

ENGINEERING AND ACCOUNTING—THEIR RELATION WITH SPECIAL REFERENCE TO PUBLIC UTILITIES.*

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AMONG the many changes brought by time none has been more complete than the change in the relations between Finance and Engineering. In times past the successful promotion of any undertaking involving the use or development of physical means was largely dependent upon the possibility of finding an engineer capable of handling the problems to be faced. The financial backing could be much more easily secured.

With the tremendous advance in engineering knowledge, and the heavy drain upon the world's finances caused by the unprecedented developments of recent years, the positions have been reversed. The necessary engineering skill can be more or less easily obtained, but, owing to the ever increasing demand and the multitudinous opportunities afforded, capital is becoming more and more difficult to interest. The requirements of capital are becoming more exacting and must be complied with to the best of our ability.

It is not now sufficient for the man of vision to paint a picture, for him to be overloaded with the necessary funds for its realization. Few projects are absolutely "in the rough" and estimates of the future must generally be verified from experiences of the past. This is particularly the case to-day when so many undertakings involve the replacement or reconstruction of the result of previous efforts. In many cases the profit to be gained is not what might be called an "original" profit but is often in the nature of a commission on increased efficiency or improved methods. The old gives place to the new but the latter pays for the sins of the former and the margin of profit is therefore reduced.

It is in these circumstances that the accountant has come into his own. Starting as the humble scribe to the "creative genius"—the engineer—he has to-day, in some instances, attained a position where the hopes of the engineer rest upon his decision. In all cases greater demands are made upon the accountant and the initiation and continuance of important undertakings depend largely upon the figures he supplies and not so much upon the sanguine expectations of the promoter or the developer.

The foregoing is even more true when we turn from the entrancing realm of exploitation to the mundane sphere of operation. With the increasing population and the disappearance of virgin fields for commercial development, financial attention is increasingly focussed upon existing enterprises and the possibilities for their betterment and economical expansion. Competition, including the competition between different means of production and sources of supply, calls for a closer watch upon the results of operation. Figures supply the medium.

Under these circumstances it should be apparent that it is to the mutual interest of the engineer and the accountant that they should co-operate to the fullest extent and should have a thorough understanding of the difficulties under which they each labor.

When I was asked to address your society it was with considerable misgivings that I consented, for "there is nothing new under the sun" and the setting forth of concrete facts such as an organization like this is interested

in appear to me to be probably beyond my ability. However, it occurred to me that some brief remarks on the problems confronting the accountant in which he is dependent upon the co-operation of the engineer might be of value and, at this present stage of the country's political progress, a brief discussion of some points in the valuation of public utilities, in which they are both vitally interested, might be of interest.

In times past there have been unfortunate divergencies between the accountant's final figures of cost and the engineer's original estimates. This was doubtless the fault of the accountant but perhaps may be forgiven as attributable to his inordinate desire for accuracy.

The chief mutual interest of the engineer and the accountant centres round the question of costs. I do not now refer to manufacturing costs, with which we in this part of the country are not greatly concerned, but to the construction costs.

It is essential that the cost of construction be properly kept for the following objects:

- (1) The vindication of the engineer.
- (2) The scientific provision of depreciation.
- (3) The reliable adjustment of cases of renewal and replacement.
- (4) The provision of figures on which to base future developments or to recommend new and similar enterprises.
- (5) The valuation of property for sale or amalgamation.
- (6) The valuation of property for regulation or absorption by the state or federal governments.

The history of most undertakings has been one of small beginnings, and here occurs the first difficulty of the accountant. It is naturally felt, when capital is small and hardly obtainable, that the energy of the organization must be concentrated upon the physical work in progress. The accounting end is given small consideration and the records kept are meager and unreliable. In many cases the engineer is the paramount authority and is able, if he will, to insure the starting of a simple yet complete system which shall be of use in the future and can be elaborated as the enterprise grows. I have experienced instances where it was quite impossible to ascertain from time books or payrolls where the work was actually done and, as expenditure on similar work at several locations was all charged to one account, it was impossible to arrive at the cost of each plant.

The books are often kept at a point remote from the actual work of construction. The bookkeeper is unfamiliar with the nature of the work and the lay of the land and is consequently unable to provide intelligent and appropriate records. A preliminary outline by the engineer, showing the general plan to be pursued and the more important items comprised therein, should be provided.

In large undertakings it is worth while to keep elaborate detailed cost accounts in a separate set of books, the balances of which tie in to the controlling accounts in the general ledger. In smaller projects this is not possible and considerable unnecessary expense and trouble is incurred because the engineer insists on keeping his own records of cost for various parts of the work. This is probably necessary in such instances as require records of cost of excavation, grading, concrete work, etc., so that daily costs may be obtained as a check upon the progress made, but the cost of sections of the work can be adequately shown by the general books if there is a proper understanding between the engineer and the accountant.

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