

THE NINE SECRETS OF ESTIMATING

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The construction industry has a myth going around. The myth is that there is a secret to estimating. Well, the myth is misleading; there are actually nine secrets to estimating! I am about to divulge to you these nine secrets. As a part of this, I am breaking a decades long, perhaps eons long silence as to the true secrets of successful estimates. Let the reader beware of the remainder of this article - it may cause you to question other myths in your life!

First Secret

The first secret to be divulged is takeoff process in estimating. A successful estimate has its foundation in a reliable identification of the quantities involved in the project. Just like a house, if the foundation is no good, the house will fall. It does not matter if the estimate is a feasibility level estimate or a bid level estimate, the quantities identified must be correct for the project!

When preparing a feasibility estimate, care must be taken to identify all of the major and minor cost items in the project scope. Whether on a square footage (or other parametric methods) basis, or a method that uses material quantities, if you do not identify all of the scope, you cannot begin to develop a reliable budget. For example, a general guide for building construction would be to use the CSI sixteen division format at levels 1 and 2 for a scope review during the quantity takeoff period. In the concrete division (level 1), one could identify the need for concrete on the project. Once this has been identified, sub-sections (level 2) could be refined further to consider items such as pile caps, continuous and pad footings, grade beams, slabs on grade, elevated slabs and equipment or housekeeping pads. By considering these areas within each of the divisions, a series of quantities can be established that will form a firm foundation for a reliable estimate.

When preparing a bid level estimate, care must be taken to identify not only labor and material cost items shown on the plans, but labor and cost items that may not be reflected on the plans. For example, on a plumbing or piping system it is not good enough to only count the linear feet of pipe by size and material type, number, sizes and types of fittings, valves and hangers, etc. An estimator needs to consider the impact of specifications concerning testing, inspection and start-up activities along with the location of the work. This necessitates preparing the estimate by system and, perhaps, by area of the facility. Each system would contain its own listing of materials to aid in determining the amount of time and materials for testing and related. By identifying the systems, a reasonably detailed schedule and control budget can be developed for the construction period without a large amount of time wasted in their preparation.

Will the takeoff be perfect? No, there are too many variables to make any takeoff perfect. However, it will be very reliable whether it is at the feasibility or bid phase of the project be-

cause the scope of the project has been identified! That is the first secret of estimating. No one company has a lock on this secret; all of the successful firms know one of the secrets to a successful project is having a reliable takeoff.

Second Secret

The second secret is the use of labor man-hours in the estimate. Labor hours, whether developed by crew analysis or applied on a unit man-hour basis, form another basic part of the foundation to a successful project. The use of a labor dollar per unit of work (i.e. \$15.00 per cubic yard for grade beams or \$20.00 per cubic yard for walls) is only applicable when the cost history supports the data being used (i.e. in same geographic location and low inflation rate over time, same project conditions, etc.) or in the early estimates such as a feasibility estimate where a decent cost history exists for the proposed application.

A lot of firms may think their man-hours are a secret, but this is not the case. The project conditions (size, location, accessibility, material sizes and types, erection equipment, etc.) play a major factor in the determination of the applicable man-hours to be used in an estimate. What is lesser known, but somewhat acknowledged, is that time and motion studies show that under specific conditions a skilled person can perform only so much work efficiently in a given day. This is typically expressed in a value range such as 100 to 120 units installed in a typical work period. Time and motion studies also will show under certain circumstances more total time can be required for one person to perform the work rather than two persons working together on the item of work.

Projects with incidental amounts of overtime will not incur any significant productivity adjustments. Projects with extended periods of 50, 60 or more hours per week will incur substantial losses in productivity. A second and/or third shift will also incur productivity penalties.

The labor force for a given project will only perform within certain ranges of time for specific tasks and the overall project. An experienced estimator that is applying the man-hours will be able to judge the conditions that affect the worker productivity on the site for each item in the estimate. In essence, preparing a range estimate of time on each item contained in the estimate.

Will the man-hour determination be perfect? No, there are too many variables to make any man-hour determination perfect. If one wants perfect man-hours, let the accountant tally them after the completion of the project (but it is too late then). No one company has a lock on this secret; all of the successful firms know one of the secrets to a successful project is having a reliable determination made of the hours required to perform the work.

Third Secret

The third secret to be revealed is the hourly rate for craft labor (a sub-secret to this is the hourly rate for staff labor and it has similar principals). The labor rate is the cost per hour for the craftsmen on the project.

To determine any craft rate, whether union or open shop, the estimator starts with the basic wages and fringe benefits. However, this is just the starting point. To the wages and fringes, the estimator need to add what are commonly called payroll burdens. These burdens are FICA (Social Security), FUI (Federal Unemployment Insurance), SUI (State Unemployment Insurance), WC (Worker Compensation) and others mandated by legislation and/or company operations. These burdens, plus the base wages and fringe benefits determine the hourly cost of a craft classification (i.e. a carpenter or a pipefitter, etc.).

From the point of having the individual craft classification, the estimator typically needs to develop a crew rate. A crew rate can consist of a number of journeymen, a foreman and/or a general foreman or variations on this hierarchy. In this crew there could be ten journeymen, one foreman and an allocation of a quarter of a general foreman in the mix. A variable to this mix is that the foreman and general foreman may or may not be what is termed a "working" member of the crew.

In select cases, where someone is being unrealistically optimistic on hourly costs, there may be ten "apprentices" and one journeyman as the crew. This is unrealistic in that the lowered productivity of the "apprentices" offset any gains in the hourly rates used in the estimate. If you don't believe this one, check out how to train people on the job effectively. It is not a ten to one ratio. Training an estimator is more of a two or three on one (skilled to beginner) ratio.

The hourly rate can also be a mixed crew where there is a mix of different crafts for a work crew for the performance of the work. In a case such as this, there may be a crew that is comprised of six carpenters with four laborers providing support to the carpenters. It may be a case where there is an operator and a laborer working together.

Overtime or the lack of overtime is another consideration in determining the calculation of the hourly rates. A project that is scheduled for completion using a forty hour work week (watch out for areas that have a standard 35 hour week!) will have a modest amount, if any, of overtime costs required in the estimate. A project that is scheduled for extended 50, 60 or even 70 hour work weeks will have a substantial amount included for overtime and loss of productivity.

Will the hourly labor rate determination be perfect? Again, the answer is no. No one company has a lock on this secret; all of the successful firms know one of the secrets to a successful project is having a reliable determination made of the hourly rates required to perform the work.

Fourth Secret

The fourth secret concerns material prices. It is a simple secret, with a potentially complex variable. The secret is material prices go up and down. The complex part is the frequency and depth of the price curves.

Prices are affected by timing of the buying cycle. Does the purchase coincide with a peak or off time of the year for the manufacturer? This equates to demand. It also depends upon the size of the order. Will this be for one standard widget or one thousand custom widgets? The delivery requirements also affect the price. If an item with a ten week delivery time frame is needed in two or three weeks, get ready to pay a big premium. And, payment terms on previous purchases affect the prices.

One big item of material cost is the sole sourced items where there are no other brands of comparable equipment allowed for the project. This creates a tremendous upswing in the pricing. It is amazing how someone would allow sole sourced items in their projects, if having the best possible level of pricing on the project concerns them.

Will the material prices in the estimate be perfect? It is highly probable that never would be the best answer. However, by recognizing the factors that raise and lower the costs of materials, it is possible to get the lowest practical pricing on materials without resorting to bid shopping or other unethical and possibly illegal practices. No one company has a lock on this secret; all of the successful firms know one of the secrets to a successful project is having a reliable determination made of the material costs required to perform the work.

Fifth Secret

The fifth secret is equipment costs. Equipment rates are dependent upon the project conditions to determine the correct size or capacity of equipment required to perform the work. They are also dependent upon using the right size or capability of equipment when interfacing with other types of equipment. With some exceptions, equipment acquisition and operating costs are going to be similar for the same conditions of the work, no matter what contractor is performing the work.

In selecting the right equipment capacity for a project, consider an extreme example for the use of a three cubic yard hydraulic excavator versus a ¼ cubic yard backhoe/front end loader for excavating a swimming pool. If the project is to excavate a back yard, shallow, residential swimming pool with tight access restrictions, the backhoe/front end loader could be a better choice. However, if it is a regulation Olympic sized pool with a deep end for diving without any severe access restrictions, the hydraulic excavator could be the better choice.

When interfacing with other equipment, cycle times and equipment capacity control the costs on the project. An illustration of this is mass excavating and hauling of the spoils. Two basic choices could be the answer. The first is the use of scrapers to excavate and haul the spoils to an on site loca-

tion. In a case like this selecting the correct equipment size would be a considerable factor since one piece of equipment can do both tasks. However, if the project conditions are such that they require the use of hydraulic excavators with trucks for hauling the spoils, the sizing or quantity of the excavators and trucks become the primary factor. If trucking capacity is limited, this will restrict the size/capacity of the excavator. If the size/capacity of the excavators is limited, this will restrict the trucking capacity. In these cases, and others, undersized/oversized capacity means higher hourly costs and inefficiencies.

Will the equipment costs in the estimate be perfect? Guess what – another “No!” However, they will be more reliable by taking these factors into consideration. No one company has a lock on this secret; all of the successful firms know one of the secrets to a successful project is having a reliable determination made of the equipment costs required to perform the work.

Sixth Secret

The sixth secret is subcontractor quotes. This has components of all the other secrets. A subcontractor quote contains labor, material, equipment, indirect costs and profit, just like any other estimate. It is dependent upon having the quantities, labor hours, hourly rate, and etc., prepared in a reliable manner, just like any other part of an estimate. The amount of the subcontractor quote is also dependent upon the payment terms like the materials being purchased on the project.

Will the subcontractor quotes/costs in the estimate be perfect? Based on the above answers – No! However, they will be more reliable by taking these factors into consideration. No one company has a lock on this secret; all of the successful firms know one of the secrets to a successful project is having a reliable determination made of the subcontractor quotes/costs required to perform the work.

Seventh Secret

The seventh secret is the indirect costs of a project. The indirect costs are the identification of labor, material and equipment items required to support the overall project. Indirect costs associated with a project range from the overall project costs for the owner (i.e. design fees, permits, land acquisition costs, legal, administration, etc.) to the contractor and subcontractor costs (i.e. mobilization, staffing, temporary construction and utilities, equipment, small tools and consumables, etc.).

Will the indirect costs in the estimate be perfect? No again. However, they will be more reliable by taking these factors into consideration. No one company has a lock on this secret; all of the successful firms know one of the secrets to a successful project is having a reliable determination made of the indirect costs required to perform the work.

Eighth Secret

The eighth secret is the profit amount. How secret can profit

be on a project? Profit on a project that has not yet bid is somewhat secret. I definitely wouldn't let anyone know how much or little profit I was putting in any bid I was preparing. But the amount of profit is not too hard to reasonably determine prior to, or even after, a bid opening by any of the other bidders. This can't be true can it? Yes, it certainly can!

Let's consider the estimating process for a minute – the other secrets from above. The quantities should be similar, and in many cases the same, for all of the companies. The labor hours to perform the work should be similar, and in some cases the same, for all of the companies. The hourly rates to perform the work should be similar, and in many of the cases the same, again - for all of the companies. This also applies to the material and subcontractor prices, and the indirect costs. Why? Because the companies are all determining the estimated cost for the project, hopefully, with similar or the same set of project conditions defined in the project documents! This means the only significant other area in an estimate is the profit amount.

Successful companies maintain bidding records. They can be simplistic to sophisticated. On the simplistic side, the bidding records would indicate that if competitor “X” is bidding the project then I should pass on this project because “X” is always has a lower price than I can bid. On the sophisticated end of bid analysis, the records should be analyzing labor, material, equipment indirect costs, etc, along with profit. From the overall perspective, historical determinations can be made as to profit amounts. If a company has a similar cost basis to their competitors (should be the case but there are exceptions), the profit of their competitors can be determined with a reasonably high degree of certainty after a project has been bid. By analyzing historical trends (in the bidding process) one can determine, with a reasonable amount of certainty, the likely amount of profit on an upcoming bid by the competition.

Ninth Secret

The ninth secret is there are no secrets in estimating! Well, perhaps for one estimate or two, but then again, that's a different story!

P.S. There is a tenth secret! I kept it out of the title on purpose. All of the successful companies use experienced, professional estimators to determine the estimated costs of a project. This includes estimates at the feasibility, schematic design, design development, construction documents and bid phases on a project. Professional estimators use all of their knowledge and skills in knowing and understanding these estimating “secrets” and their applicability to each and every project. Does this mean they will always be low if they are a bidder? Watch Out – it is another “No!” Does this mean they have the right “amount” for the project? It is highly likely that this is a resounding “YES!”

P.P.S. There is a eleventh secret that I absolutely will not divulge – the secret handshake of professional estimators! You will have to become a member of the American Society of Professional Estimators to find out this secret! **E**