

individual piece rates were also considered, there were discrepancies of as much as fifty per cent.

In a plant in another industry, the piece rate on a new style was carefully estimated by an intelligent foreman. In spite of this the operative earned a little more than double the hourly rate the foreman figured he should earn. In other words, the foreman's careful estimate of the time standard was over one hundred per cent high. Estimates such as these are just as likely to be wrong in the other direction.

There is another type of so-called time standardization that frequently is carried on as a fixed policy. The purpose is to set rates quickly. It results, however, not only in inaccurate times, but in the necessity of timing the operations on every new style or part, instead of utilizing the unit times obtained by thorough analytical study to quickly set the new time. These "get rich quick" methods take no note of the method of performing the operation and make arbitrary allowance for the speed of the operator, relying entirely on judgment to fix the allowance and set up new independent times for each job.

This scheme had been in operation in a plant making machinery of complicated and diverse design requiring an immense diversity of small parts, many of them made up very infrequently. When an order for a new part came along, instead of utilizing data on file, the time study man would go out to the operative and take an observation on the first part of a lot, which might occupy the worker from less than one to three days. From these few studies on this one man he would set a rate, guessing at the proper allowance for rest and the variation in speed of the worker from the average. The results were, as would be expected, a heterogeneous set of times and rates, with no uniformity. For example, in checking the so-called standards, it was found that two machine parts, precisely alike but carrying different numbers because belonging on different parts of a machine, were given at different times separate piece prices differing by twenty-five per cent. In other words, two identical operations were "standardized" at different times, with a twenty-five per cent variation in the rate.

True, this method of setting standards begins to show results immediately, but it never comes to an end. On the other hand, the methods which give accurate results are simple and scientific, require

much less time and labor, taking all in all, and, as time goes on, reduce the time study work to a minimum.

A discussion of improper methods is scarcely complete without reference to certain practices of employers, which fortunately are growing infrequent, those of using time study for undue speeding up. As a matter of fact, in practice, such purposes soon defeat themselves. On the other hand, the stop-watch is an effective tool for labor co-operation, because through it facts may be established that cannot be gainsaid. In practice, contrary to common belief, it is the workman who appreciates, even more quickly than the employer, the value to him of real time study and it is he who can gauge the correctness of its operation.

Fixing Time Standards in a Shoe Shop

Because of the vital importance of understanding the fundamental principles of unit times, let us take up a special case in rather elementary fashion.

The operation is one in shoe making called "hand folding." In various parts of a shoe, the raw edge of the leather, after skiving to a tapering edge (another operation), is cemented, turned back over itself by hand, and sealed with blows of a hammer to show a neatly rounded edge. At sharp curves or angles the edge has to be clipped or "snipped" to take the curve. In Figure 1 are shown pieces of leather on four different styles of shoes. One is a top, another is a tongue, a third a tongue of a different style of shoe and the fourth is another top, very different in style.

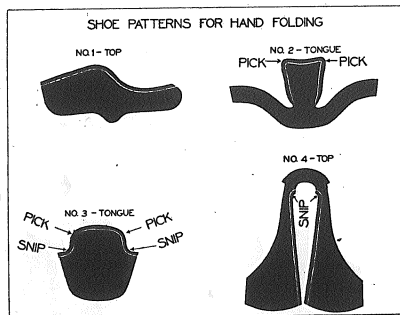


Figure 1

In making each of these varied pieces, and in fact for all hand folding, there are just five elements or units which make up the operation.

These are: (1) cement, for which the time is taken from a standard curve made up from time study to give the variations in time according to the length of fold; (2) snip, a constant time for each concave curve; (3) fold, a constant time per inch of edge to be folded; (4) pick, a constant time to pick in and smooth a convex curve of ninety per cent or less; (5) handle, which covers the laying aside of a complete piece and placing the next piece ready to be folded.

The following table gives the unit times on each of the four pieces shown in Figure 2.

STANDARD TIMES ON HAND FOLDING*

No. 1 Top Minutes	No. 2 Tongue Minutes	No. 3 Tongue Minutes	No. 4 Top Minutes
0.068 Cement 8"	0.062 Cement 6"	0.059 Cement 5"	0.077 Cement 12"
0.093 Handle	0.093 Handle	0.093 Handle	0.093 Handle
0.220 Fold 8"	0.165 Fold 6"	0.114 Two Snips	0.114 Two Snips
		0.138 Fold 5"	0.330 Fold 12"
	0.156 Two Picks	0.156 Two Picks	
0.381 Total	0.476 Total	0.560 Total	0.614 Total

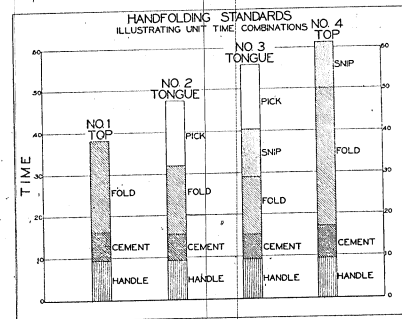


Figure 2

Notice that in No. 1 there are only three operations—handle, cement and fold, with a total time of 0.38 minutes.

In No. 2, we have handle, cement, fold and also pick, with a total time of 0.47 minutes. In other words, in order to get the leather round the corner

in this case, the tool had to be used to make the necessary pickers.

In No. 3, there are two picks, two snips, and in addition the edge of the leather at the convex curve is nicked every one-eighth inch, so that the edge can be folded back on itself. The total time here is 0.56 minutes.

In the fourth case, without picking, since there is no interior corner, the total time is 0.61 minutes because of the extra length to cement and to fold.

Now, as has been said, each of these total times, and in fact the times of some three hundred different styles of pieces in this one shoe shop, are made up from a combination of these five elements. When a new style of shoe comes in, it is simply

necessary to select from the basic curves and tables the unit times for the new shape and add the figures together. It is evident that it is absolutely impossible to estimate the times for a new style from simple inspection of the piece, and yet this is the way that rates are fixed in most shoe shops as well as in many other industries. Either the foreman fixes the rate haphazardly, without regard to the time element, or else the foreman and a representative of the workmen get together and haggle over the matter.

The unit time method we have described, on the other hand, represents clearly the value of accurate time study in providing for variations in character of work and for setting incentives.

Time Standards in Production Control

The use of time and motion study as a broad gauge tool of management, as well as for the pur-

*These samples are four actual cases out of some three hundred different folding jobs in a particular shoe shop. To avoid unjustified comparison, however, the unit times have been altered and cannot be checked against actual or standard times in any factory.