

sent through if found in error in either way. All of which resulted in a general good feeling.

Any piece of work entails three fundamental considerations; first, what implements are to be used; second, how it is to be done; and third, the length of time required for its performance. The time required is the all-important consideration, for both means and method are significant chiefly as they affect the time taken. To set a rate at which work should be performed necessitates a preliminary standardization of both the implements to be employed and the method to be followed. The best results are obtained only when these steps have been taken.

An investigation to increase output calls for time study, for time primarily is concerned; therefore time study has for its object: first, the determination of possible improvements in the equipment and in surrounding conditions for producing a given piece of work; second, the determination of possible improvement in the method of actually performing the work; third, the determination of a unit time in which a given piece of work should be finished. Properly speaking the main object of time study is to determine the time for the task; the first two enumerated objects being rather of the nature of analysis and simplification of the motions preparatory to time study—in reality, motion study.

Time study is essentially constructive in its function, for its ultimate object is to arrive at a fair and equitable rate at which work should be done, and this is reached only after each act, incidental in any way to the completion of the operation, has been carefully analyzed and made as convenient and easy as possible for the op-

erator, and all unnecessary motions are eliminated. A detail analysis of all the elements that enter into the completion of the task is made, and the most effective method of operation determined in advance. The fundamental principle underlying time study is that the greatest material gain to the employer is possible only when the employee gains correspondingly and the responsibility for gain is divided equitably between the management and the workers.

No time study should be taken without first thoroughly acquainting those who are in any way connected with the work that it is to be studied, and with the objects of time study and the benefits derived therefrom; and the confidence and full consent of the workmen should be secured.

In taking a time study, there should be made: first, a careful survey of the work and all of the influencing conditions; second, an analytical breaking down of the task into simple elements; third, an observation and record of the time taken in performing each of the elementary operations; and fourth, an analytical study of the recorded unit times. To make use of the data collected for determining a rate at which work should be performed, a fair standard is determined for each one of the elementary operations, due and fair consideration being given to the character of the work and the demands upon the operator. Finally, there is prepared from the time study analysis an instruction card that shows the elementary motions, in the proper sequence, and the standard time for each, there being included an allowance for fatigue and other unavoidable delays. This total constitutes the time in which the work can be performed by an efficient worker.

THESE are many reasons why it is imperative that these problems of human organization within our industries should be solved. I will mention three outstanding ones:

Firstly, productivity depends not only on good engineering, good mechanical devices and good financing, but also on effective personnel administration. A machine can be bought but we must get cooperation from our employees.

Secondly, there is the matter of creating sound human values. If in our factories the handling of human problems is ignored we cannot have sound human values in the community generally, and,

Thirdly, the best melting pot for our social classes is in manufacturing establishments. It is not only a matter of creating a proper understanding between the manual laborers and the monied classes, but also of a proper understanding between manual laborers and the intellectual and professional classes. It is most important that the rank and file appreciate the value of brains in our social structures. Unless executives sell themselves to the rank and file in the plant and factory I do not know how this appreciation can take place. (Sam A. Lewisohn in *American Management Review*, Vol. xii, No. 1, p. 9.)

LABOR CLASSIFICATION AND PAY-ROLL ANALYSIS¹

By CARLETON F. BROWN²

THE subject which I am to discuss to-night has long been a matter of controversy. Opinions have been almost as numerous as those who held them. We ourselves have in the past been possessed of not one but many at various times.

In presenting our method of solving the problem—a method which we have tested, tried and found satisfactory—I desire to have you bear in mind the following points:

First; My purpose is to classify labor into its primary activities and is not so much concerned with the manner in which it is ultimately charged or distributed. For example, two men may be placed in the same classification, but the product of their efforts may, for purposes of cost distribution, fall under different headings.

Second; The labor or pay roll discussed herein pertains solely to the factory. Selling and general administrative expenses are not included.

Third; Labor as used herein is to be accepted in its broadest sense and to include every individual normal to manufacturing operations from the Works Manager or Superintendent down. This interpretation is equally true of the use of the words "Pay Roll." Methods of pay, whether by the hour, day, week or month, are ignored.

In any manufacturing enterprise labor has been considered, as a general thing, the most important element, although it has not as a rule been given such a broad definition as that above. Rather the tendency has been to limit it to those who work with their hands in the manufacture of the product or perhaps in some cases engaged in other supplemental activities. Another broad way of looking at it has been to consider those who are paid an hourly wage as labor, and those who work by the week or the month as something else.

In broadening the definition of the term labor, I do so with the specific object of bringing into the picture

of our plant activities the entire force of workers, whether their efforts be physical, mental or clerical, in order that the inter-relation between such activities may be properly presented.

Now it has been considered that the worker, who with his hands produced or aided in the production of the product which was intended for sale, was the one factor indispensable to the enterprise. The work of all others was in a sense auxiliary or supplemental thereto. This type of worker was called productive because he "produced" the goods which were sold.

The producer, however, had to have help; some one was needed to order material for him; others were needed to look after this material when it was received; and still others were required to direct and supervise his efforts. These were called "non-producers" in contra distinction to the "producers."

It then happened that as a manufacturing business grew, it was found that other enterprises should be engaged in because it was either profitable or convenient to do so. In this type of activity, product was not intended for sale but was to be utilized by the enterprise itself. This developed a third class of workers, many of whom engaged themselves in productive effort. Such productive effort, however, was distinct from that of the first class in that it was not directly applied to the product but to articles of supplementary manufacture.

And yet again, other workers were required—men necessary to the proper conduct of the business, not as clerks or supervisors but as skilled physical labor, such as millwrights or carpenters.

As a result of these varied activities a confusion naturally arose as to who were producers and who were not producers, and there being no practical agreement on the question, various manufacturers went their own ways and not only did their ideas differ from the ideas of other manufacturers, thereby making comparisons impossible, but their own ideas changed from time to time, thereby rendering it difficult to make comparisons

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