

The late James M. Dodge told a story to the effect that shortly after the Taylor System had been installed in the shops of the Link-Belt Co., a friend of his—the head of a large machine works—after seeing and having explained to him the slide rules by which the proper combination of feed, speed and depth of cut are computed, persuaded Mr. Dodge to lend him one for a day or two in order that he might show it to his superintendent and foreman. A short time later Mr. Dodge heard that this friend had stated at a meeting of some kind that “he had tried the Taylor System in his shop but that it had proved a failure.” Upon investigation it was found that he had taken the slide rule—specially designed for a machine in which the speeds and feeds had been standardized, as had also been the cone and countershaft belts, and in which were used standard cutting tools—and had tried to operate according to it a machine in his shop for which none of the conditions had been standardized!

It is indeed surprising that the importance of standards in the attainment of results should be so little understood or appreciated. Only ignorance, the adherence to policies of “penny wisdom and pound foolishness,” reluctance to assume responsibility, or sheer indifference on the part of the management can account for it.

In the paper “Shop Management” Mr. Taylor made the following statements with reference to standards:

“In many cases the greatest good resulting from the application of these systems is the indirect gain which comes from the enforced standardization of all details and conditions, large and small, surrounding the work. All of the ordinary systems can be and are almost always applied without adopting and maintaining thorough shop standards. But the task idea can not be carried out without them.

The adoption and maintenance of standard tools, fixtures and appliances down to the smallest item throughout the works and office, as well as the adoption of standard methods of doing all operations which are repeated, is a matter of importance, so that under similar conditions the same appliances and methods shall be used throughout the plant. This is an absolutely necessary preliminary to success in assigning daily tasks which are fair and which can be carried out with certainty.

One of the most important functions of the planning room is that of the maintenance of the entire system, and of standard methods and appliances throughout the establishment, including the planning room itself.

By the adoption of standards, and the use of instruction cards for overhauling machinery, etc., and the use of a tickler, the writer reduced the repair force of the Midvale Steel Works to one-third its size while he was in the position of master mechanic. (There was no planning department, however, in the works at the time.)

It would seem almost unnecessary to dwell upon the desirability of standardizing, not only all of the tools, appliances and implements throughout the works and office, but also the methods to be used in the multitude of small operations which are repeated day after day. There are many good managers of the old school, however, who feel that this standardization is not only unnecessary but that it is undesirable, their principal reason being that it is better to allow each

workman to develop his individuality by choosing the particular implements and methods which suit him best. And there is considerable weight in this contention when the scheme of management is to allow each workman to do the work as he pleases and hold him responsible for results. Unfortunately, in ninety-nine out of a hundred such cases only the first part of this plan is carried out. The workman chooses his own methods and implements but is not held in any strict sense accountable unless the quality of the work is so poor or the quantity turned out is so small as to almost amount to a scandal. In the type of management advocated by the writer, this complete standardization of all details and methods is not only desirable but absolutely indispensable as a preliminary to specifying the time in which each operation shall be done, and then insisting that it shall be done within the time allowed.

Neglecting to take the time and trouble to thoroughly standardize all of such methods and details is one of the chief causes for setbacks and failure in introducing this system. Much better results can be attained, even if poor standards be adopted, than can be reached if some of a given class of implements are the best of their kind while others are poor. It is uniformity that is required. Better have them uniformly second class than mainly first—with some second and some third class thrown in at random. In the latter case the workmen will almost always adopt the pace which conforms to the third class instead of the first or second. In fact, however, it is not a matter involving any great expense or time to select in each case standard implements which shall be nearly the best or the best of their kinds. The writer has never failed to make enormous gains in the economy of running by the adoption of standards.

It was in the course of making a series of experiments with various air hardening tool steels with a view to adopting a standard for the Bethlehem works that Mr. White, together with the writer, discovered the Taylor-White process of treating tool steel, which marks a distinct improvement in the art; and the fact that this improvement was made not by manufacturers of tool steel but in the course of the adoption of standards, shows both the necessity and fruitfulness of methodical and careful investigation in the choice of much neglected details. The economy to be gained through the adoption of uniform standards is hardly realized at all by the managers of this country. No better illustration of this fact is needed than that of the present condition of the cutting tools used throughout the machine shops of the United States. Hardly a shop can be found in which tools made from a dozen different qualities of steel are not used side by side, in many cases with little or no means of telling one make from another; and in addition, the shape of the cutting edge of the tool is in most cases left to the fancy of each individual workman. When one realizes that the cutting speed of the best treated air hardening steel is for a given depth of cut, feed and quality of metal being cut, say sixty feet per minute, while with the same shaped tool made from the best carbon tool steel and with the same conditions, the cutting speed will be only twelve feet per minute, it becomes apparent how little the necessity for rigid standards is appreciated.

Let us take another illustration. The machines of the country are still driven by belting. The motor drive, while it is coming, is still in the future. There is not one establishment in one hundred that does not leave the care and tightening of the belts to the judgment of the individual who runs the machine, although it is well known to all who have given any study to the subject that the most skilled machinist cannot properly tighten a belt without the use of belt clamps. And the writer showed in a paper presented to this Society in 1893, giving the results of an experiment tried on all of the belts in a machine shop and extending through nine years, in which every detail of the care and tightening and tension of each belt was recorded, that belts properly cared for according to a standard method by a trained laborer would average twice the pulling power and only a fraction of the interruptions to manufacture of those tightened according to the usual methods. The loss now going on throughout the coun-

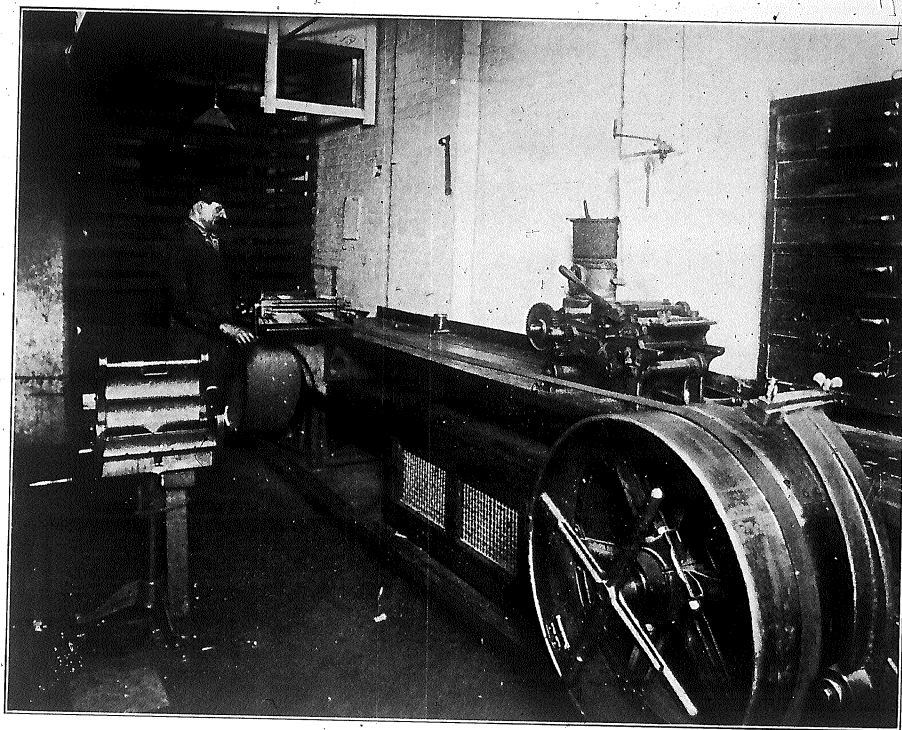


FIG. 1. Barth-Gulowsen "Belt Bench." A device for periodically inspecting, repairing and tightening belts. An outgrowth of Taylor's work in standardizing belting practice.

try from failure to adopt and maintain standards for all small details is simply enormous.

It is, however, a good sign for the future that a firm such as Messrs. Dodge & Day of Philadelphia, who are making a specialty of standardizing machine shop details, find their time fully occupied.

Does not Taylor seem to have set forth the nature and importance of standards clearly and forcefully enough in this paper to have made an impression on his audience? Again if one may judge from the character of the discussion, they did not get his message. Fourteen members discussed the paper on the occasion of its presentation. The discussion covered industrial relations with special reference to what the speakers conceived to be the principal iniquities of trades unions as of that date; political economy; the natural resources of the United States; the relative merits of

various pay systems; lightly touched upon elementary time-study, planning and "system;" but not one word about standards!

Probably ninety per cent. of my hearers have read Taylor's "Shop Management." I wonder how many of them really grasped what Taylor was driving at in the paragraphs I have quoted.

So much for general explanation of what Taylor meant by standards and of their place in scientific management. I shall now endeavor to supply specific and tangible examples to illustrate each class of standards, and, as standards of accomplishment are prone to eclipse all of the others in spite of being dependent upon and in a large measure a natural consequence thereof, I shall discuss them only incidentally.