the powerhouse and is prorated back to the departments using the utilities. Some of the plants, by employing a prefix such as J for all of their expenses, use this complete set of expense accounts for the powerhouse and then prorate the costs back at the end of an accounting period.

Maintenance, Repairs, and Rearrangements - 500

Account 510 is for labor and material costs for maintenance and minor replacements of foundations, walls, roofs, elevators, plumbing and heating systems.

Account 540 covers maintenance and minor replacement costs on all types of machinery and equipment.

Maintenance and repair costs of dies, fixtures, tools, and replacement of minor component parts on these items are covered by account 550.

Included in account 570 are the same things as in 550 except that the subject items are furniture and fixtures.

Account 580 comprises all rearrangement costs where machines, conveyors, washers, and such items are relocated. Newly purchased equipment costs of installation are capital-

ized, that is charged to the equipment account, which is an asset account. Costs are recovered through depreciation charges over the life of the machine.

This group of accounts represents quite a large share of the expenses incurred in a plant. In order to control costs of this type, the industrial manager has to be constantly aware of cracks developing in cement foundations and paving, leaks in the roof, minor breaks in machines which may not stop the operation of the machine but which eventually might result in the need for a major repair, thus interfering with the whole manufacturing process. There is constant talk among cost-conscious supervision of preventive maintenance. "Get those minor breaks and weaknesses before they develop into major breaks," is their by-word. Preventive maintenance consists primarily of regular systematic checks and servicings of machines, plants, and grounds.

Other methods of cutting costs in this group of accounts are to

1. Watch employees to prevent malicious damage of property, tools, and equipment.

2. Train truck drivers carefully, as a carelessly controlled truck can cause considerable damage.

3. Keep down plant rearrangement costs unless there is a valid reason for change such as

- A. Improved safety
- B. More production
- C. Changed design in product
- D. More efficient use of floor space
- E. Improved working conditions

Employee Insurance and Taxes - 600

Just so that the reader will realize somewhat the number of tax and insurance costs that will be paid by an employer, The various accounts are listed.

611 - Employee group insurance

This account accumulates costs of additional funds paid to such companies as the Metropolitan Insurance Company to supplement employees' contributions.

613a - Compensation insurance

613b - Outside medical expense

614 - Surety bond premiums

621 - State unemployment compensation tax

622 - Federal unemployment compensation tax

623 - Federal old-age benefits tax

623a - Separation allowance for salary employees

633 - Vacation payments for hourly employees

634 - Holiday payments for hourly employees

641 - Provision for employees' contributory retirement plan

642 - Past service and special credit benefits

643 - Service pension plans

The nature of these accounts somewhat prohibits any direct method of decreasing their costs. However, the attempt to keep labor turnover to a minimum might make accidents fewer, as there would be a smaller number of inexperienced men to break in. Also, by attempting to schedule production evenly over a production year, one might keep lower the number

of layoffs with their attendant cost.

Losses, Errors, and Defects - 700

Account 710 - Process rejects scrapped.

This refers to production parts, such as a motor block, which have been scrapped due to a material or labor fault. In cases where the error is a material fault, it may be that the supplier can be billed back for the material cost. The labor cost is the amount of direct labor which was expended on the part and which is taken out of direct labor costs and thrown into this account.

Account 720 - Process reoperations and repairs.

This account covers material and labor repairs upon the finished automobile or any component parts that are reworked rather than scrapped. Some defects may be the result of supplier errors.

The next two accounts in this group have only a small number of charges entered into them. Large costs which might fall into the following accounts generally are entered into either administrative or commercial expense, because the units have been sold and the manufacturing operations have been completed.

Account 732 - Factory guarantees

Account 740 - Change in design

Account 760 - Manufacturing delays

This account does not ordinarily have much cost entered into it either. This is due to the fact that the

factory group losing time because of break-downs or other miscellaneous causes generally stands its own costs through a lower efficiency rating in its direct labor accounts.

Account 791 - Substituted Material

Excess costs may result from the use of substituted material which has been put into production because of running out of the regular specified material.

Account 792 - Uninsured losses and wages paid for labor lost as a result of theft, floods, or fires

From the foremen's point of view, the most important item in the 700 series of accounts is the reduction of scrap. Too much scrap affects the efficiency rating of his group, and it shows up every week on the group credit sheet, which was discussed in the section upon direct labor. The inspection department keeps the foreman informed about scrap and rejections by verbal and written reports. It is then up to him to analyze the reports, try to ascertain the reason behind the difficulty, then do something about it.

If there is a material fault such as steel not drawing properly, he should have it inspected to see whether it is up to engineering specifications. If there is a labor fault, he should check the guilty individual as to whether he has been instructed properly concerning his particular operation. Quite often a few extra minutes of instruction for a beginner will cut down measurably upon material rejects. Again, an operator's errors may be the result of illness, weak eyesight,

or poor hearing; these possibilities must also be considered and probably can be alleviated.

A continuous program of education in a department as to causes and remedies for scrap and rejects may materially increase group efficiency. In addition, by insisting upon good housekeeping and a continual striving for top production, there may be an "esprit de corps" built up which will help the group as well as result in greater production.

Fixed Charges - 800

Account 810 - Insurance

This account consists of money paid to insurance companies for protection against losses. Cost of this insurance is, to a certain extent, based upon experience losses. Good housekeeping and cooperation with the plant fire department will help keep losses to a minimum.

Account 820 - Taxes

Here one finds an account which accepts charges for all types of city, county, and state taxes, including both property and intangible taxes. The State of Michigan intangibles tax is based upon the amount of money required to operate a business. Inventories particularly affect the amount of intangibles tax, so that if they are low at the time the tax is paid, the tax will be lowered. State sales tax and federal excise tax are included in the costs of material and equipment purchases and lose their identity in that way.

Account 830 - Depreciation

This refers to the decline in value of a fixed asset because of wear and tear, obsolescence, and inadequacy. There is a break down in the account to show depreciation costs on land improvements, buildings, machinery and equipment, and furniture and fixtures. The plant supervision can cut down on depreciation costs by increasing the productive capacity of machines. This might be done by adding an additional shift or by using better methods of feeding a machine in order to eliminate the necessity of buying additional equipment. Furthermore they can use vertical distances as much as possible for the storage of material and, perhaps, improve upon the original planned floor space layouts after the machines are in actual production. This would help, too, to cut down unit cost of depreciation upon buildings.

Account 840 - Rentals

The largest item in this account is the cost of renting tabulating equipment. However, there are additional charges which may go into the account for the costs of renting other types of machines, equipment, buildings, and land.

Account 860 - Amortization of special facilities

This account is similar to the depreciation account except that it covers the write-offs of equipment for special jobs which may last only two or three years. The accounts in this group are fixed accounts only in the sense that they are

not tied in directly with production and they will continue to exist even if production stops completely.

Sundry Expense - 900

This section is divided into a group of self-explanatory account titles.

Account 911 - Traveling expense

Account 912 - Company car expense

Account 921 - Telephone expense

Account 922 - Telegraph expense

Account 923 - Teletype expense

Account 940 - Experimental work

Account 950 - Postage

Account 971 - Inbound transportation unapplied

Account 972 - Demurrage charges

These are costs caused by holding railroad cars and highway trucks longer than the time allowed by the carriers.

Account 991 - Employee-suggestion-plan awards

Account 992A - Committeemen bargaining time

Account 992B - Claims paid under union agreement

Account 997 - Permanent disability leave of absence

Account 998A - Employee leave of absence for temporary
military duty

Account 999A - Inventory expense

This account includes the cost of labor and materials for the taking of the yearly inventory.

Account 999B - Incoming bags and containers

Account 999D - Welfare and recreation

Account 999E - Membership and dues

Account 999F - Outside truck hire

Account 999J - Lost time -- no work

Account 999K - Miscellaneous expense

Account 999S - Savings Bond bank fee

Manufacturing supervisors can exercise quite obvious methods for controlling this group of costs. Inventory taking costs are high; but proper preparation, prior planning, and good housekeeping throughout the year can help keep down expenses in connection with it.

The user or consumer of all these expense items is the employee. Hence, the management executives' control of these costs comes through the actions that supervisory personnel take in controlling their employees. As potential supervisory personnel, remember that expenses always tend to increase, and if they are ignored, they will never decrease of their own accord.

VII. SUPER BURDEN

Super burden is not quite the same thing as manufacturing expense; yet, in many small plants, what is referred to here as super burden is charged into manufacturing expense accounts directly. However, as the name implies, one can assume that costs in connection with super burden are costs superimposed, or costs above ordinary, which do not regularly occur after production is once started.

These costs are, for the most part, costs in connection with pre-planning and getting into production upon a new model automobile. They might be broken down into four categories:

1. Product-engineering costs
2. Special tools
3. Rearrangement costs
4. Pre-production costs

Product-engineering costs are those of engineering a new model before it can be produced. This work has to be completed before production is started; therefore, to charge the costs against current revenue would be to charge current sales with next year's expense. Naturally this would be violating the old theoretical accounting principle of matching cost against its own revenue; so charges are made against the next model year's production on a per-unit basis which is determined by the budgeting process.

Product engineering also works all during a year upon

the improvement of the current model. This cost becomes a current expense and may go into the cost picture as additional expense or as an increase in the super burden rate.

Special tools are special in that they are developed to produce a new model. A special tool for a new-model fender might be a large fender-shaping die to be installed in a piece of equipment. As it is used, its original cost is spread out over its production. Other examples of special tools are jigs and fixtures.

Rearrangement expense includes all expenses in connection with the rearrangement and preparation of a particular area. The plant engineering and plant layout departments are instigators of this necessary work, which is completed before actual production begins. The accumulated costs are apportioned over the quantity of parts to be produced.

Pre-production costs are the same as tool tryout costs. This is a period of final adjustment and correction before actual production begins. During this period the following matters are taken care of:

1. Obtaining and training men for the machines
2. Developing methods
3. Correcting tools
4. Revising specifications
5. Establishing checking points

These costs are absorbed on the basis of the parts pro-

duced after our process swings into production.

Super burden is controlled by budgeting. Through the processes of planning explained in the section on production engineering, amounts are requested in advance for particular purposes, which amounts are carefully determined in advance, and if they should prove to be in error, additional amounts have to be authorized. Pre-production costs have to be watched quite carefully, for of all super burden costs, they are the ones most likely to get out of line.

VIII. BUDGETING

Top management men are in general agreement that a knowledge of budgeting is essential for the potential industrial manager. It is interesting to note their unanimous feeling that this type of education is becoming more and more necessary for a proper supervision of manufacturing operations. Undoubtedly the reason behind their opinion is that it is basic common sense to feel that the people who have to live under a budget, such as the foremen and plant superintendents, in other words those who have to make the budget work, must have a hand in its preparation.

Too often in the past budgets have been prepared upon historical data which is not going to be at all characteristic of succeeding periods of operations. Many of the people who attempt to make a budget work have become bitter, because they have had to try to operate under what were undoubtedly inequities in their budget allotments. This subject was treated in a survey made by the Controllers Institute of New York;⁸ it shows some of the widespread resentment characteristic of people operating under budgets: Foremen often think that the accounting department is tattling to top management when it reports inefficiencies and errors; factory supervisors think they should be allowed to participate as a group upon preparing the budget. The Institute suggests that human relations should be taught to the budget people.

The above will give some idea of the characteristic points of dissension that arise among those forming and those working under the budgeting program.

What, then, are some of the prerequisites for setting up a budget so that it will be successful?

1. A good accounting system. Men engaged in the budgeting process should have a thorough knowledge of the accounting aspects of the business, how information pertaining to the budget is recorded, and how it is reported.

2. Thorough knowledge of the business. This would be necessary in order to permit orderly and progressive analysis of individual department requirements.

3. Complete company data, past and present. This data would give an indication of economic trends in a business. In some cases, future rates of growth can be prognosticated from these figures.

4. A sound organizational plan, so that the budget will be set up based upon this plan. Budgets place responsibilities for performance; therefore duties must be clear cut.

5. Detailed analysis of economic, industrial, financial, and business statistics of the territory served by the company.

6. Good judgment in interpreting all statistics accumulated.

7. A thorough knowledge of human relations. This

is becoming more and more necessary, as for many years it has been a weak point in the accountants' attack of most problems involving human beings.

Assuming that a company has available a group of men highly versed in the subject of making, reporting, and interpreting a budget, what would the foremen like these men to do when they prepare the manufacturing budget?

They would appreciate having the budgeters work with them individually, and as a group, so that information as to the figures which they must live under and work to meet may be understood and accepted. They would like to know the reasons for the figures under which they are to operate.

Also they should like to know in advance how their departments are supposed to be managed. This implies that they should know what will be produced for the succeeding year, how many shifts they will have to run, how many men they are to be allowed for production, how their burden charges were built up, and other things that they don't know enough to ask about unless there is group discussion between the budget men and them.

Now, from the point of view of the budget men, at the time that they are building the budget with the supervisory personnel of the plants, they should try to conduct a selling program for their performance. To the foremen they might explain that in the automotive industry there is continual and keen competition, the latter tending to drive down pro-

fits. They can, however, work together to keep profits up. Explaining that for the most part, competition determines selling price, they might add that normally a manufacturing company cannot advance selling prices upon automobiles or upon any other commodity unless there is a corresponding increase in selling price by their competitors.

Also if they are to get the profit figure up, they must get costs down. But why, ask some skeptical foremen, all this interest in profits, and they point to the large dividends paid to stockholders. Then the budget men, as salesmen for capital and the free enterprise system, bring up the idea that profit ensures accumulation of capital and that accumulations of capital insure jobs for the average individual who never has much more than a family, a home, and a living. They could also point out that the budgeting process they are about to undertake is a planning procedure which is job insurance for everyone involved, as with that process they don't go into production upon items that will cost more than they can sell them for, nor are they likely to manufacture more than they can sell. As a result of this planning, they conserve capital and save themselves many unhappy moments at later dates.

And then they endeavor to convince the foremen that this process of preparing the budget is a planning process now, but that in ~~the~~ future when the new models go into production, it becomes a control process. Management uses

these figures for just those reasons, planning and control, but the success of the planning and the efficiency of the control are dependent upon each of the supervisors and foremen. Something like the following could be said:

"Next year we plan upon building 300,000 cars. This means that we shall work two shifts a day, eight hours each, for eleven months. We want to know what each one of you, as foremen, will need in your department. Here is a schedule of previous costs and another of contemplated costs. Do they tie in with what you'll need. If not, why not?"

And they could give each one a schedule for his department, which might look like this.⁹

	Total	Deduct Fixed	Actual Variable
Indirect labor	\$10,000	\$8,000	\$2,000
Operating supplies	2,000		2,000
Tools	500	400	100
Heat, light, power	2,500	500	2,000
Maintenance - labor	3,000	1,500	1,500
Maintenance - material	3,000	1,500	1,500
Insurance, taxes	2,000	2,000	
Losses	4,000		4,000
Fixed charges	2,000	2,000	
Sundry mfg. expenses	1,500		1,500
Total burden	30,500	15,900	14,600

They could also provide for the foremen a schedule of the accounts as listed in the section on burden, so that they might know exactly what types of charges go into each account. Then they should spend some time with each one and have personal interviews with him until he understood that it was his responsibility to try to control the variable portion of expense. If he desired any changes in his allotted budget, he

could offer the reasons for his requests, and the budget men would explain how they arrived at their figures. After any further discussion necessary, they would settle upon the proper amounts of the various expenses to allow each foreman in his department.

Once this process is completed in all departments in a plant, the totals are added, and a completed manufacturing budget is attained, as far as expense is concerned.

After the analysis of manufacturing expenses as to those that are fixed or non-controllable and those which are variable and controllable, the cost department is ready to build up the burden rate. This is the rate by which they will multiply direct labor in order to find out how much burden should be absorbed by each part produced.

For instance in the event that the company is going to manufacture 300,000 automobiles, for each one of them they assume that they will spend \$400. for direct labor. This figure is obtained by adding together the standard (estimated) direct labor for each part that is produced and which goes into the car. This results in a total direct labor cost of \$120,000,000. After adding up all of the manufacturing expense estimates for each department in the plant, it is found that there is a total estimated expense cost of \$210,000,000. Using the following formula, it is perceived, that the burden rate is 175 percent of the direct labor cost.

$$\frac{\text{Budgeted 1951 burden}}{\text{Standard 1951 direct labor}} = \frac{\$210,000,000}{\$120,000,000} = 175\% \text{ burden rate}$$

DAILY PLANT REPORT
GENERAL MOTORS CORPORATION

PLANT XXXXX

DIVISION

DATE 12/1/52
MONTH TO DATE

	TODAY				MONTH TO DATE			
	TOTAL BURDEN	DEDUCT FIXED	ACTUAL VARIABLE	STANDARD VARIABLE	SAVING	SAVING	VARIABLE RATE	
INDIRECT LABOR	\$12,100	1,500	10,600	10,102	498	498	Actual 47	Standard 45
OPERATING SUPP.	2,100		2,100	2,245	145	145	9	10
TOOLS	550	200	350	449	99	99	2	2
POWER	2,500	800	1,700	1,796	96	96	8	8
MAINTENANCE-LABOR	3,050	1,450	1,600	1,571	29	29	7	7
" Material	3,050	1,450	1,600	1,571	29	29	7	7
EMPLOYEE TAXES	5,800	1,085	4,715	4,715			21	21
LOSSES	4,100		4,100	3,592	508	508	18	16
FIXED CHARGES	850	150	700	674	26	26	3	3
Miscellaneous	900	300	600	674	74	74	3	3
TOTALS-BURDEN	35,000	6,935	28,065	27,389	676	676	25	122

	TODAY	MO. TO DATE	YR. TO DATE
ACTUAL DIR. LABOR	21,100	21,100	
STD. DIR. LABOR	22,450	22,450	
SAVING - LABOR	1,350	1,350	
SAVING - BURDEN	676	676	
TOTAL SAVING	674	674	

DATE ISSUED _____ TIME ISSUED _____
SIGNED BY _____
PLANT MANAGER

Using this rate and assuming that the costs are accurate, one should be able to charge the finished unit with \$1.75 burden for each dollar of direct labor cost.

For purposes of checking on the manufacturing plant, one can break this rate down to ascertain how much of the estimated expense is fixed non-controllable cost.

$$\frac{\text{Total budgeted fixed cost}}{\text{Standard 1951 direct labor}} \text{ equals } 53\% \text{ fixed burden rate}$$

For the purpose of checking variable expense costs, this formula can be utilized:

$$\frac{\text{Total budgeted variable cost}}{\text{Standard 1951 direct labor}} = \text{Standard variable burden rate}$$

The standard variable rate could be broken down by dividing each group of variable burden accounts as indirect labor by the direct labor cost. This would result in the figures for the standard variable rate column on the daily plant report.¹⁰

Now considering the daily plant report figures found upon the facing page, one may examine the manner of analyzing the efficiency of a hypothetical assembly plant.

The left-hand column lists the burden control accounts, which are explained in detail in the section on burden. The report is organized in this way so that manufacturing management executives can tie in their expense variations with accounting classifications and with their original estimate of individual burden costs.

The column headings across the top of the page represent

costs for the date given and may be explained as follows:

Total Burden - Actual figures for the day. Indirect labor costs come from the time clerks in the plant to the cost department. Operating supplies would be procured from requisitions for supplies issued out of the storeroom. Generally speaking, material costs would come from requisitions; labor costs would be derived from time tickets made out by foremen in the plant and forwarded through the time department; cost estimates and allocations as depreciation, power, and so forth would be arrived at from figures prepared in the cost department; and other miscellaneous costs might be procured from invoice classifications forwarded from the accounts payable department.

Deduct Fixed - These costs are fixed costs which are non-controllable as far as the foremen and plant superintendents are concerned. Over a year's period they should run fifty-three percent of the total direct labor cost.

Actual Variable equals Total burden minus fixed

Standard Variable equals Standard variable rate times the standard direct labor cost. This is what the expense should be in terms of budgeted figures. Standard direct labor is the number of units produced times the standard labor cost for each unit.

Saving - This figure is equal to the difference between actual variable cost and standard variable cost for the day. It can be either a loss or a gain when compared to

the standard set.

Month to date columns are figured as explained in the following paragraphs:

Saving - This figure is the total of the savings for today added to the accumulated savings for the month, the latter being received upon the prior day's plant report.

Variable rate - actual - This group of percentages is equal to the actual variable figures divided by standard direct labor. The difference between the actual variable and the standard variable percentages reflect the savings or loss on original budgeted figures. It gives the plant manager an easy way to check the efficiency of the plant, and in case of excess variation, he can readily go into a departmental analysis of individual expense captions.

Actual Direct Labor - This is the total cost of direct labor hours. It is the time reported from the foreman's time sheets, which are actual group times on specified parts. The timekeeper working for the payroll department ties in the direct labor reported by the foreman with the amount of time punched upon the employees' clock cards.

Standard Direct Labor - The units produced for the day multiplied by the standard labor cost per unit.

Savings - Labor equals direct labor subtracted from standard direct labor.

Savings - Burden equals total burden loss taken from the savings columns on the right-hand side of the sheet.

Total savings equal gain or loss on total savings for day, month, or year.

This concludes the discussion of one form used in handling a budget. Though there are many other ways of determining budget variations, in most cases the daily plant report should be adequate, because the reporting of actual performance as opposed to budget or expected performance is the key to most budgeting procedures.

IX. CONCLUSION

It now seems appropriate to make a summary of points in the development of this case study, indicating where there is a tie-in between operating management and accounting practices. This will enable the management student to go to each operational phase and ascertain how it is handled.

As far as cost estimates are concerned, the administrative engineer performs the accounting which is deemed necessary in the product engineering department. On a day-to-day basis, hourly rated employees and salary personnel below a certain level of income fill out time tickets which give the nature of their work and the time spent upon it.

The timekeepers pick up labor tickets from the day rate men and some salary personnel in the production engineering division. This time is development time and is handled as super burden. It is charged to an appropriation number to be accumulated until the contemplated operation is completed. At the time the total costs are removed from the appropriation account and are amortized over the ensuing production. This allocates the expense as a charge against the revenue of the period in which the new developments are used.

The material receiving department is responsible for proper checking of incoming material and the write-ups of the receiving slip. The supervisory personnel have to be

sure that accurate checks are made of incoming material, as it becomes the basis for records in both the materials control department and the accounts payable department. Improper training of personnel and careless counts by irresponsible employees can cause improper payment to suppliers and inaccurate material records.

Foremen in charge of productive labor are responsible for accurate counts of their men and correct classification to their operations. Their production reports are checked by timekeepers who forward their employee times and piece reports to the payroll and cost accounting departments. Inaccuracies on the Group Credit Sheet will be revealed, as they will throw group efficiencies out of line.

Burden control is the direct responsibility of all management personnel, who should conduct as much of an educational program as they possibly can among their employees. Detail as to how burden can be controlled and special methods which may be used are included in the burden section. The accounting for this aspect of cost may be originated from time tickets for indirect labor, scrap tickets, requisitions for indirect materials, and classified invoice charges for items being allocated to the burden accounts.

As far as the making of a budget is concerned, all foremen should have received previous training regarding this procedure and the need for it. Then, after conferences with management executives and budget men, they should have a

chance to participate in the construction of their own budgets. In this way, when the actual budget is adopted, each foreman should basically agree as to its workability, and not feel that he is being forced to do the impossible.

By checking on the various burden accounts in the chapter on burden, the industrial management student can perceive exactly what each special item of burden might be and what a foreman would be able to do in order to control it.

When the budget is put into use and compared with actual cost figures, the foreman has an opportunity to observe the manner in which his actual costs compare with his estimated costs. This is done through the use of the daily plant report. If there are any variations of actual burden from his original estimate, they are immediately apparent upon this form. The expenses analyzed in this report are controllable, variable cost. A working familiarity with this or any other budget report presupposes an understanding of the entire manufacturing process with an accounting tie-in.

To arrive at the information included in this thesis, an institutional approach was utilized. Beginning with the development of the car, the entire manufacturing process was reviewed, being allied to accounting procedures through use of forms and cases.

It is hoped that the information presented will be enlightening to all potential industrial managers, that it will help them select more profitable courses, and

that it will provide them with a better understanding of cost accounting and budgeting--those two very important phases of scientific management.

LANSING CHAPTER
NATIONAL ASSOCIATION OF COST ACCOUNTANTS

TO: SELECTED EXECUTIVES - LANSING AREA.

FROM: MAURICE I. STRAIT - DIRECTOR OF EDUCATION.

SUBJECT: MANAGEMENT'S USE OF ACCOUNTING.

PURPOSE: IMPROVEMENT OF ACCOUNTING INSTRUCTION IN RELATION TO GENERAL BUSINESS STUDENTS RATHER THAN TO ACCOUNTING MAJORS.

1. NAME

2. POSITION

3. FIRM

A. PLEASE LIST THE ACCOUNTING STATEMENTS OR FORMS WHICH YOU USE IN MANAGING YOUR OPERATION OR BUSINESS. (USE BACK OF SHEET IF MORE SPACE IS NEEDED.)

B. CHECK THE ITEMS WHICH YOU WOULD LIKE COLLEGE GRADUATES THAT YOU MIGHT HIRE FOR POTENTIAL MANAGEMENT POSITIONS TO KNOW OR BE FAMILIAR WITH:

- | | |
|---|--|
| 1. ELEMENTARY ACCOUNTING () | 5. COST ACCOUNTING () |
| 2. STATEMENT PREPARATION AND ANALYSIS () | 6. BREAK-EVEN ANALYSIS () |
| 3. ACCOUNTING TERMINOLOGY () | 7. PREMISING (LONG RANGE FORECASTING) () |
| 4. BUDGETING () | 8. REASONS FOR ACCOUNTING I.E. BACKGROUND OF DEVELOPMENT () |

C. DO YOU USE ACCOUNTING PRIMARILY FOR

A. PLANNING () B. CONTROL ()

THANKS FOR YOUR COOPERATION AND ASSISTANCE.

TRULY YOURS,

M. I. Strait

MAURICE I. STRAIT.

(- Payroll - Budgets)

1000

30

\$15 million

\$75,000.00

✓ ✓ ✓

Cost Accounting & Budgeting should be stressed more. Very few graduates know what budgets consist of, let alone trying to make them of some use in their daily work.

FOOTNOTES

1. The author is a former accounting instructor at Michigan State College and was a counselor to industrial management students for three years.
2. The author was one of the ten selected to take this course in 1937-38, hence became extremely familiar with the feelings of the executives as well as with those of the foremen.
3. After completing the management training program, the author was employed by Chevrolet Motor Division for several years, where he worked through all the plants in the division as well as in various sections of the accounting department.
4. Oldsmobile Division, General Motors Corporation, Control of Manufacturing Costs, Lansing, Michigan, 1945, chapter 8, p. 7.
5. Ibid., p. 4.
6. See page 8.
7. Ibid, chapter 5, p. 2.
8. "Foremen, 'Slide Rule Boys' Clashing in Budget Battles," The State Journal, Lansing, Michigan, March 19, 1952, p.26, cols. I-4.
9. Compiled by author.
10. Compiled by author.

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