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William O. Cutter

Charles A. Williams

NATIONAL ASSOCIATION
of
COST ACCOUNTANTS
Affiliated with The Canadian Society of Cost Accountants

Official Publications

Vol. V August 15, 1924 No. 23

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BUSH TERMINAL BUILDING
130 WEST 42nd STREET, NEW YORK

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WILLIAM O. CUTTER, Comptroller,
United States Rubber Co.,
New York City.

CHARLES A. WILLIAMS, Comptroller,
American Safety Razor Corporation,
Brooklyn, N. Y.

DAVID W. HOOK, Cost and Industrial Engineer,
Consolidated Safety Pin Co.,
Bloomfield, N. J.

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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CONTROLLING THE LABOR

PUBLICATIONS DEPARTMENT NOTE

The Publications Department depends to a large extent on the Director in Charge of Publications of each Chapter to see that all papers presented at Chapter meetings are forwarded to National Headquarters. The value of such papers depends in turn upon the care of chapter officers in planning chapter meetings such as selection of vital topics and capable speakers. In the development of our chapter work during the past year, the New York Chapter took a distinct step forward in carrying to a successful completion the program mapped out last fall.

The general plan of each meeting was as follows: A non-technical paper but one of general interest to cost men was first presented. This was followed by a main paper on some cost topic of vital interest, which laid down the general principles of the subject. In other words this paper was one on "How it should be done." Then several members gave short snappy talks on how they handled the cost procedure under discussion—in other words a "how we do it" talk which did not go into the principles of the subject.

After the general discussion which ensued, some one summed up the salient points made by those who spoke on the technical subject for the evening's discussion.

This plan was carried out at a meeting of the New York Chapter held in November, 1923. The general topic for consideration was "Controlling the Labor."

The following article contains most of the material presented at this meeting and is published because of its evident merit and also as a sample, so to speak, of a plan for chapter programs that could be emulated with profit by other chapters. But many chapter meetings remind us of some lines from Longfellow:

"I shot an arrow into the air,
It fell to earth I knew not where."

While there is no doubt that many members carry away good ideas and food for thought from each chapter meeting they attend, nevertheless much of the material presented simply goes into the air. It does not bring forth good cost fruit, nor is the area of influence wide enough, unless the worth while material is published by the Association.

During the forthcoming year, it is hoped that every worth while cost idea or procedure will be sent to National Headquarters where the Publications Department can prepare it for distribution among our members.

W. O. Cutter, the author of the main paper in this publication, is Comptroller of the United States Rubber Co. The opening portion of this article was prepared by G. M. Burnett, Assistant Comptroller of the United States Rubber Co.

Mr. Cutter, was at one time a partner in Cutter, Fletcher & Co., Public Accountants, Production Engineers and Systematizers. He has been Director in Charge of Research of the N. A. C. A. for two years.

Several of the men connected with Cutter, Fletcher & Co., have taken prominent parts in the affairs of the Association. F. R. Fletcher now with Scovell, Wellington & Co., Boston, was vice-president of the Boston Chapter in 1922-23 and president in 1923-24. During his term as President, the Chapter held a series of interesting and valuable meetings which considered the subject "Fundamentals of Business

Management." F. L. Sweetser, also a member of Cutter, Fletcher & Co. is now General Manager of the Dutchess Manufacturing Co., Poughkeepsie, N. Y. He is Director in Charge of Publications of the N. A. C. A. F. B. Cherrington, another member of Cutter, Fletcher & Co. is now proprietor of the Frederick Bond Cherrington and Associates, Boston. During 1920-21 he was vice-president of the Boston Chapter.

For the purpose of this article, labor is considered as including all compensation of any nature paid in connection with the manufacturing division of an industry. Selling and administrative labor will not be dealt with. Manufacturing labor is properly divided into two classifications, direct and indirect.

To define direct and indirect labor except in a general way, it would be necessary first to use some one of the five basic cost plans as outlined in the paper read at the October meeting of the New York Chapter.

To define direct and indirect labor in a manner that would be applicable to all of these plans would be so general that very little information would be brought out that would be of interest, and to go into the details of each of the five plans would require considerably more space than is alloted for this paper; besides, we could not hope to add anything to the information contained in a number of excellent books on the subject of cost accounting which most of you probably have read. Therefore, we will describe our interpretation of "how it should be done" (that is, the control of labor) in an industry similar to our own, using the class (unit) cost plan, with the thought in mind that the points brought out, while not applicable without considerable modification to cost systems in effect in a great many plants, nevertheless furnish material for considerable thought.

What Direct Labor and Indirect Labor Includes

Under this class (unit) cost plan, *direct labor* should include the cost of all labor definitely applicable to either operations or processes in the manufacture of the finished product or its component parts. It should be borne in mind, however, that compensation paid to employees engaged in operations or processes direct in themselves is direct only so far as such compensation coincides with the amount of work performed, or the actual time engaged in such work. As an illustration, suppose employee A is paid a straight weekly salary, although engaged in performing a direct labor operation. Because of lack of production, due to any one of several reasons, this employee is actually engaged only part time. Such compensation as he receives for work not performed should be considered as indirect labor, and charged to a proper indirect labor account which will reflect such idle time.

Indirect labor should include all other labor, comprising salaries, wages or other compensation paid to all employees whose

[1]This paper, by Eric A. Camman, was issued as Vol. V, No. 4, of the Official Publications of the N. A. C. A.

efforts cannot definitely be allocated to a specific operation or process in the manufacture of a finished product or component part.

Employment Department Record

It is unnecessary to spend any time emphasizing the importance of proper records in connection with the control of labor. Therefore, we will proceed to a brief description of a comprehensive system of records, starting with the Employment Department, proceeding through the Payroll and Cost Department, and embracing the final disposition of the information gathered in the books of account, and various statistics prepared as a guide for general management.

As cost men, we all appreciate that one expense that offers an opportunity for reduction, and that should be of vital importance to all management, is the cost of labor turnover. This naturally brings us first to the Employment Department. We will assume that no one will disagree with the idea of delegating to an Employment Department the task of providing the personnel required by the manufacturing departments, and to this end suitable records will be maintained, such as sources of personnel, personnel supply, physical requirements for different jobs, class wages, etc.

The Employment Department, upon receipt of a requisition for additional operatives from a manufacturing department, should be in a position to supply them either by transfer from the surplus in another manufacturing department, or by engaging new employees. It is obvious that if the Employment Department is to function properly, recorded information is necessary as to the requirements for the particular position that is open; and in the case of employees available for transfer, information as to their ability, physical condition, attitude, etc., possible earnings on new job, and previous earnings on old job. The same information should be secured and recorded in the case of new employees.

Such records should include a History card for each employee, showing name and address, age, sex, nationality, whether married or single, dependents if any, brief summary of results of physical examination at the time of employment, education or training, previous employment, starting rate of compensation and subsequent changes, position for which he was originally hired, transfers or promotions, and if employee leaves or was discharged, the reason therefor.

Another record is that of attendance and earnings, which might very well be used for preparing a statement of earnings submitted to the State and Federal Income Tax Departments. Such a record is of considerable value in controlling labor turnover. Provision should be made for showing the attendance and weekly earnings, particularly in the case of piece or bonus workers. It has been our experience that the information compiled for making the income tax returns has been a very handy record to have available, when combined with the attendance record, to convince "Mr. Wage

Earner" that the reason he is not earning a comfortable income is not because of low piece rates, but rather his own industry; the remedy is a nearer approach to full time. Conversely, if the fault is with the management, it gives a lead for investigation, which might develop cases of improper selection not apparent when the employee's fitness was considered in connection with the job requirements, for example, an operator of nervous temperament employed on a highly repetitive operation. The monotony of the job in this case would cause the loss of an employee who might be otherwise desirable, and might well be employed in another department. Or again, an employee, through some physical handicap not readily observed, might be unable to earn a fair wage in a given operation and yet be of the desirable type, and should be transferred immediately.

For the purpose of properly maintaining these records, there should be provided proper Engagement Reports, Transfer Reports, Rate Change Reports and Discontinued Reports. In the case of the Engagement Reports, either the individual slips or a summary of them should be submitted to the head of the manufacturing department for approval which is a means to control the labor at the outset, as it is obvious that no more effective means of control can be operated than by watching the additions to the payroll as they occur.

For the same reason, rate change slips should have the approval of the manufacturing department head.

With reference to transfers and discontinuances, except for special cases, a summary of these would be sufficient.

Payroll Department Records

We will now take up the Payroll Department, embracing time keeping, compilation of earnings, and actual payment of employees. From the Employment Department, the Payroll Department receives a report of new employees hired, giving starting date, rate of pay, and job or operation to which the employee is assigned. A payroll number is immediately given to the new employee, which is also used as his in and out clock number. Payroll numbers are assigned in groups to various departments, separated as to day workers and piece workers.

All employees, whether piece or day workers, are required to record their time in and out of the plant on time recorders. For piece workers, although attendance does not affect their earnings, the information as to hours worked is necessary for a proper control of piece rates. As day workers' earnings are based entirely on attendance, the reason for having their time properly recorded is apparent.

The Payroll Department maintains a piece rate record showing rates in effect for each operation, which are corrected currently from copies of rate setting slips as new operations are rated. For the purpose of computing piece work earnings, coupons are used which

provide a space for punching out the number of units produced, and on the same coupons the rate applying against the operation performed is shown. As the work is completed and passed by the inspectors, the number of units is punched and the rate checked. At the end of the day the coupons are turned into the department head and, after approval, are sent to the Payroll Department where rates and extensions are checked and the earnings posted to the piece worker's earnings record.

Day work earnings are figured from the clock record cards after approval by the foreman. These constitute the day worker's earnings record and are turned in to the Payroll Department weekly; extensions are made and the earnings posted to the payroll.

No day workers are ever paid on a piece rate basis unless upon duly approved voucher, which would show the time engaged in such piece work operation; or vice versa, no piece workers are paid on day rate basis unless upon approval of a voucher by the foreman, showing the time engaged and the reason therefore.

The payroll sheets provide for the reporting of total earnings of all employees in the department and show employee number, name, rate, total hours, total earnings, adjustment, net earnings, deductions, amount paid. It might be well to mention that this record is merely to summarize the earnings of employees according to their departmental grouping.

The question might be raised as to why the departmental payroll could not be determined by simply adding the total hours and earnings of all employees in the department from their earnings records, or from tabulator reports. This can be done, but in doing so we eliminate the important feature of permanency of record. By posting to departmental earning sheets, we assure a permanent record of earnings of all employees in the department, and are not confronted with the always impending danger of having the information separated in the file and the record thus destroyed. Moreover, an inspection and comparison of the payroll can be more conveniently accomplished if the earnings of all employees are grouped in some logical sequence according to departmental classification.

As each payroll sheet is completed, the total earnings are footed and the amount is checked with the total of the individual earnings record for the same group, in order to insure accuracy in posting. The total payroll for the departments is then posted to a summary sheet, the grand total of all departments being the payroll for the plant, for which the payroll check is drawn.

As soon as the payroll is completed, the earnings records are turned over to the employees by the departmental foremen in order to advise the employees in advance what their wages for the week will be. Supplying information of this kind has its benefit in that it gives the employee an opportunity to check the earnings reported with his own record, and where differences occur, permits him to take up the matter for explanation, or adjustment if necessary. Employees sign the earnings record and retain it until paid off.

A word or two may be stated regarding the method of paying off help. Paymasters pay off departmentally, receiving the individual's earnings record in exchange for the envelope.

At this point, if we might digress for a moment, emphasis should be placed on a matter that ties in somewhat with the Employment Department, and while it departs from the record control of labor, nevertheless it affects control in that it influences turnover. It has been said by one who has made a study of personnel relations that all the good accomplished by a proper handling of new employees by the Employment Department can be defeated by the improper attitude or carelessness of the Payroll Department. A very rosy picture of the advantage of making a connection with a new employer may often be smudged if the employee gets the idea that the amount in the envelope is not as much as had been expected, and is not able to find out why, without an argument with some one who, unfortunately, but all too often, just thrives on argument when the subject is the question of the accuracy of the Payroll Department. This situation can be avoided by arranging to keep the employee informed currently as to his or her earnings. Aside from the elimination of dissatisfaction by this practice, there is the further advantage to be gained of incentive to speed up if the earnings earlier in the pay period have not been as large as they might and should be.

Distribution of Labor Expenditures

Having described the control of labor through the process of providing the personnel and paying for its services, we are now faced with the task of distributing the labor expenditures. It would be a job but half done if this distribution were not made in a manner that would supply the greatest help to the executives who direct the manufacturing effort. For accounting, a distribution of payroll to direct and indirect labor by classes of product might well be sufficient. If we attempted to use as general a distribution as this for executive control, however, it is apparent the information would be of little use.

The only value obtained from so general a distribution would be a comparison with previous performance, and unless we are interested in ancient history, we might well save the effort expended.

A subdivision of labor detailed enough to require no further analysis by the executive, and a means of measuring the performance by the same subdivision, is the basis upon which the distribution of labor should be built.

Direct labor should be subdivided by departments and by operations within the departments.

Indirect labor should be distributed to various sub-accounts, such as supervision, clerical, property, industrial relations, power, development, receiving, storing, shipping, and miscellaneous indirect, and still further subdivided by departments and operations.

The actual operation of making this distribution can be greatly

simplified by arrangement of the payroll so that operations by classes are more or less grouped. After the payroll is completed, the original records from which the roll was made may be sorted into as detailed a subdivision as required, a tabulation made, and the total checked against the payroll.

Labor Reports

For the purpose of measuring performance, standard labor costs are set which are the result of a scientific study of each operation to determine the most efficient method and its cost for each class of production.

Having set standards and scheduled production, it is possible to predetermine the expenditures for labor. Against this predetermination or labor budget can be applied the actual labor cost by operations, showing the variations by operations.

A set of reports should be prepared as follows:

1. Direct Labor Budget, which would show the total scheduled production by classes for the period, and the pre-determined or standard labor for each class of production.

2. Analysis Standard and Actual Direct Labor, which shows the actual labor cost for the same production, and the variation from standard.

3. Analysis Standard and Actual Direct Labor Departmentally—departmental analysis supporting the above showing the same information, only in the detail that would be of interest to department heads.

4. Weekly Departmental Class Wage Report, compiled from the payroll, showing by departments, the number of employees, total hours worked, total earnings, average hours and average earnings, separated as to sex.

5. Weekly Operation Class Wage Report, compiled from the payroll, showing hours worked and total earnings by operations.

6. Indirect Labor Budget, which would show the scheduled production, estimated working days, and standard allowed for each subdivision thereof.

7. Analysis of Standard and Actual Indirect Labor, which would show the total standard and actual indirect labor for the period, and the variation by each subdivision thereof.

8. Departmental Analysis of Standard and Actual Indirect Labor, which would show the standard and actual indirect labor for each department by classes of indirect labor, and the variation by each subdivision thereof.

9. Ratio Piece Work versus Day Work, which would show the total earnings by departments, the amount of piece work and the amount of day work earnings with the percentage of each to the whole.

These reports would not be complete without a further analysis as to the cause of the variation shown. The finer the subdivision of labor, the more readily this analysis may be made and the cause determined.

In addition to the above, reports showing the ratio of different subdivisions of indirect labor to various controlling factors would be of considerable interest to the management, and would assist them in the control of overhead, for instance the following:

1. Ratio of property expense labor to plant values.
2. Ratio of industrial relations expense labor to turnover and number of employees.
3. Ratio of power labor to production.
4. Ratio of receiving and storing labor to materials handled.
5. Ratio of shipping labor to production or sales.
6. Ratio of miscellaneous indirect labor to standard direct labor.

Reports of this nature should be prepared in such form that a comparison by periods can be made readily. The leads developed by a study of these reports direct attention to the high spots in the labor cost that are in need of regulation. For example, excessive variations in actual as against standard labor cost in any department would warrant an intensive study of local conditions which were handicapping efficient performance, such as improper routing, etc.

Fluctuations in operations class wage report would tend to show instances of improper rate setting, or insufficient training of employees.

There might be inefficiencies reflected in several of these reports, the reason therefor being quite apparent from a study of the ratio of piece work to day work report, such as, falling off of per cent of piece work to day work in relation to the period when the standards were set.

It is understood, of course, that all of the detail and distribution just described is carried through the general books by means of control accounts, which are finally cleared to the cost of finished product.

Conclusion

An attempt has been made in this article to present the manner in which labor is controlled at the source through the medium of executive control of employment and rate changes. Labor payment is controlled through proper records of services rendered, approved by the executive in immediate charge of the labor. It might be said that the labor has been secured and paid for and it now remains to properly control the use of it. The distribution records that have been described are designed almost exclusively with the thought in mind of furnishing the executives responsible with proper control figures.

As stated previously, this article has had to deal largely with generalities. To describe in detail our own system would consume

too much space. The use of the tabulating machine in our business would alone take up considerable space; furthermore, we have found that methods in use in connection with tabulating machines are almost entirely peculiar to our own requirements.

In closing, there is one point that should be emphasized and that is that the control of labor can only be accomplished by furnishing the management with information that fits the requirements and focuses attention on abnormal or subnormal conditions which are in need of executive action.

The following material was supplied by Charles A. Williams, Comptroller, American Safety Razor Corporation, Brooklyn, N. Y.

In treating the primary elements which enter into the cost of manufacturing, namely, labor, material and overhead expense, the element of labor should give the least trouble. In handling labor costs, fixed values are dealt with in that the cost of labor by the hour or by the piece is a fixed amount for each employee. Therefore, if accurate record is kept of the number of hours and the number of units produced by each man, it is purely a matter of mathematics to convert these values into dollars. With a schedule of accounts against which costs are desired, the problem of allocating these labor values to the accounts is a simple matter of accounting and the total represents the money spent for labor in a given period. There are, however, certain considerations of importance in obtaining these results. The fact that the keeping of labor costs is not a difficult problem is likely to be the reason that it is in many cases poorly done, insufficient attention being given to many details which in the end results in erroneous cost figures.

It goes without saying that the first consideration is to make sure that no one is on the payroll who does not actually perform some service. This has a bearing on obtaining accurate costs because if a condition did exist wherein the payroll was inflated, the conclusions drawn from the resulting cost figures might be sufficiently in error to cause wrong decisions of manufacturing policy, resulting in important losses other than those directly attributable to the payroll inflation. The safeguard against this, of course, is the customary time clock, which is rung by each employee when entering and when leaving. In addition to the clock, it is important that all overtime be approved by the foreman of each department, not only to discourage the practice of working overtime, but to guard against paying for overtime when no work is actually done.

Written authorizations for the addition of names to the payroll are important and should in all cases be used. The employment authorizations should be counter-checked by the time-keepers and in cases where employees' badges, locker keys, etc., are provided, these features give additional means for checking the correctness of additions to the payroll.

While the time clock checks the arrival and departure of each employee, it is quite necessary and advisable to have timekeepers who actually check every man at his work several times daily. This checking, of course, can be combined with the obtaining of the distribution of each man's time for the cost accounts but even where the distribution feature is unnecessary the employee, for obvious reasons, should be checked while actually at work.

After installing the necessary system for insuring the accuracy of the payroll as regards names and hours, consideration should be given to the correct distribution of the payroll expense to departments, jobs and operations. For this purpose supplementary time cards are advisable as the clock cards showing the entering and leaving time have served their purpose in that respect and it is unwise to attempt to combine with them any additional time checking for distribution purposes. Supplementary time cards are for the purpose of obtaining payroll distribution and can be handled by the time checkers in each department. When a man works on more than one job or operation, a number of cards would be made for the same man. These cards should show the employee's number, department, operation, quantity of production, hours and earnings. It is important that the supplementary cards be checked against the clock cards, thereby additionally safeguarding the clock card record and insuring that in the case of each employee the number of hours shown on the supplementary cards is not less than nor in excess of the hours indicated on the clock card. The balance in hours between each man's clock card and his supplementary cards prepared by the timekeepers is important and should be ascertained before proceeding further with any of the records.

In this connection a word might be said about the counting of the articles or units produced by each employee. Where the work is of a repetitive nature, this is easily done by placing automatic counters on the machines. Such work as cannot be counted in this manner may be laid out in trays or other containers of a stated capacity. The use of these two features will be found of considerable assistance in obtaining correct results.

Having obtained cards which show the work done by each man and having balanced them against each man's clock card, the next consideration is the correct tabulation of the data obtained by the timekeepers in checking the employees at their work, as shown by the supplementary cards. Where the volume of work warrants it, it is advisable to take advantage of the automatic tabulating machines which are now on the market and which are coming into more constant use every day. It does not take a great volume of work to make it worth while to use such a machine, and the accuracy of the results, to say nothing of the saving in clerical labor, certainly justifies their use wherever possible. Therefore, the cards prepared by the timekeepers should be designed for use on one of these tabulating machines. This may be done by having the left

hand portion of the card designed to take data in writing, and the right hand portion designed for punching for the tabulating machine. This means, of course, that the various departments, jobs, operations and accounts of all kinds must be coded, but the coding of data of this sort does not present any great problem. It simply means a carefully prepared numerical code which should be flexible enough to permit of additions when necessary. After these cards are punched, the punching should be checked against the written portion of each card before the cards are tabulated. From these cards it is very easy to tabulate the earnings of each employee, the hours and the amounts chargeable to each account, the quantity of each article produced, and any other data which may be desired.

The transferring of the figures thus obtained into the cost records is simply a matter of bookkeeping. The cost accounts to which the labor is distributed, of course, should be carefully laid out in order that the results may be intelligently applied.

An important function of labor cost is to measure the efficiency of the labor. To do this the figures obtained which show the actual results should be measured against what is known should be produced in a given time under given conditions. The judgment of production should, of course, give consideration to the quality as well as the quantity. The quality is a matter of inspection and supervision. The quantity, however, is a matter of knowing what should be expected from each machine, if machine work is done, and from each bench, if hand work is done. Most plants have both machine work and hand work. At this point it is advisable to institute time studies conducted with the idea of finding out what may be considered normal production, and not with the idea of forcing abnormal production. Without going into the question of time studies in detail, the various purposes which they serve, and the various methods of making them, it is important to note that, regardless of other considerations, time studies should be made in every plant, even if they are very elementary, in order that there may be some measure of the efficiency of labor and something on which to base intelligent efforts to reduce labor costs.

There are other factors which, while they are not directly related to the control of labor, nevertheless may be the cause of excessive labor costs. One of these factors is to keep the material flowing smoothly to and away from the machines and work benches, and another factor is to keep the machines and all of the equipment free from breakdown in order to insure a minimum interruption of production. Any failure to cause either or both of these factors to function as efficiently as possible is sure to result in wasted time, inefficient work, and full value will not be obtained for the money expended for labor.

There are problems of detail in every plant which require solution, but these general considerations may help in laying a foundation upon which accurate and useful labor costs can be built.

The following material was supplied by David W. Hook, Consolidated Safety Pin Company, Bloomfield, N. J.

In compiling costs one should endeavor to have the system as simple as possible, so that the actual machinery in assembling the data would not be more expensive to operate than the results obtained would justify. This is liable to be especially true where the costs per unit are very small.

After years of experience I believe the following Process Labor Cost system, is about as simple and accurate as could be devised, and will meet the requirements in similar conditions.

Process Costs are obtained by taking the total production for a department or operation, for a certain period and dividing it into the total labor for the same period for that department or operation. The important thing is to accurately assemble the production, and all the labor belonging to that operation during the time specified, and where the operations are similiar in a whole department, the labor costs will be sufficiently accurate to take the totals for that whole department.

To get the accurate production it is necessary to require that the production of each machine or operator daily be reported by a production ticket or other means, which would be assembled according to brands or sizes and a grand total made for the period desired. For most purposes it is not necessary usually to assemble the labor so minutely but only to get a total cost of the whole operation or department for that period. This is best accomplished by having all operators on the payroll arranged in the payroll book or sheets according to departments; also by productive and nonproductive workers. In totaling the payroll each week the clerk will first make a total of each department, then a total of all the departments for the total payroll. These totals are copied on to a ten column analysis sheet with the symbols of the departments along the left hand margin. The first week's payroll for the period is written in the next column to the right, and the second in the next and so on for the period, say one month. Some months might have four weeks and some five; but care should be taken to compile the production and labor for exactly the same period.

At the end of the month totals for each department should be taken horizontally across the sheet, writing the totals in the sixth column. Some of the productive workers have doubtless been transferred during the month from one department to another "temporarily," on account of their machine being down for repair or other reasons. A careful record should be kept of these transfers on a journal sheet; debiting the department receiving the worker and crediting the department from which the worker is sent. At the end of the period all the debits should equal the credits. These transfers should be indicated in the seventh and eighth columns of the labor analysis sheet referred to above, either subtracting or adding to the proper department as the case may be. In the ninth

column could be entered any bonuses or extra wages paid out during the month not appearing in the regular payroll book, so that the grand total made in the last or tenth column would equal the amount paid out for labor as indicated in the general books of the company.

For the productive labor the above totals are usually accurate enough but not so for the non-productive labor.

Doubtless there has been considerable maintenance and repair work done by the machine shop workmen for the different departments during the month. Also, some of the departmental machinists might work in more than one department, and it is necessary to have the time so spent properly indicated on time tickets or cards. A columnar analysis sheet should be kept for the non-productive workers for the month, a column provided for each department, and the different machines indicated in red ink in the proper column. Then as the different time tickets come in it is a simple matter to post the time and pay to the proper account quickly. The time of the machine shop could be written down in purple ink to distinguish it from the others, and a total made separately of this if desired. Care should be taken that the time of all inspectors, foremen, watchmen, weighers of work and other non-productive workers be properly posted to the proper account. The totals of each department, should be made and compared with the payroll total, and a new revised total made, the grand total of which would equal the total of the payroll figures.

We now have the total production of each department, as well as the total productive and non-productive labor for the same period. It is a simple matter to divide the total production into each of these and so get the cost per unit for the month, which labor costs are reconciled with actual total cash paid out by the company.

All these different totals and costs for the period should be arranged so that comparison could be easily made for the different periods of the year and unfavorable conditions determined and means taken for correcting them.

A comparative record follows:

COMPARATIVE PRODUCTION RECORD AND COST PER UNIT OF LABOR BY DEPARTMENTS

Department	*January*	*February*	*March*	*April*
Production 1st Week	23,293	27,873	29,311	28,364
Production 2nd Week	26,143	27,496	32,541	28,789
Production 3rd Week	28,071	27,543	32,319	26,940
Production 4th Week	28,083	22,831	33,074	29,235
Production 5th Week	26,727			29,618
TOTAL FOR MONTH	132,317	105,743	127,245	142,946
Productive Labor	$ 1,302	$ 1,049	$ 1,229	$ 1,308
Non-Prod. Labor	$ 1,092	$ 862	$ 836	$ 1,038
Total Labor	$ 2,394	$ 1,911	$ 2,065	$ 2,346
Cost 100 Gr. Prod. Labor	.99	.99	.96	.91
Cost 100 Gr. Non-Pro. Labor	.84	.81	.66	.72
Cost 100 Gr. Total Labor	1.83	1.80	1.62	1.63

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