1 THE ESTIMATING PROCESS

1 Components of an Estimate

One of the most difficult tasks in estimating any project is to capture all of the costs involved in the project. Construction has many variables, and it is these variables that can have an impact of the way the estimator "sees" the work and ultimately its costs. The means and methods selected, or the plan to execute the work, will impact price significantly. Another important variable is the bid documents; comprehensive, fully developed designs offer a better chance for the estimator to reach an accurate price. It is the goal of the estimator to arrive at the most accurate price for the cost of the work under a specific set of circumstances and conditions.

While different estimators may see a project differently and thereby arrive at a different price for the work, all estimates share some basic components. Every cost estimate requires three basic components. The first is the establishment of standard *units of measure.* The second component of an estimate is the determination of the *quantity* of units for each component, which is an actual measurement process: how many linear feet of wire, how many device boxes, and so on. The third component, and perhaps the most difficult to obtain, is the determination of a reasonable *cost* for each unit.

The first element, the designation of measurement units, is the step that determines and defines the level of detail, and thus the degree of accuracy, of a cost estimate. In electrical construction, such units could be as all-encompassing as the number of watts per square foot of floor area or as detailed as a linear foot of wire. Depending on the estimator's intended use, the designation of the unit of measure may describe a complete system, or it may be a single task within the entire scope of the project. The selection of the unit of measure also determines the time required to do the estimate.

The second component of every estimate, the determination of quantity, is more than simply counting units. In construction, this process is called the *quantity takeoff* or *quantity survey.* It is an integral part of the estimating process that requires an intimate understanding of the work being estimated and a commitment to

accuracy. To perform this function successfully, the estimator should have a working knowledge of the materials, methods, and codes used in electrical construction. An understanding of the technical specifications that were the basis of the design is also particularly important. This knowledge helps to ensure that each quantity is correctly tabulated and that essential items are not forgotten or omitted. The estimator with a thorough knowledge of construction is also more likely to account for all requirements in the estimate.

A clear understanding of the *scope*, or limits of the work, what is included and what is not, is also critical for a defining the estimate.

Not all of the tasks in an estimate involve materials; some are labor-only tasks. Testing is an example of a labor-only item. Some can be just material items, for example, a work box and conduit that is set in a masonry wall by the bricklayer. Experience is, therefore, invaluable to ensure a complete estimate.

The third component is the determination of a reasonable cost for each unit referred to as *pricing.* This aspect of the estimate is significantly responsible for variations in estimating. Rarely do two estimators arrive at exactly the same material cost for a project. Even if material costs for an installation are the same for competing contractors, the labor costs for installing that material can vary considerably, as a result of varying productivity and pay scales in different areas. The use of specialized equipment can decrease installation time and, therefore, cost. Finally, material prices fluctuate within the market. These cost differences occur from city to city and even from supplier to supplier in the same town. It is the experienced and well-prepared estimator who can keep track of these variations and fluctuations and use them to his or her best advantage when preparing accurate estimates.

This third phase of estimating, the determination of costs, can be defined in three different ways by the estimator. With one approach, the estimator uses a unit cost that includes all the elements (i.e., material, installation, overhead, and profit) in one number expressed in dollars per unit of work. A variation of this approach is to use a unit cost that includes total material and installation as a single amount, adding a percent markup for overhead and profit in the estimate summary.

A second method is to use individual unit costs for material and for installation. Costs are calculated separately for each category without markups. These are called *bare costs*. Different profit and overhead markups are applied to each item before the material and installation prices are totaled. The result is called the *billing* rate or price.

A third method of pricing uses unit costs for materials, with labor-hours as the measure of labor. Again, these figures are totaled separately; one represents the value of materials expressed in dollars, and the other shows the total labor-hours for installation. The average cost per hour of trade labor is determined by allowing for the expected ratios of foremen, journeymen, and apprentices. This is sometimes called a *composite labor rate.* This rate is multiplied by the total labor-hours to get the total bare cost of installation. Different overhead and profit markups can then be applied to each, material and labor, and the results added to get the total billing rate.

Whichever methodology is selected, it is important to remember that it should remain consistent through the entire estimate to avoid errors, omissions, or duplications. The estimator must, therefore, exercise care to utilize these methods correctly and consistently for the format of each particular estimate.

As a point of clarification, the word *unit* is used in many ways, as can be seen in the preceding definitions. Keeping the concepts of units clearly defined is vital to achieving an accurate, professional estimate. For the purposes of this book, the following references to different types of units are used:

- **Unit of measure.** The standard by which the quantities are counted, such as *linear feet* of conduit, or *number* of boxes. There are industry-accepted standards of units for almost all work.
- **Cost units.** The total dollar price per each installed unit of measure, including the costs of material and installation. This figure may be a bare cost or may include overhead and profit.
- **Material unit cost.** The cost to purchase each unit of measure. This cost represents material dollars only—with no overhead and profit.
- **Installation unit cost.** The cost for installing each unit of measure. This cost includes labor dollars only—with no overhead and profit.
- **Labor unit.** The labor-hours required to install a unit of measure. (*Note:* Labor units multiplied by the labor rate per hour equals the installation unit cost in dollars.)

A final thought on cost: It is important to note that the word *cost* is defined by its frame of reference. For the general contractor; the electrical contractor's entire price is a cost. When the work is complete, the general contractor will pay the entire contract amount to the electrical contractor and record it as a cost to the project. For the electrical contractor, cost is defined as all amounts in the estimate, with the *exception* of the profit. The electrical contractor will records costs as material, labor, and equipment paid to others, while the profit made is the only item not classified as a cost.