

engineer's knowledge of what our work was costing has led him to allow modifications in the design which have saved much money for our clients, whereas if our cost accounts had been concealed our suggestions and arguments regarding a change in the design would have gone unheeded. For instance, on a recent job where the depth of column footings varied, owing to bad ground, the engineer desired to build all footings the same thickness and to start all columns at the same height and to make up the different depths between top of footing and bottom of column by pyramids of concrete, each one of which, of course, would need separate forms of varying shapes. Instead of arguing on a matter of opinion we were able, after building two or three, to demonstrate that this method was much more expensive than putting additional concrete into the footings, and we were allowed to make the change.

Principal Features of Cost System.—First, the estimate: (a) An estimate for each job is made, based on the costs of earlier jobs of similar nature. (b) This estimate should be analyzed to show first the quantities, unit costs, and total costs of each item of labor, and then the quantities and estimated prices of each item of material and each sub-contract.

Second, a daily labor cost report showing the labor costs of each day's work.

Third, a weekly labor cost report showing in parallel columns the estimated and actual quantities, unit costs, and total costs of the work performed.

Fourth, a monthly statement of the cost of materials and sub-contracts purchased or ordered, showing in parallel columns estimated and actual costs.

Fifth, a final summary made at the close of the job showing the total cost of all labor and material.

Estimate of Cost.—In many offices the estimate is locked up in the safe the day the contract is signed, and never sees the light of day again. The estimate is, or should be, the result of the estimator's study of cost data on preceding jobs, and is therefore the standard set for the cost of the job for which it was made. With it daily labor costs and material purchases should be compared. It contains much valuable information that is most useful to, and should be made use of by, the contractor's force.

In order that it may be of the greatest possible use it should be in sufficient detail to show in separate items the various kinds and classes of work done by different gangs, and it is best to make an analysis of the estimate into two main divisions: Labor; Material (sub-contracts and all items not classed as labor). The total of the first division, therefore, gives the estimated total payroll and shows how it is expected that this will be spent upon carpenters, masons, laborers, etc. The second division shows in detail the quantities of material, sub-contract work, etc., item by item.

Use of Estimate.—Who should see and use this valuable information and work to these standards?

First, the general superintendent. It gives him standard of performance by which he can measure up his job superintendents and foremen. It tells him more in a few minutes about the supply of materials and sub-contracts than would a day's studying of the plans, and in general is a big help to him in supervising the employment, supply of materials, progress, etc.

Second, the job superintendent needs more than anyone to see the estimate. From it he can see what the firm expects him to accomplish in the way of costs and his criticisms of the estimate should prove helpful to the estimator. With it he can confer with the purchasing

agent of the company and with the local dealers from whom he has to buy supplies and without a lot of computation on his part he can place the orders for much of his material. From the sub-divisions of the analysis he can determine the sort of organization that should be placed upon the work, how many carpenter foremen, how many carpenters, the size of the labor gang, the number of mechanics, etc. Reading the estimate will call to his mind all the work that has to be done.

The estimate shows him the quantities of materials he has to receive and he can plan for their efficient storage.

Third, the purchasing agent. From the material section he prepares a more detailed schedule and by taking dates from the progress schedule he can prepare for his own use a list showing all materials required and the dates required in order that he may start in buying intelligently and see that everything is delivered on time. He has a valuable check on the bids received.

Fourth, the scheduling men also should receive the material section of the estimate and check their quantities by it. From the purchasing agent they receive notice of the dates these schedules are required in order that he may buy them and have them delivered at the job in time.

Fifth, the foremen of brickmasons, carpenters, concrete gangs, etc., should be told what are the estimated costs of their work, and shown from week to week how their work compares with the estimates.

Daily Labor Costs.—The second important feature of a cost accounting system is a daily report of the labor costs. These are best prepared on the job and should be in the job superintendent's hands by 9 o'clock the next morning.

If each carpenter foreman is told what are the estimated costs on the operations he is to do and is notified every day as to whether he is coming inside or overrunning his costs, it is sure to have its effect. We frequently plot the principal items graphically on a chart which not only the carpenter foremen but the carpenters can see as they check in and out. The lowest laborer takes a cheerful and even enthusiastic interest in the vagaries of the wandering line that shows the cost of the work he is doing.

It is best to keep the cost accounts on the job instead of in the head office. Costs to be of any use should be fresh, not stale. If the superintendent knows at 9 o'clock the very next day that concrete costs 20c. a yard more to put in than on the preceding day he can talk it over with his foreman while the matter is fresh, and investigate and remedy the fault; but if the news does not come to him until a week or ten days after the work in question is done, it is too late to do anything.

The daily costs point out to the superintendent an occasional high spot that he has missed, and are an unfailing barometer of the job.

Weekly Labor Costs.—The fourth essential of a cost system is a weekly labor report. This should show in parallel columns the estimated and actual quantities, unit costs, total costs, and saving or overrun. This statement should be furnished to the heads of the main office of the company as well as to the job superintendent. By the use of a simple summary, the main facts can be condensed into a very few items. This statement gives a sort of review of the job's operations to date. It should go to the general superintendent and the estimator in the head office. The latter particularly needs to know the fluctuations in costs in order that he may check up his judgment with actual facts and learn the costs of any new sort of work.