

ESTIMATING THE COST OF WORK

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Estimating the Cost of Work by William B. Ferguson

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WILLIAM B. FERGUSON

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ESTIMATING THE COST OF WORK

WITH SPECIAL REFERENCE TO
UNSTANDARDIZED OPERATIONS, AS IN
JOBGING SHOPS OR REPAIR WORK

BY
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PREFACE

This incomplete discussion upon the systematic collection and use of unit costs for ordinary estimating purposes has been compiled partly from memoranda issued from time to time within the past four years by the author to the members of the hull Estimating and Planning Staff at certain Navy Yards, as a part of their instruction and training.

On account of the satisfactory results obtained by the use of these notes, incomplete as they are, I have been persuaded rather than to wait several years longer for more complete data from which to prepare a scientific discussion of the problems of the average estimator, to venture at this time to contribute my mite to the cause of standardization of labor. I do this in the belief that my efforts will be supported and far surpassed by many others of kindred faith, and that at some distant day the art of Estimating the Cost of all classes of work will approach becoming a science.

W. B. F.

Washington, D. C.

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INTRODUCTION

WHAT IS AN ESTIMATE?

The word "estimate" is used in several different senses, and in dealing with the cost of work it is necessary to confine our discussion principally to one specific definition or meaning. Those who require or seek estimates of cost need them for a variety of reasons or purposes, and these various purposes correspond with the kind of estimate required, for example:

To estimate may mean: To make a "rough" approximation of probable cost. This is the only kind of estimate possible when the specifications are not exact as to the extent and nature of the work which is contemplated. Such estimates as this are required by Congress upon which to base most of the appropriations. Such an estimate is required for large projects or for contemplated work not definitely decided upon, where the approximate outlay may determine whether the project can be financed properly, and whether it is worth while to go to the expense of making more detailed investigation and of making accurate estimates.

To estimate may mean: To fix the value by comparison and experience; to calculate; and usually to make this calculation by utilizing all available comparative data. If an estimate is made for a prospective customer, it is usually in the form of a "bid," submitted on a regular form of proposal; and if the estimate is accepted and approved, it becomes the contract price. This form of estimate must be made

and checked with great care; and it will be of advantage to be able to submit an estimate of this kind without undue delay. Hence both accuracy and promptness are desirable. Such estimates or "bids" are made by adding to the estimated *cost of production* a sum for marketing the product and for *profit*.

The term "estimated cost of work" will be used to indicate the probable actual cost or outlay to the contractor, which is required for a specified production. Profit and selling expense will not be included. Total cost is composed of labor, material, and incidental expense. Attention will be especially devoted to estimating the *labor*. Estimating the cost of material presents no difficulty to the experienced estimator after a complete list of the material required is prepared. The "incidental" expense can be allowed for by a number of different methods, depending upon the degree of accuracy desired, and upon the kind of cost-keeping system in effect in the plant. The practical application of these methods to estimating the incidental or overhead expense will be discussed briefly.

In estimating or calculating probable costs (which must be done by comparison and experience), the estimator is bound to use some *standard* of comparison, not a fixed or immutable standard, but nevertheless a standard or guide; whether such standard is the written record of actual previous costs of identical or similar products, or whether such standard exists only in the mind or imagination of the estimator.

WHAT IS A STANDARD?

Funk & Wagnalls' Standard Dictionary says a standard is: "Any type, model, example, or authority with which comparison may be made; any fact,

thing or circumstance forming a basis for adjustment and regulation; a criterion of excellence."

In the art of estimating, it is only in determining what costs *should be*, if we eliminate preventable waste (or, using Mr. Emerson's term, it is only in "predetermining costs"), that we establish a standard which is "a criterion of excellence." In estimating what costs *will actually be*, we use for a standard of comparison the type or example of past performance which represents the *average* cost of work, under standard conditions. By thus using a *standard* estimate for each unit (whether the unit chosen be an object or an operation), based on the cost of a standard number of units under certain conditions taken as standard, the estimator can proceed methodically to classify and study all cost data and estimates with reference to such standard.

By this means, each and every cost or estimate can be compared to some standard cost or estimate; and data gradually collected by which the best possible estimates can be skillfully made for any item of work that may arise.

The pursuit of this practical application of data and knowledge by estimators, and the devising of rules which govern the average costs of all units, dependent on the variables of (1) Number of units, (2) Size of unit, (3) Classification number, will become an *art* instead of a haphazard guessing process.

