Estimate-To-Complete, or,...Guess What?!

By W. Scott Tidemann, Director of Claims Services PinnacleOne

During the life-cycle of a construction project, most contractors routinely predict in some fashion the project's final job costs to determine whether it will be in a profit or loss position at completion. If these predictions are frequent, accurate and timely, the contractor can also often identify job problems, take appropriate action and mitigate or eliminate potential economic loss while the project is underway. Armed with this information, a contractor can make critical business decisions more confidently.

For these reasons, it is essential that contractors make these interim calculations of the projected final job costs, referred to as the estimate-at-completion (EAC), with the highest degree of accuracy. This article discusses some of the common methods utilized by contractors to develop their estimates at completion and the accuracy commensurate with each of these methods.

In its simplest form, the EAC is generally determined, at any given point in time, by adding the actual job cost-to-date to the estimated cost-to-complete. The methods utilized and discussed herein to develop a projected EAC will be identified as "Method A" or "Method B," etc. In addition, it is important to note this discussion relates to the cost of the work and not the price of the work, which is often shown in a Schedule of Values and not representative of the true cost of an individual element or feature of the work.

Essentially, all EACs must first take into account what the actual job costs are to date in comparison to the actual progress to date. Making this determination is the first step in calculating the estimated cost for the remaining work. One of the most common calculations (Method A) simply compares the actual cost-to-date to the total budget for an individual element or feature of the work. For example, if project records reflect that 48% of the budget has been expended, it may lead to the conclusion that 48% of the work has also been completed.

While this may be accurate at times for some elements of the work, the probability that it is accurate for the entire project is highly unlikely. Using "Method A" would simply result in an estimate-to-complete of 52% of the total budget for that element of work and, therefore, an estimate-at-completion equal to the original budget. This gives the appearance that you are right on track and within budget for that element of work. Applying this method to every budgeted item of work gives the appearance that the entire project will finish right on track and within budget. Such appearances are often deceiving and the actual condition may not be fully evident until the project is completed, leaving the contractor with very few alternatives to improve its position.

Another method used to calculate the percent complete of elements of the work ("Method B") is to base it upon the representations in the Schedule of Values or current payment application. However, using Method B can result in even higher levels of subjectivity than Method A. This is because contractors often assign the highest possible value to elements of the work accomplished early in the project for cash flow reasons. Consequently, Method B may produce percentages of completeness considerably higher than the actual physical progress of the work.

"A more accurate means to develop a usable EAC (Method C) involves on-site physical inspections of the work to determine the extent to which the work has been completed."

A more accurate means to develop a usable EAC (Method C) involves on-site physical inspections of the work to determine the extent to which the work has been completed. When combined with in-depth knowledge of the original budget and the actual cost of the work through the date of inspections, the physical percent completion data leads to the ability to accurately estimate the cost of the remaining work.

For illustrative purposes, assume that Method C calculations involve formulas comprised of the following values for a single element of work within a total project:

BAC - Budget at Completion - $139,000
BCWP - Budgeted Cost of Work Performed to date - $58,500
ACWP - Actual Cost of Work Performed to date - $66,750
ETC - Estimate to Complete (to be determined)
EAC - Estimate at Completion (to be determined)

Estimate-To-Complete, or,...Guess What?! *(Page 2)*

Imagine that we are analyzing an individual item of work labeled "Hand Texture 2nd Floor Walls and Ceilings." For the sake of this example, also assume this work was represented as an individual activity in the project schedule for which an individual budget item exists in the original detailed estimate. Consequently, the Job Cost Report will contain a cost code for the purpose of collecting and reporting the actual cost of this work.

In order to calculate the EAC, use the steps identified below:

Step 1: Determine the BCWP. This will require analysis of the work completed to date (e.g., all walls have been textured but all ceiling texture work remains to be done), and will require an analysis of the original detailed estimate and budget information. Generally, use the labor hours/dollar and unit cost data relative to both the completed and remaining units to determine the BCWP. As a consequence of this analysis, the BCWP for the work completed to date is $58,500.

Step 2: Determine the ACWP. This will require analysis of the most current job cost report and, given that there are no reporting delays, these records reflect that the actual cost for the work completed to date is $66,750.

Step 3: Determine operating efficiency. You can now determine that you are currently operating at about 88% efficiency (BCWP / ACWP).

Step 4: Determine the ETC. This is calculated by subtracting the BCWP ($58,500) from the BAC ($139,000), leaving a remaining budget of $80,500. Divide this value ($80,500) by the present rate of efficiency (88%). In formula, it is written as (BAC - BCWP) / (BCWP /ACWP), or ($139,000 - $58,500) / ($58,500 / $66,750), or ($80,500 / .88), for an ETC value of $91,477.

Step 5: Determine the EAC. This is calculated by adding the cost-to-date (ACWP) of $66,750 to the ETC of $91,477, for an EAC of $158,227. This figure represents that, in consideration of the current rate of efficiency (88%) and the assumption that the efficiency rate will not change for the remaining work, there will be a $19,227 overrun on this element of the work (BAC - EAC).

Contrasting our hypothetical figures to the results of Methods A and B, we see why Method C is the preferred approach. Using Method A is of little value since the end result will always represent a project as being on budget and finishing within the parameters of the original planned cost. [ETC = [1 - (ACWP / BAC)] x BAC, and then (ETC + ACWP = EAC)].

Method B is also flawed since, according to the payment application, this work appears to be 65% complete. However, according to the job cost report, only 48% of the budget has been expended. This gives the appearance of operating at a high rate of efficiency. In fact, these figures would suggest an efficiency rate of approximately 26% more than the planned efficiency rate [(65% x BAC) - ACWP] / (65% x BAC). Placing too much faith in these figures would also suggest an estimated cost savings of $36,140 (26% x $139,000) for this element of the work. While this information may be appealing, blindly adopting such calculations may have disastrous consequences.

It is essential that the development of an ETC and EAC be accomplished in consideration of all available information regarding the original budgeted costs, the schedule, the work completed to date, the planned and actual costs of the work completed to date, and the work remaining to be completed. The analysis must include sufficiently detailed estimates, budget data and timely reporting of the actual cost of the work. Without careful consideration of these factors, contractors will be unable to accurately predict whether a job is in a profit or loss position until it is completed. Finally, without an accurate EAC, it will be impossible to identify specific problem areas in a timely manner and take the appropriate action to mitigate cost overruns.

For valuable advice and assistance with setting up a reliable EAC development system, contact the professionals in the Construction Claims Services division of PinnacleOne at 800-229-9050.

About the Author
W. Scott Tidemann serves as the Director of Claims Services for the Phoenix division of PinnacleOne, specializing in disputes avoidance and resolution, claim development and defense, and construction/project management. Mr. Tidemann has worked with owners, contractors, subcontractors and legal counsel across the U.S. assisting with disputes, program development and management, contract administration, scheduling, negotiations, risk assessment and project estimate/cost analysis. He has also been a guest speaker for numerous national associations and organizations.

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