



## Minimizing Risks Associated with Construction Cost Estimates

*(This article is reprinted with the permission of the American Council of Engineering Companies of Massachusetts.)*

There are several types of construction cost estimates—preliminary or ballpark estimates, intermediate estimates, Engineer’s estimates (sometimes referred to as the owner’s estimate), and the Contractor’s bid estimate. The appropriate estimate type depends on when, during project development, the estimate is required. Regardless of the estimate type there are associated risks for design professionals involved in preparing an engineer’s estimate of construction costs. This article will review those risks and suitable methods to minimize a design professional’s exposure to those risks.

### **Construction Cost Estimate Risk**

Construction Cost Estimates provide the project owner with a reasonable expectation of the overall project costs, as well as a breakdown of individual pay items, if the bid form is structured to allow for it. This serves as the benchmark for establishing acceptable bid proposals and allows the owner to ensure that adequate funding is in place prior to soliciting bids from construction contractors.

Bid errors, particularly underestimating project costs, can cause serious problems such as delayed contract awards or the outright rejection of bids, and can therefore necessitate redefining the project scope and re-bidding the project. When problems arise as a result of an error in the cost estimate, an owner might view this as a breach of the professional’s standard of care and seek recovery from the design professional. However, the courts have determined that simply establishing that a professional’s estimate of cost was materially less than the actual cost of construction is not sufficient to prove liability.

In *Durand Associates, Inc. v. Guardian Inv. Co.*, 186 Neb. 349, 183 N.W. 2d 246, 251 (1971) the Nebraska court found:

“[A]n architect or engineer may breach his contract for architectural services by underestimating the construction cost of a proposed structure...the cost of construction must reasonably approach that stated in the estimate unless the owner orders changes which increase the cost of construction. It is ordinarily for a jury to say whether the actual cost is within a reasonable range of the estimated costs unless, as here, the excess is so great that the court can deal with it as a matter of law.”

The quality of a construction cost estimate is generally measured against the actual results of the bid process. However the determination of the quality of a cost estimate is not strictly objective. Many construction officials believe that the Engineer’s Estimate should not actually match the low bid, but should fall somewhere between the second and third bidders. The Federal Highway Administration guidelines recommend that the Engineer’s Estimate should be within 10% of the low bid at least 50% of the time. The New Jersey Department of Transportation believes that “The ideal estimate would be where the Engineer’s Estimate is approximately the median between the actual low and high contract bid.”

## **Preparation of Construction Cost Estimates**

Cost estimating, particularly in the construction industry, is not an exact science. A qualified cost estimator, well versed in appropriate estimating techniques, can reasonably be expected to determine what the work, as defined in the contract documents, should cost. In addition to having a thorough understanding of the contract documents and any unique project characteristics, there are several other factors<sup>1</sup> that the estimator should consider when preparing a construction cost estimate. These cost factors include: fluctuation of costs, traffic conditions, restrictive work hours or method of work, small quantities of work, separated operations, handwork and inefficient operations, accessibility, geographic location, construction season, and material shortages.

### ***Fluctuation of Costs***

Every estimate should be reviewed and updated just prior to soliciting prices from contractors, as it is not unusual for costs and/or availability of needed resources such as labor and material to fluctuate. The time of year that a project is released, as well as economic conditions, can adversely affect how contractors will price a project. The cost estimator needs to incorporate this information and update the cost estimate accordingly.

### ***Traffic Conditions***

Traffic conditions can substantially influence the cost of construction. A civil project that involves work on, or adjacent to, existing traffic may consist of large quantities of related roadwork items overall. But if the project is separated by traffic restrictions into multiple work zones consisting of smaller quantities of work, the unit price of those items will be higher than if all of the work is readily available to the contractor.

### ***Restrictive Work Hours or Method of Work***

The cost of the work will also be affected by any restrictions on the hours of work or on acceptable construction methods. Such restrictions could include limiting work hours on highly trafficked roadway arterials to nighttime when there is less traffic or imposing noise restrictions on construction equipment in residential areas. Impacts on the cost of the work could also include the addition of premium time differentials to labor rates, reduction in production rates and efficiencies, and increased equipment costs.

### ***Small Quantities of Work***

Because the cost mobilization and setup is unaffected by the quantity of a particular work item, small quantities are more expensive. The cost estimator must be cognizant of items procured in minimal quantities.

### ***Separated Operations***

Similar to small quantities, items which are separated, such as different areas of the project or available work zones will require individual set ups and thereby increase the cost of the project.

### ***Handwork and Inefficient Operations***

In those areas where high-production equipment cannot be used, such as asphalt sidewalks where the work is performed by hand, the cost of the work will be more expensive.

### ***Accessibility***

The ability of the contractor to move material and labor in and out of the work site will impact the cost of the project. An example is work on a highway where, due to traffic restrictions, the contractor is limited in its ability to access the work areas. Other examples include working on slopes and retaining walls where access becomes more limited as the work progresses, thereby affecting the excavation and backfill activities.

### ***Geographic Location***

Geographically remote areas will also result in higher construction costs. Cost estimators need to incorporate the additional cost of housing and feeding the workforce when the project is located in areas where daily commuting is not practical. Examples of remote work sites include offshore marine projects and dam projects.

### ***Construction Season***

The time of year work is expected to be performed can also influence the cost of the work, particularly on smaller projects that are not expected to take more than several months. For larger projects, it is important for estimators to understand the anticipated construction schedule, particularly if work will be performed during winter months when the cost can increase to accommodate weather-related needs such as protection of the work, the use of heaters, and the use of concrete add-mixtures.

### ***Material Shortages***

As was recently demonstrated by the volatile steel market, material shortages can have a substantial impact on the cost of a project. It is essential the cost estimator understands the economic conditions and accounts for resource shortages. This is typically accomplished through the use of contingencies.

### **Methods to Estimate Construction Costs**

There are essentially two different approaches a cost estimator can use when developing a preliminary cost estimate: the Historic Data Method and the Complete Analysis Method.

#### ***Historic Data Method***

This is the most rational method used by non-contractors in developing a reasonable construction cost estimate. There are several factors that should be taken into consideration when developing a cost estimate utilizing this method.

#### ***Use Projects of Similar Size and Scope***

The referenced bid price should be adjusted to reflect differences in the project factors. If possible, use only recent projects to eliminate having to adjust for variances in economic conditions. A study by the Oregon Department of Transportation has shown that utilizing a bid history of three to four months yields more accurate results than the former practice of using a three-year history.

#### ***Complete Analysis Method***

This methodology involves a detailed analysis of each item of work similar to the bottom-up estimate process that a contractor would perform. This is a difficult approach in that it requires the cost estimator to make assumptions about construction techniques, size and type of equipment, and various crew sizes. It also requires a thorough understanding of the local marketplace for both labor and material costs. This approach is best used for projects where an adequate bid history is not available, or for unique types of construction features for which there is no bid history.

### **Conclusion**

Design professionals engaged in the development of construction cost estimates for their clients should understand not only the project for which they are providing design services, but also the external environment in which that project will be constructed. This additional insight into the various external nuances of a project will enable the design professional to select the best method, or combination of methods, to adequately develop the construction cost.

<sup>1</sup>*Engineer Estimating Guidelines for Roadway Construction Projects*, County of Riverside, State of California, January 29, 1999.

### **Risk Management Prevention Tip**

If you remember to consider all aspects of a project when figuring your initial estimate, you can help prevent the possibility of inordinate discrepancies between the original amount and the final cost—ultimately minimizing the potential of a claim from an unhappy client. It's also vital that you review the estimate methods available to you to make sure you utilize the most suitable for each job to avoid focusing on outdated, or even irrelevant, market factors.

by David M. Ponte, P.E., Senior Claims Consultant, DH Consulting Group LLP, a subsidiary of Donovan Hatem LLP, World Trade Center East, Two Seaport Lane, Boston, MA 02210. © DH Consulting Group LLC 2009. All rights reserved.

*With all projects, it is important to consider using a contract with limitation of liability clauses, as recommended and reviewed by experienced legal counsel, to help further reduce the risk of claims.*

*ASCE is dedicated to providing its members with high-quality professional liability coverage at affordable rates. Through their partnership with the ASCE Professional Liability Program Administrator, Pearl Insurance, they can provide insured members with valuable risk management tools and services to help effectively assess and reduce their potential risks and liabilities. For more information about the ASCE Professional Liability Program, call a Customer Service Representative today at 1.888.619.1908 or email [ascepro@pearlinsurance.com](mailto:ascepro@pearlinsurance.com).*

The information contained in this article should not be relied upon as legal advice for specific facts and circumstances and is not intended to be a substitute for consultation with counsel.