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Report of Cost Committee

of

American Boiler Manufacturers Association

French Lick Springs, Indiana

May 31st to June 2nd, 1920



Prepared by

G. S. BARNUM

E. C. FISHER

Cost Committee

With co-operation of Ernst & Ernst

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1. Since our last convention held in Buffalo, June of 1919, your Cost Committee have had occasion to meet on quite a number of occasions with members of the Association to discuss the subject of Cost Finding. These meetings have been well attended and more than usual interest has been displayed by everyone attending them in the subject of Standardization of Cost Accounting in our industry.

2. During the early part of the present year your Cost Committee prepared and sent out a questionnaire which covered a large range of questions, the answers to which would make it possible to determine to what extent cost finding was conducted throughout the industry along more or less standard lines and also determine to what extent there were variances from the best accepted standards of cost accounting practice.

3. Your Cost Committee are confirmed in the opinion that most of the larger manufacturers in the Association are conducting cost finding systems that will make it possible for them to determine their cost of production, but that among the smaller manufacturers there are many who have not as yet appreciated the necessity for better costing methods.

4. It is safe to say that boiler manufacturers as a whole have been more backward in the development of their financial accounting and cost accounting than they have in the development of greater efficiency in their plants; they have looked upon cost accounting as something to do with red tape or something that may be all right for the other fellow.

5. The application of the Federal Tax Laws has brought home to many of us the necessity for better accounting methods and in this particular at least, the heavy disbursements made to the Treasury Department during the last few years has had its effect in making it necessary for manufacturers to

keep better and more accurate accounting records.

6. It is our conclusion that the interests of the Association can best be served and the work of our Committee productive of most good, through the distribution of this booklet which we might consider as a primer on cost accounting for our industry, and to this end we present it with the hope that it will be given your careful consideration.

7. In this booklet we will endeavor to outline in a simple manner, a procedure that if followed will make it possible for any manufacturer—large or small, to compute his cost of production with a reasonable degree of accuracy.

8. A general accounting system is the essential basis for any cost accounting plan, as the data and statistics on which costs are based must be obtained from the general accounting books, and the cost accounting should be made a part of and be controlled by the general books.

9. We will not endeavor to outline hard and fast rules that must be observed in connection with the number and kind of accounts or the kind of records that should be used; we will leave it to the discretion of the member to determine to what extent he will analyze his figures and the particular forms that he desires to use.

10. It is necessary in connection with any cost accounting procedure, to consider four general divisions of cost, as follows:

1. Direct Materials,
2. Direct Labor,
3. Factory Expense,
4. Administrative and Selling Expense,

and in the following we will proceed to define each one of the factors entering into the cost of production and outline briefly the application of each.

Direct Materials

11. The term "Direct Materials" applies to all materials and parts that are purchased or made for use in and become a part of the boiler, the tank, the stack or other article manufactured for sale in the plant.

12. Included in this classification are such materials as plates, tubes, angles, bolts, rivets, castings, valves, or in fact every item of material that can be identified to the job and which can be included as a part of a complete Bill of Material.

13. The cost of Direct Material is the Invoice Cost plus Transportation Charges.

14. We recommend that whenever possible a complete Bill of Material be made for each job or order, on which should be listed the kind and quantity of each material that will enter into the article.

15. A complete Bill of Material is the best means for checking the accuracy of the estimate, and the final cost of Direct Material entering into a job or order.

16. All Direct Material received should be charged to "a Job" or to "Direct Material Stores." In order to determine where to charge an invoice for Direct Material it will be necessary to consider whether the purchase is made for use on a specific job or whether it was purchased for stock and then charge it accordingly as follows:

Account "A" Jobs in Process.

Account "B" Direct Material Stores.

The cost of any article charged originally to Account "B" will, when used on a job, be charged to Account "A" and credited to Account "B."

Direct Labor

17. Direct Labor (or Productive Labor) consists of wages paid for labor performed upon (and that can be charged directly to) a job or order.

18. All labor paid for as shown by the pay roll should be accounted for by time reports furnished by or for the employees of the plant, and should be classified into three general divisions as follows:

(1) Direct Labor

(2) Indirect Labor

Consisting of wages paid for supervision, foremanship, truckers, oilers, repairmen, etc.

(3) Labor on additions or improvement in Plant (to be capitalized).

In applying the Cost of Direct Labor to Jobs and Orders, either one of the following plans may be adopted:

1st: Applying on basis of individual employees' rates.

Under this plan the hours reported against the job, multiplied by the actual rate paid to the respective employees engaged upon it; the amount so determined will represent the charge for Direct Labor.

2nd: Applying on basis of Average Rate per hour for all Direct Labor.

Under this plan the hours reported against the job by any employee, multiplied by the average rate per hour paid to all employees for Direct Labor will represent the charge for Direct Labor.

In order to arrive at the rate per hour to charge under this plan, divide the Monthly Direct Labor Pay Roll by the total hours reported on all Jobs for the month and the result is the rate to use in Costing all Jobs for the month.

19. The recording and charging of "time" (labor) is very important and every safeguard should surround this part of your Cost Accounting.

20. The best plan is to locate one clerk, or more, in the factory, where he is easily accessible to the workmen, and also provide him with some good mechanical time stamp for recording the "start" and "finish" time on Jobs.

21. The "Job Time Card for Direct Labor" should provide a space for recording the following:

Name of Workman,
Workman's Number,
Date,
Job Number,
Description of Operation,
Time Started,
Time Finished,
Elapsed Time.

22. Another card, preferably of another color to distinguish it from the "Job Time Card for Direct Labor" should be provided for recording the idle time, time expended in non-productive labor or Indirect Labor, and time expended on special plant orders, such as additions or betterments; it should provide spaces for recording the following:

Name of Workman,
Workman's Number,
Date,
Order Number, or Expense Account,
Description of Work Done,
Time Started,
Time Finished,
Elapsed Time.

23. It should be kept in mind that the total hours of each employee as shown by the "In and Out" clock for the pay period (week or two weeks) should be accounted for by the time cards representing charges to "Jobs," "Expense Accounts" or "Additions and Betterments."

24. The "Job Time Cards" can be passed by the Time-Keeper to the Cost Accountant

at the end of each day or as the operation is completed, and in any event all time cards should be turned in as of the close of the pay period.

25. In a small shop employing from fifty to seventy-five men, the Time-Keeper in the shop can post the time cards to the "Labor Cost Sheets" but it is preferable to do such work in the office.

26. There are several good methods used for posting or recording the labor charges against Jobs, and one of the simplest methods is to use a form where the time of a workman covering several weeks can be entered on one sheet and distributed in columns according to the Jobs he works on. In this manner it can readily be seen that the total amount of wages or hours of the workman for a given period is allocated to "Jobs," "Expense Accounts" or "Additions and Betterments" as the case may be.

27. After the "Job Time Cards" have been posted to the cost sheets, they should then be filed away according to Job Numbers until the Job is complete, when they should be sorted according to operations and the time and cost of operations computed and compared with estimates. The statistics on operation time should be of great assistance to the superintendent of the plant in his determination of the efficiency of the workman and also furnish him with a basis for guidance in future work of a similar nature.

Factory Overhead Expense

28. Factory Overhead Expense represents expenditures made for wages, materials and supplies that cannot be charged directly to a job or order, and consist of such items of expenses as are enumerated in the following:

Supervision and Clerical Wages (Foremen, Timekeepers, Clerks).

Indirect Labor (Janitors, Watchmen, Truckers, etc.)

Supplies.

Drayage and Cartage.
Fuel (Coal, Oil, Gas, etc.)
Small Tools.
Electric Power.
Repairs to Machinery and Equipment.
Repairs to Buildings.
Automobile Expense and Repairs.
Insurance—Fire.
Insurance—Liability.
Taxes on Real Estate and Buildings.
Water.
Depreciation on Automobiles.
Depreciation of Buildings.
Depreciation of Machinery and Equip-
ment.
Depreciation of Patterns.

29. It is the concensus of opinion of the members of the Cost Committee that for the purposes of the manufacturers for whom this booklet is intended, we will not recommend the distribution of expense according to manufacturing departments. We want to leave this open for the discretion of the individual members. In other words, we are not recommending a system of cost accounting that will require the use of a number of different overhead expense rates in computing costs, as it is our opinion that among the smaller manufacturers this step is a development of the future and should be undertaken only after a good basis has been laid down by them or for them in their cost accounting procedure. It is customary among the larger plants to recognize five producing departments, as follows:

Boiler Shop,
Machine Shop,
Smith Shop,
Pattern Shop,
Erection,

and this necessitates the proration of power and general factory expense over these departments.

30. Factory Overhead Expense can be applied either as a percentage upon the amount

of Direct Labor or upon the hours of Direct Labor charged to a job or order.

31. If applied as a "percentage," the percentage rate to use can be obtained by dividing the Total Direct Labor into the Total Factory Expense.

32. If applied on "Hours of Labor" the rate per hour can be obtained by dividing the Total Direct Labor Hours into the Total Factory Expense.

Administrative and Selling Expenses

33. Administrative and Selling Expenses are those expenses incurred in connection with conducting a business and which do not contribute directly to the operation of the Manufacturing Department.

34. In the larger plants in the industry and in conformity with recognized accounting practise, Administrative and Selling Expenses are applied as a percentage on the total Factory Cost, or in other words on the total of the Direct Material, Direct Labor and Factory Expenses.

35. In the smaller plants, however, we are of the opinion that the Administrative and Selling Expenses may be added to the Factory Expenses and both factors figured on one rate (either as a percentage on Direct Labor or Rate per Hour).

36. These expenses consist of such items as are enumerated in the following:

Salaries (Executive, Salesmen, Office Clerks, etc.)

Commissions.

Stationery and Printing.

Postage.

Telephone and Telegraph.

Traveling.

Advertising.

Interest on Borrowed Money.

Engineering Expenses.

Branch Office Expense.

Legal and Professional Services.

Loss on Bad Accounts.
Incidental Expenses.

37. In arriving at your expense, do not include any payments made for Federal Taxes as this is not considered as overhead expense and is not determined until after the net profit results of the year are figured. All other taxes, however, such as local and state taxes, should be included in the overhead expenses.

38. The questionnaire referred to in the foregoing developed that the average rate of overhead prevailing was about 180% of the direct labor, but several plants reported an overhead ranging from 60% to 125% and on further investigation it developed that certain expenses had not been included in arriving at these lower rates.

39. The questionnaire also developed the fact that a number of the members were not including as cost any allowance to themselves for salaries which a manufacturing executive or proprietor is entitled to before arriving at the net profits of his business. It is a good plan to discard the so-called drawing account whenever it is used and convert it into a regular salary account.

Depreciation

40. Depreciation may be briefly described as a provision in accounting for the amortization of capital represented in Fixed Assets that are wasted, consumed, or become obsolete; also, an element in the Cost of Production that should never be overlooked. It represents an accruing expense as inevitable as taxes.

41. There are two principal elements that govern in the determination of the amount of Depreciation to apply on property. The first is the element that considers the estimated years of service, without regard to obsolescence. The secondary element considers obsolescence as a factor for consideration, but it should rarely be given preference over the former.

42. The rate of depreciation should be the reciprocal of a useful life which is fixed to take into account "years of service" as well as "obsolescence" and other factors all combined in the most intelligent life forecast obtainable.

43. There are a number of different plans for applying the Depreciation charge, but on account of the complexities of some and the inequalities in others, we are influenced to accept and recommend a plan that provides for a regular annual charge of an equal amount to provide for the refunding of the original cost over a predetermined period of years.

44. The following rates of Depreciation seem to be used generally throughout our industry:

Buildings	3% to 5%
Fixed Machinery	10%
Patterns	25%
Erection Tools	50%
Automobiles	25%
Furniture and Fixtures	10%

45. It is possible that the representatives of the Internal Revenue Department may have disallowed Depreciation Deductions made in tax returns on figures that may correspond closely to those given in the foregoing, however, in computing your expense for Depreciation, you should not be influenced altogether by what the Treasury Department may allow, but rather on what sound business judgment dictates.

46. If you set up as an expense a greater amount than the Treasury Department will allow, the amount of the depreciation over the amount allowed in the tax return may be considered as invested Capital.

Production Order Numbers

47. Order numbers should be assigned to each "Job" just as soon as the order is entered.

48. The order number becomes the medium to which is identified all charges for Material and Labor.

49. Where parts are made for stock, such as drums, headers, etc., ahead of the time when they will be used on a job, they should be kept separately identified by an order number.

50. It is a good plan to use a distinct series of order numbers or letter prefixes to indicate the different classes of work being done in the plant, i. e.,

A—Boiler Contracts

B—Customers' Repairs

C—Parts for Stock

D—Plant Change Orders for repairs and new buildings and equipment.

Estimating

51. A sound basis of estimating cost for the determination of selling prices is the most important factor in the success of any manufacturing enterprise and particularly for a boiler manufacturing business.

52. Estimates of cost should be made on exact information based on all the factors of cost that can be obtained and a systematic procedure should be followed.

53. Your Committee recommends the use of the Standard Estimate Sheet similar to the one submitted herewith, which is designed particularly for H. R. T. Boilers and which may have to be changed or modified to meet conditions or specifications that apply to different parts of the country.

54. A printed estimate sheet provides against the possibility of omitting any item and also furnishes a means for comparing the actual final costs when the job is completed.