

White Paper 2014-07

What the Two Approaches for Cost Forecasting are, and When to Use Them

Depending on the type of cost, there are two different fundamental approaches to Cost Forecasting. The differences between those two approaches, where they do apply and where they cannot apply, need to be fully understood by Project Managers and Cost Controllers. In this White Paper we expose what are these two approaches, what are they main characteristics, and how best to use them.

The two fundamental forecasting approaches

There are two fundamental forecasting approaches that are applicable to different types of costs:

- An approach based on Commitment / Yet-to-Commit for external costs related to numerous small purchases of standard equipment such as bulk piping, steelwork, electrical equipment, etc.;
- An approach based on Estimate to Complete derivation from productivity data (Earned Value) for internal costs (engineering) or external costs such as services, subcontracts, fabrication, complex procurement, etc.

Unfortunately depending on their history, organizations sometimes tend to use a single approach for all types of costs, which does not work. It is essential to be able to use both methods depending on the type of activity or costs that is involved.

It is important to understand that the final cost does depend in part on the underlying quantities, but also on softer issues related to contractual issues and other considerations

Type 1 Forecasting: Quantity-based forecasting

This forecasting approach for bulk standard procurement is based on the following principles:

- Cost already committed should form a sound basis for Forecast; it is driven mainly by the quantities and equipment that have been ordered;
- The main contributors to the Forecast are the quantities that remain to be ordered as the development of the engineering design proceeds; or the packages that remain to be ordered when it comes to the procurement of equipment (Evolution of the specifications and technical requisition / trend from Commercial Bid Evaluation and from Change Order Requests submitted by the vendors once the Purchase Order has been issued). As new data comes in, the forecast must be updated accordingly.

The quality of the forecasting in this case is heavily dependent on the quality of the allowance benchmarks that are being used to estimate the quantities that remain to be ordered, based on the engineering maturity level

and other considerations related to the construction approach.

Type 2 Forecasting: Progress-based forecasting

This approach is applicable for all cost types for which it is possible to measure some productivity.

A sound forecast relies on the consideration of two quantities: one indication of actual cost spent, and one indication of actual physical progress. These are the two pillars of sound forecasting. If only one of these pieces of information is available, forecasting is impossible, or rather remains merely of the quality of an opinion.

The following figure summarizes this important remark. Too often, Cost Controllers try to forecast while missing one pillar – and this attempt is unfortunately futile. It might be sometimes because they don't identify that the two measures are not independent in the case under consideration.



A forecast will only be as good as the information that is used for its generation. Two types of essential information need to be accurate at the time of forecast: Actual Cost of the work performed to date (which quality is very much linked to the quality of the commitments tracking) and physical progress.

Why the forecast of ongoing activities is only as good as the quality of commitments recording, and physical progress measurement.

The accuracy of Actual Cost of work performed to-date (AC) is extremely dependent on the quality of commitment registration and tracking (including the proper assignment of costs to the relevant Work Package). This in turn is dependent on the quality of the breakdown structure with respect to the contracting strategy.

Commitment tracking allows the detection of additional charges and overruns: there are occasions when certain costs increase due to an additional scope of work or an extension of services. This should trigger the issuance of an amended purchase order; when this is not done, costs will only be detected when invoices are received, which can be a few months after the products were procured or services performed and is too late to negotiate performance measures or agree appropriate conditions. Good commitment tracking will highlight deviations early and trigger project management actions and re-forecasts before invoices are received.

Rule of thumb and best practice: *It is important to audit the health of Work Packages around 20-30% of progress. Earlier will not give very reliable insights; later... is too late. Thus whenever Work Packages reach 20% to 25% cost progress, Cost Control should implement a specific review to check that costs remain within the expected magnitude.*

Schedule update quality is also essential and it is important to check the quality of the physical progress data. It's particularly important to consider contractors' schedules for work outside project's worksites. Caution: This information is sometimes difficult to get, its quality needs to be ascertained and is often delayed by a few weeks.

The limits of quantity-based forecasts in large, complex projects

In some organizations – mainly those with a yard/fabrication history – the Estimate at Completion tends to be derived from forecasts of quantities that will be used for many types of costs. The term 'Forecast' is often used instead of EAC. As an underlying meaning, the term is used for all those forecasts that are derived from quantities – man-hours, Bill of Quantities etc.

It is important to understand that the final cost does depend in part on the underlying quantities, but also on softer issues related to contractual issues and other considerations on which the organization has more or less control. For example, a subcontractor might have to be paid more for its resources or for the work to be delivered on time, because it has currently a very high workload and the project happens to be in competition for usage of its resources with other of its clients. Contractually difficult situations might lead to final costs that are vastly different from a Forecast based purely on quantities. Significant changes and rework will also lead to a final cost that is very different from the actual quantities implemented (although some of it could be tracked through the actual quantities spent, it is difficult

to estimate the impact of delayed delivery of material or parts).

While consideration of quantities is certainly an important input, a proper estimate of the cost at completion of the project needs to be based on many other considerations to be accurate, and to avoid surprises towards the end of a project: if the Estimate at Completion did only account for known quantities, final claims from subcontractors based on other issues (e.g. late delivery of material or parts, acceleration programs)

will come as a surprise, and they can be extremely significant.

While the term 'forecasting' is commonly used to describe the process of estimating the final cost of the project, it is important to remember that it should not be limited to quantity-based cost estimates. In particular when it comes to the forecast of the final outcome of subcontracts, which are often a substantial amount of the costs in large, complex projects, quantity-based forecasts are notoriously insufficient.

Conclusion

In all cases, forecasting requires Cost Control to have an excellent understanding of the business so as to understand the drivers that need to be considered. The two main approaches for Forecasting described in this White Paper are relevant to certain types of costs and not to others; and it is important to understand that difference. In all cases, a good forecast also relies on a committed Budget Owner who effectively can guide Cost Control as to the softer issues that might influence the forecast – beyond quantities or productivity measurements.

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