and is therefore not recommended as a method to be followed.

Assuming that the time study man has secured the right man for the job and that the conditions surrounding the job are as right as they can be, he should make a thorough analysis of the task to determine points at which time might be lost. He is then in a position to arrive at the correct allowance to make for the flexibility factor on that job.

In these notes I have tried to point out the factors which enter into allowance computation and, assuming that we were encountering a new problem, I have tried to illustrate the method of solution for each particular phase.

In summary, let us remember that allowances are divided into two classes—the incidental allowance and the standard allowance. Assuming that our scheme of allowance computation ties in with the balance of the industrial engineering procedure, we may state that incidental allowances are generally evaluated by the observer while on the job, while the standard allowance is determined by arbitration and experimentation, covering a more extended period.

In each case a percentage factor or time allowance is reckoned which, when added to our base synthetic time, produces a standard, the achievement of which is within the ability of the average experienced employe.

However, the problem of the correlation of these details remains unsolved. Obviously, allowance determination would be a difficult matter if such an involved procedure was necessary on each task. It is fortunate for us that we may resort to mathematics for, first, a graphical solution of the problem, and second, an empirical equation to conform to the pre-reckoned charting. Through the addition of an allowance from the curve thus derived a theoretic base time may be converted into a workable standard.

Each basic industry has its own problems to meet and accordingly a plan applicable in one situation will not suit another. Hence, in getting into a new field of work it is essential that the allowance factor be set up according to the needs of the industry. It is advisable, also, to follow a definite and scientific procedure, the determination of which will depend on the problem confronting the organization at the time.

The Production Study as a Check

By L. W. HASKELL
Dodge Brothers, Inc., Detroit, Mich.

OF ALL the great economists that I have read, I have yet to read one who has valued the importance of time. Any industrial engineer who devotes himself to the study of the utilization of time is looked upon by the average layman as a robber, because this layman thinks that the time study man is trying to get something for nothing. In reality the man that fully appreciates the importance of time and insists that his co-workers utilize their time, without waste, for productive purposes, is doing as much to elevate the standard of living, to make the luxuries of today the necessities of tomorrow, as any other person or persons following any line of endeavor.

Time was apportioned to man by the Deity. He shows no partiality. He allotted the same time equally to the hobo and to the capitalist. The only difference is that the former spends it and the latter invests it. I firmly believe that the big majority of us are capitalists, and I make this statement advisedly. Capital is but a word, though it means the accumulated difference between individual or group production and the corresponding consumption. For this reason any man who works, either with his head or with his hands, and saves a part of his income, whether it be for the purpose of buying a bond, a home, to educate his children or to have a little surplus for old age, is just as much a capitalist as a Morgan or a Rothschild. To me it is just as absurd for capital and labor to fight as it would be for the thumb and finger of the same hand to fail to co-operate.

It was undoubtedly a part of the great plan of things that man was created with an independent individuality and, with it, a varying degree of reasoning faculties. It seems that, through the economic conditions which are constantly becoming more complex, men are more dependent upon one another than ever before, and our mutual trust in each other is of paramount importance. The public at large demands that we have dependable men. In an effort to make themselves more dependable, men have unconsciously concentrated their studies and efforts on separate phases of this complex whole, and so have become specialists. This is the reason for specialists, and their ever increasing

numbers, together with the intensity of the degree of specialization, show the trend of advance in civilization in this direction. Naturally we have our specialists in time study.

One of the largest manufacturers and producers of the present day does not admit having made a mistake. Errors in judgment are called by him increase in experience. Time study men are human. Humans make mistakes. Errors, entirely mistakes of the mind, occasionally creep into time study conclusions.

Time is money. A time study is made to determine the monitary value of an operation. It is an erroneous idea that time study is made only for a determination of a wage. The breadth of time study endeavor includes the collection of data, the bearing on plant load, quotas, fixed investments, cost estimation, fixing a wage, and many other factors.

In case a time study is made for determining a wage, discontent on the part of a workman may arise. With the possibilities of error, it is absolutely fitting and proper that every step be taken to prove to all concerned whether the workman or the study is fair.

It is about wages directly or indirectly that most serious industrial disputes arise. The individual is born with the instinct of self-preservation. We have interposed a device of wages between basic needs and their satisfactions. Wages, therefore, acquire the importance of both, and it must also be remembered they are the cushion between a state of anarchy and civilization.

We have societies of many kinds. We have our legislature with its endless debates. We have laws, so many in fact, that if we did not break some of them ourselves we would be a paralyzed nation. But where is there a rational study being made of wages, relative to work being done, by any other group than the time study engineers?

Time study in its present state has such a close relation to wages that it behooves men responsible for the studies to see that they are carefully and scientifically made. Fairness must be the keynote of the whole, if our work is to be a real benefit to mankind and to be perpetuated for future generations.

In my opinion, the best known means of checking a questionable time study is through a production study. In a well known automobile factory where an argument between the production division and the budget and rates division occurs, this is the instrument which is used to settle the dispute. They also use it in establishing a rate where the job is so full of variables that an equitable rate cannot be established through their regular time study procedure. The operations of straightening, metal finishing, cleaning, etc., are examples.

In illustration of the principles I have outlined, I wish to cite a case which came to my attention last week. Our time study engineer was checking some temporary rates he had set in the sheet metal hammer room. The results of these studies reduced the cost established through the temporary rates. The hammer men worked on their new prices for a few days and found that even the best of them could not make $1.50 per hour while working on the left hand fender. Therefore, we were asked to prove the equity of the reduction that had been made in the rate.

Checking our original study on the job, we found a note, transferred from part No. 37264, Front Fender Right Hand. In an automobile there are many parts which are identical except that they are right and left hand, and to conserve time and space studies are transferred from one to the other. Taking this study, we rechecked it for clerical errors and found everything all right as far as the study itself was concerned. As the very nature of the job makes it extremely difficult to get an accurate time, and as there was also dissension on the job, we decided to make a production study.

Another time study engineer was chosen to make this study, as he was neutral in the argument. He was not acquainted with the previous study, and therefore went on the job with an open mind.

After consultation with the foreman, one of the best hammermen was selected for the study. Using our standard time study form, the study began. First, by recording all the conditions as outlined on the form, breaking the operation down into its natural elements, and using a continuous running watch every move of the operator and all delays were recorded. (These delays are elements which do not recur in the performance of the operation.) This study was continued for a period of four hours and thirty minutes, three hours and thirty minutes being devoted to the study of the elements in this operation. In the course of this time, both right and left hand fenders had been run.