

discipline at his disposal. Under the efficiency plan, it is impossible for the worker to cross the street and secure another job just as good. The employer across the street unable to measure the efficiency of the applicant, can only afford to offer him \$90 a month and as a consequence, the worker who in the efficiency shop is receiving \$108

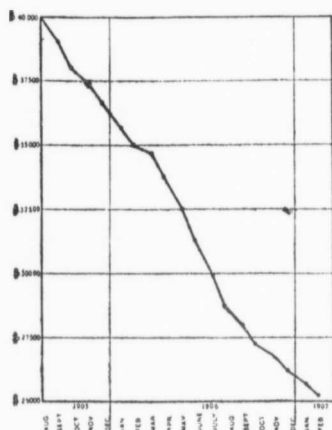


Fig. 3—Decline in the Total Disbursements for Shop Machinery and Tools

with a possibility of making \$180, cannot be pried from his job with a pinch bar. Furthermore, the employer is unwilling to lose the valuable man of high efficiencies, so that the usual hostility and ill-will are replaced by cordial relations of mutual esteem and forbearance. Discipline is maintained because the penalty to the worker is very great if he

applicable to material, to supplies, to methods, to tools and to machinery. By the adoption of this standard the disbursements for machinery in one large plant were reduced as shown in Fig. 3. When, as has been recently shown by English tests, certain selected files will make six times as many strokes before wearing out as other files, and at each stroke remove three or four times as much metal, it is evident that there are other inefficiencies than those of labor. In a foundry, for example, the cost of iron in castings may be \$1.50 per hundred pounds. Direct labor costs \$0.50, surcharges on labor \$0.55, total \$2.55. It is evident that inefficiencies in the cost of iron (for instance 3 per cent, in short weight of pig received) and inefficiency in surcharges on direct labor, may prove more serious than labor inefficiency. Also even if labor contends for a fixed rate and limited output and is willing to give an efficiency of only 60 per cent or less, a great difference will occur in the quality of the output, and this would place one man in a 20 per cent, class, another in a 60 per cent, class, up to the permitted standard.

STANDARD APPLIED TO FOUNDRY WORK.

The efficiency method has been applied to foundry work with success. To determine foundry cost, expenses pertaining to the office are separated from those of the foundry proper. All foundry items of expense are sub-divided into

- (1) Those that make up the cost of iron.
- (2) Those that cover direct labor.
- (3) Those that are a surcharge on labor.

In a grouping of accounts worked out for a very large foundry, the main items appear as follows:

- (1) Cost of iron in cupola.
- (2) Surcharges on iron in ladle.
- (3) Sum of 1 and 2—total cost of iron in ladle.

TOTAL COST OF GOOD CASTINGS					
NET WEIGHT OF GOOD CASTINGS					
AVERAGE COST PER POUND 2.24					
STANDARD COSTS				INEFFICIENCY PER CENT	ACTUAL COST
CLASS	COST PER LB CENTS	NO OF LBS	TOTAL STANDARD COST		
A	1.75	1000000	17500		
B	2.00	1800000	36000		
C	2.10	800000	16800		
D	2.20	400000	8800		
E	4.00	200000	8000		
		4200000	87100	92.5	94080

Fig. 4—Diagram Illustrating Table of Costs.

has to pass from a shop where his high efficiency is rewarded to one where he is graded and paid on the same basis as men who are not doing more than one-fourth as much.

EFFICIENCY STANDARD APPLIED TO OTHER ITEMS.

Let it not be supposed that efficiency applies only to the worker. It is equally

- (4) Floor surcharges on iron in castings.
- (5) Total cost of iron in net good castings.
- (6) Applied labor.
- (7) Surcharge on applied labor.
- (8) Sum of 5, 6, and 7—total cost of net good castings per pound. This is, however, of very little value until classes are arranged and every separate casting assigned to its proper class; one in class \$1.75, another in class \$2.00, a third in class \$2.25, and so on

through 10 or 12 classes. A diagram showing a table of standard foundry costs is shown in Fig. 4.

By the adoption of this system the cost of power is standardized; cost of rent is standardized; depreciation is standardized; cost of iron in net good castings is standardized; surcharges on labor are standardized; applied labor per piece is standardized, and someone is made responsible, for every standard item and is expected to work on it to bring it down, so that while the foundry moves along smoothly on a system of standard costs, everybody from the manager down is desperately busy bettering the standards and reducing the inefficiencies.

Cost determinations become a matter of simple entries on the records which can be made by any clerk, but reductions in standard cost, and elimination of inefficiencies become the business of every one from the president down to the cleaner up, and inefficiencies are specifically and automatically revealed and brought home to some one who is responsible.

Manufacturers' Catalogues

D.C. MOTORS—TYPES S. AND S.A.—Circular No. 1,068 of the Canadian Westinghouse Co., Hamilton, Ont., descriptive of their D.C. motors, types S. and S.A., constant, varying and adjustable speed. This is a very complete circular on these types of motors. It contains 47 pages and is profusely illustrated. There is a section containing data on application of motors to machine tools, pumps, etc.

BLUE BOOK ON GEARING.—Catalogue and price list of the Horsburgh & Scott Co., Cleveland, O., on their rawhide gears, cut metal gears, planed bevel gears, spiral gears, racks, worms and worm gears. The catalogue contains a short article on the manufacture of rawhide gears.

ALUMINUM.—A neat little booklet gotten out by the Norton Co., Worcester, Mass., giving an illustrated account of the manufacture and use of aluminum, the trade name of the material from which their grinding wheels are made.

TESTS OF "TRIMO" WRENCHES.—The Trimmont Mfg. Co., Roxbury, Mass., have recently published a booklet containing a report of a series of tests made on several sizes of the "Trimo" monkey wrench, and also the corresponding sizes of several other makes. These tests showed the "Trimo" wrenches to be well worth investigating. Anyone interested in monkey wrenches should see the results of this test.

ENGINEERS AT NIAGARA FALLS.

The fall course of meetings of the Toronto section of the American Institute of Electrical Engineers was inaugurated last Saturday, when the members held an excursion to Niagara Falls. In the morning visits were paid to the generating stations of the Electrical Development Co., and to the transformer station of the same company, and also to that of the Canadian Niagara Power Co. In the afternoon the generating stations of the Canadian Niagara Co., and of the Ontario Power Co., were inspected. During the day the retiring secretary, Mr. W. G. Chase, was presented with a club bag. Mr. Chase will shortly leave for Winnipeg.