

typical sampling from each group obtained. No engineer would begin the development of scientific management by taking time studies of each individual operation.

Except for purposes of analysis, or the setting of standards, time study should never be used in an office. Its purpose is not to discover the entire time in which an operation can be performed, but the time required to perform each of the elements of an operation. So the attempt to find out "how long it takes the clerk to do it," whatever else it may be, is assuredly not a time study. Except for purposes of analysis the stop watch has no place in scientific management, and experiments made with it without the knowledge of the worker and his intelligent co-operation, are worthless. It is even worse than useless when used secretly, for when the worker discovers what is being done to him he will naturally resent the procedure, to the impairment of his good will and the office morale generally.

Recently I called at the office of one of my clients and the general manager had a very interesting story to tell me. He said that one of his girls had resigned, and when he asked for the reason, she said that she was not going to work where they took time studies of the length of time it took a girl to blow her nose. The next day one of the directors of the company called up and said, "I think you are carrying this efficiency business too far. I don't think you ought to make a time study every time a girl blows her nose." By this time the manager thought he ought to investigate and find out what it was all about.

There was a young man in the office who had been working under me. In his eagerness to learn something about simplification in management he had mentioned the subject of time study. I was not ready to do any time study work there, however, and had not gone into detail. He was very anxious to experiment and therefore bought a stop watch of his own. He was a little bit afraid to do the timing openly, and so pulled out the front drawer of his desk and put the watch in there. He could then time the girls without their knowing it, he supposed, and get his time study experience in this way.

It transpired that the girl he happened to be timing had a very bad cold. He had heard me say that in making these observations he should be

very careful to get down everything he saw, so he noted the fact that the young lady had a cold and every time she blew her nose he noted, "Blew nose." One of the girls saw the record, and that is how the story started. No secret time studies should ever be made under any circumstances.

As before mentioned, the real purpose of a time study is to divide into its elemental times, or units, the time required to do a certain piece of work. At first the observer may have some difficulty in separating the motions, especially if they are being performed by a fast and skillful worker, but after some practice these difficulties will disappear.

Practically all office work will be found to consist of six elementary units:

1. *Preparatory Work.* In practically every operation there is a certain amount of preparatory work which differs in volume according to the operation. Thus, in running a stencil on a duplicating machine, the stencil must be put on the machine, the latter cleaned, inked and adjusted for use. If a letter is to be typewritten, the preparatory work may apply either to all the letters written within the day (such as cleaning the type or putting on a new ribbon), or to the mere setting of the machine for writing and the insertion of the paper.

2. *Sorting or Arranging Work.* This is an important element in all office operations.

3. *Searching and Finding.* This applies to every operation; in some it is a minor matter, in others, as in filing of all sorts, a very important one.

4. *Performing the Work.* This applies to the actual motions only, such as typing a letter, making an entry, or putting a letter into the files. Few examples of this element will of course be comparable.

5. *Removing Work* (or returning to position). This also applies to most office operations.

6. *Adjustment of Next Operation.*

These units may in many cases repeat themselves, and their performance is not necessarily in the sequence I have given.

A sufficient number of time studies of operations should be made to make possible the setting of standards. The longer the operation, it may be stated in general, the fewer the studies required, and vice versa. If the length of time consumed is five minutes, I generally make ten studies; if two minutes, fifteen studies; if one minute, thirty studies. For those of half a minute or less, sixty studies are required. On the whole it is better to

have too many than too few, and perhaps it would be well for beginners to take twice as many as I have mentioned as my practice. A greater degree of accuracy will be assured.

A special form for recording these observations of elemental times should be provided, and as in all scientific investigations, everything that transpires is recorded. The sheet should be designed with this object in view. Many times in this work things are omitted which are afterwards found to have a distinct bearing on the problem, and if what is recorded cannot be used it can be readily dropped.

Great care should be taken in the selection of the person whose work is to be studied. The best clerk in any particular task should always be chosen. A time study should never be made of an inferior worker. The person to be studied should also be fully prepared for the experiment and should be convinced that it is no ordeal or trial. It should be made clear that its purpose is not to find out how fast *he* can perform the task, but rather that it is an impersonal scientific experiment in which he has been selected to take a part. The use of the stop watch should be explained to him as a necessity, not for timing him as an individual, but for discovering the elemental times of the various portions of the task. Very often you will come across people who are stop watch shy. I handle that type of person by having a little talk with him and explaining what we are trying to do and how the watch works. Then I usually leave the watch with him, suggesting that he try to figure out for himself how long the work takes, and go away. Of course, he very soon finds that he cannot time study himself, but his resistance is very easily overcome, and when I go back he is quite willing to have me proceed with the study. In short, his entire confidence should be gained before attempting the time study. The observer will then secure his willing and intelligent co-operation. No distrust or nervousness on his part will be likely to mar the experiment. As a matter of fact, the time lost in the most extensive explanation is not wasted. The more intelligent the person selected, the more readily will he comprehend what is desired and become interested in the work.

In making time studies, allowance must always be made for delays, and for this reason the sum of the times of the units of an operation cannot be

considered as the total time to be allowed. In the actual work, delays are bound to occur; some avoidable; and others that cannot possibly be avoided.

The unavoidable delays are those which are inherent in the work or the worker. No clerk can possibly work at top speed every minute of the day, so fatigue is one of the factors for which an allowance must be made in the standard. Clerks will also have occasion to stop now and then, for other reasons than actual fatigue. Again, it is not to be expected that work will always flow smoothly without a hitch of any kind, not even in the well organized office. In setting standards these facts must always be taken into consideration and allowed for, as unforeseen and unavoidable.

It is true that no definite allowance can be made for fatigue, for it varies with the individual and has not as yet been measured. This allowance, though it cannot in the nature of the circumstances be definite, should be liberal. In short, the standard maker will recognize it as an unknown quantity, to be estimated only.

The avoidable delays which occur are invariably to be attributed to some failure or shortcoming in the management. Machines that have not been carefully attended to may break down, or work may not be delivered in time. A small allowance should be made for these, but it is far better to have them recorded and steps taken to avoid them in the future.

In looking over some old records, I found several examples of time studies which I made as far back as 1915. They do not differ essentially from those of today except that they are made in seconds. The result obtained from them is much the same as that secured from present day studies. Here is the first, a study in filling and packing supply orders:

November 15, 1915.

Time Study

Operation: Filling and packing supply orders.

To check previous studies, which seemed to be too high, a study was made on twenty-four miscellaneous supply orders for packing and filling.

Item	Seconds
Time to fill.....	333
Average time per order.....	13.5
Time to pack.....	95

Total..... 441.5 seconds