

product during the period. Another section presents figures showing the direct-wages and material-cost charges for new equipment and other capital expenditures. This statement backed up by original documents covers all expenditures and expenses and balances out with payrolls and other primary accounts concerned. It may in turn serve as an original document in making lump-sum debits and credits to various general-ledger or control accounts.

2. *A statement showing in such detail as may be desirable or useful the complete or final manufacturing cost of each class, lot or item of product turned out during the period.* Complete or final manufacturing cost would include not only the costs directly chargeable to product but a proper proportion of each class of indirect expenses. Farther on I shall discuss methods of allocating or distributing indirect expenses to various classes of product. This statement would provide for comparison of current costs with previous and standard costs. It serves as an original document for debits and credits to such controlling or general-ledger accounts as "work in process" and "finished-product stores," and furnishes the basis for charges to merchandise or product sales.

3. *An inventory analysis* showing values of each class and important subdivisions of purchased materials, of work in process and of manufactured products on hand. These are supporting figures for totals shown on the general balance sheet. This statement should show for each class or subdivision net change from previous periods, normal rate of use, standard or budget-inventory figures for the existing rate of operation, etc. It should also segregate inactive or obsolete items in a separate supplement. This statement is backed up by current original records in the nature of detailed cost sheets, "balance-of-stores" or stock-ledger sheets and equipment-inventory sheets.

4. *An income or profit and loss statement* showing the revenue from sales, complete cost of the product sold and the net profit or loss for each period. These would be shown not only for the business as a whole, but for each class of product or important subdivision thereof. The figures for classes of product should be regularly backed up by such detail as may be useful and it should be possible readily to draw off further analyses so that when desired the profit or loss on individual items of product sold may be ascertained. This statement should provide the information cited for the current period, for the year to date and for previous comparable periods. It may also show quotas

or standard sales projected for each class. It serves as the original document or voucher for credits to general-ledger accounts for manufactured product, debit to merchandise sales, and credit or debit to profit or loss. Books of original entry such as registers of accounts receivable (sales registers) are so designed that the information is automatically compiled and may be directly posted therefrom to the statement.

As I have described it, this statement is an analysis of sales by products. The system should be so devised that from the same documents used in its compilation supplementary analyses may readily be drawn off by classes of customers and sales territories.

#### Costs of Products

The cost of a product is made up of:

##### 1. *Direct charges.*

a. *Wages* of workmen who perform the various operations upon it. The cost for these is compiled from job-time cards and "posted to cost sheets.

b. *Materials* used. These are reported on "stores-issue" requisitions from which the cost is compiled and posted to cost sheets.

2. *Manufacturing indirect expenses.*—These consist of all operating expenses not directly chargeable to the cost of any given item of product. This group includes such things as supervision, power, maintenance, taxes on plant, insurance, etc. These are compiled from job-time cards, stores-issue requisitions, accounts-payable vouchers and journal vouchers.

##### 3. *General business or administrative expenses.*

##### 4. *Sales expenses.*

The two latter classes of expense are compiled from original documents in the same manner as indirect manufacturing expense. Manufacturing indirect expenses are distributed or allocated and added to the cost of various products worked upon during each accounting period, in order to obtain a complete manufactured-product cost or inventory value.

Administration or general business expense and selling expense are apportioned and added to the manufacturing cost of products when sold.

The value of such a system of accounting depends upon two things:

First: *a classification* for the business of its accounts, expenses, activities, products and properties. The classification must be designed not only with a view to facilitating the work of accounting, that is, accumulating and setting up figures representing expenses, costs of product, revenue, etc., but—and this is more

important—it must be so designed as to make these figures of the greatest usefulness to management. The Taylor method of classification and designation meets these requirements more fully than any other scheme that has come to my attention. I commend a study of this subject to both utility management and regulating agencies."

Second: *a logical and equitable scheme for the apportionment of indirect expenses* to the various classes and kinds of product, in order that the complete cost and relative profitability of each may be known.

The Taylor method for apportionment or distribution of manufacturing indirect expenses, which is commonly though often imperfectly practiced in industrial cost accounting, is basic and may be adapted to the apportionment of any class of indirect expense in any business. Briefly it consists in determining and assigning to each machine, work-place or other unit of productive equipment a proportionate expense rate. These rates, for purposes of explanation, may be regarded as the normal cost per hour, over and above direct wages, for operating the respective machines to which they apply. In establishing them each item of indirect manufacturing expense, as shown by records for a normal year, is allocated to the various producing units. For example, building charges such as taxes, insurance, repairs to buildings, sweeping and cleaning, heat and light, etc., are allotted to the various machines in proportion to the floor space occupied. Power cost is distributed according to the horsepower required to drive each machine. Maintenance, small-tool costs and supplies are based on recorded past experience, and so on. Each item is allocated on an individual, suitable, logical basis. The sum of the amounts allotted to each machine is divided by the number of hours that the machine in question normally operates on productive work, giving a normal indirect expense rate per hour. Hours multiplied by machine or work-place rates are recorded in the same manner that direct wages on productive work are charged to classes of product and individual jobs, and the manufacturing indirect expense is distributed in proportion to the hours multiplied by the rates set up against each class of product and job. When these inclusive, proportionate rates for each producing unit have been established, charges for all items of indirect expense may be made to products

by a single inclusive transaction. The laborious distribution of numerous items individually is thus avoided.

The general administrative and selling expenses may be allocated with reasonable accuracy and fairness to the classes and even items of products sold in a manner embodying the same principle. These for a given period are added to the cost of products sold during that period. For each product there is built up a weighted factor representing the proportional amount of each item of administration and sales expense that it should bear. Each item or class of such expenses would, in building up these weighted factors, have to be treated in accordance with its peculiar nature. The factors represent the cost per unit on a basis of a normal volume of business. Some products sold to a large number of customers in relatively small quantity may be charged with a greater amount of sales, advertising and accounting expense than others sold in large quantity to a few large users. Some may involve more service expense, more inventory investment cost, more purchasing expense. All of these are given due weight in the proportional rates built up for the various products. Naturally, both the rates used in distributing manufacturing, sales and administrative indirect expenses must be checked and revised from time to time to take care of changing conditions.

What I have said with respect to product costs applies in the main to capital expenditures for construction and for new equipment, whether for expansion or replacement of facilities.

As I have remarked, under the accounting methods discussed costs come largely as a by-product. Production and work orders are issued which indicate definitely not only what is to be done or made, but the charge or expense symbol and order number under the classification to which it is to be charged. The work is planned in advance, broken down into subdivisions and definite operations. Job-time cards for the operations are prepared in advance. At the proper time these are issued to workmen and work accomplished and time spent are reported on them. These, when extended, serve to accumulate and charge on the cost sheet for the work order, the wages paid and the basis for the indirect expense charge.

Requisitions on the store room (stores-issue tickets) are prepared for delivery of the various materials at the proper stages in the work's progress. These upon their return are priced, quantities and value deducted from the "balance-of-stores" (stock-ledger) sheets and

<sup>2</sup>Cooke, Morris Llewellyn, "Classification and Symbolization," in *Scientific Management in American Industry*, New York and London, Harper & Brothers, 1929, Chapter IX, pp. 113-134. References to other works are given in the bibliography at the end of this chapter.