

Costing and estimating - a rough guide

Chris Collins of R & D Concepts Ltd, creators of Synchro32, takes us through his thoughts on this important topic for all businesses.

Definition

So, you want to know what's involved? Let's start by first defining what we mean by costing and estimating. Costing is an action performed to calculate costs *after* a process has taken place (in hindsight you might say) and estimating is an action performed to *approximate* costs *before* a process takes place (crystal balls on standby!).

Essential Difference

It is important to understand that both the action of costing and estimating use the same fundamental methods to attain their goals and they should be almost identical if comparison is to be at all useful. Some would say that the point of costing is to validate the estimate model; and there is a good deal of truth to this. Given that both use similar models to attain a final result, and that both (should) use the same components in their calculation what is the difference? Costing data is based upon actual recorded data (after the event) and estimates are based upon what essentially is a best guess. Some may argue that knowledge of similar jobs and use of 'industry standard' cost knowledge equates to more than a best guess and perhaps they are correct; but essentially you are still trying to predict costs for processes and events that have not yet occurred; and like it or not that is a guess (no matter how accurately you refine it over time).

Methods

First a word of caution, there are as many methods of costing and estimating as there are companies operating them. When I first started out assisting in the computerisation of this area many of the companies I helped used very basic methods of assessing cost. Many had absolutely no idea of unit cost or material/conversion variances and didn't understand the reasons why they even need to care. However competition is now very tough and any extra margin that can be achieved or loss which can be eradicated can all help in the ultimate goal of survival and growth.

For the moment, we need to forget the differences between costing and estimating and just look at what actually goes into a product. The costs involved split into two main areas - material costs and conversion costs. Material costs encompass everything that is purchased specifically for the use of manufacture (not just what it's made of but this also includes manufacturing consumables) and conversion costs encompass every resource used to convert materials into the finished product. Design and development costs could also be included within the conversion costs but at the moment we will concentrate on those costs directly related to production. Incidentally, this type of cost should be included as part of conversion process norms for one-off job shops but not necessarily for long production runs. I would say that there is a third cost "tooling costs" (core boxes, patterns, dies, trim dies, gauges, machining fixtures etc) that can either be paid for up front or amortised into a unit cost over a specific number of units (this is typically for large production runs where the tooling cost would be recovered quickly).

Material costs

This is one of the most straightforward of cost predictors but it can deal some potentially fatal blows if care is not taken. Firstly, let's take the

material a company buys to make the product. Is the actual cost known? The price per tonne may be identifiable but does that equate to a price per tonne in the actual finished product? If a company doesn't have the luxury of buying virgin alloys it will have to deal with waste that essentially increases the overall cost before the material has even hit the shop floor. Even when waste has been dealt with (and of course you've remembered to factor in the cost of the wasting process in your conversion costs), does the manufacturing process itself use part of the material inventory? Has the effect of potential rework and returns been factored in? If part of the material can be recycled (such as cut-off remelt, etc) is the returned material valued accurately? It is a common mistake to use the same value for material going into a process as for the value coming out of a process. Ask yourself if you would buy the same specification of material (post melt) for the same price as the material going in (pre-melt). Even if you have built all this in, there is the issue of changing market conditions to consider. Materials are expensive and (for some manufacturers) can form the greater part of the overall costs. For those costing (as opposed to estimating) you will be dealing with actual purchase costs, which is straightforward, but for those who are estimating, then the position of the market price when the purchase actually takes place should be taken into account. If you are planning a scheduled production release over a period of a year or more material prices are going to change. And to complicate the matter you may be purchasing the materials outside your own country and you have to factor in possible exchange rate fluctuations. Whether varying material costs are a concern or future exchange rates (and possibly, both) a company can hedge against these fluctuations or simply just take a gamble. Either way when building a cost model these items need to be built in as certainties or assumptions and a company cannot afford to ignore them. In recent times, where material costs have fluctuated so widely, most companies base a price on a specific material price and then apply a material surcharge at time of casting supply if the material cost has passed a certain threshold.

Of course so far we have just dealt with the materials that the product is actually made of, each of these concepts will need to be extended to cover all the purchased items that are directly related to its manufacture - this could also include purchased services such as sub-contractors. When a company has the actual supplier invoices costing of material components is straightforward (assuming purchases can be accurately paired with manufacturing correctly) but the estimating model needs to be far more careful. When dealing

with subcontract costs you need to ensure that suppliers are tied into a product specific price for the same duration you are guaranteeing the sale price to your customer.

Conversion costs

When calculating conversion costs we need to look at all the resources that go into turning the purchased materials into a company's finished product, which covers a lot of ground. Firstly, it is useful to split conversion costs into two distinct areas - direct costs and indirect costs. Direct costs are those relating to the product's manufacture (all the processes and resources directly used in production) and indirect (or supporting) costs which covers all the additional resources that are essential for the production to be possible.

In order to obtain accurate direct costs the manufacturer has to know how much their processes cost to put in place - for each and every process. This not only covers employee wages, but also plant and equipment and should only cover those directly related to the manufacturing of the product. A word of warning here, it is all too easy to take a broad brush approach when looking at direct costs and it is tempting to include indirect costs by mistake. The way to tell them apart is by asking yourself if you would own or operate the cost centre if you were not manufacturing the specific product in question. If the answer is yes, then at least part of the cost involved is indirect. The reason it is important to separate the two accurately is for value/profit comparison. You need to ensure that where the line thins between definitions, you are proportioning the costs correctly. Some may say that all costs are included in the end so what's the fuss about? Well, if your only using the end result to obtain a customer price not a lot, but if you're trying to assess what manufacturing you should be concentrating on, which lines are profitable, which are not, in the end where you are making money and where you are losing it, I would say it is very important. So, to obtain these costs make sure your relationship with the accounts department is good and if the information is not available there go and find it yourself. Find out how much it costs to run the equipment, how much capital is being expended, and how long the product actually takes during its cycle. With costing of course you should already have timing information (no excuses here please) and with estimating you need to develop accurate process simulations (and talk to the people on the shop floor where the expertise actually lies) or use so called 'industry standard' time and cost indicators. At this point I must admit to a little ambivalence towards using industry standards, they are certainly better than not using anything but the whole point of costing and estimating is to gain advantage over competitors through timely and accurate information thus by using the same

figures which everyone else seems to be throwing away an opportunity to press home an advantage exists.

Indirect costs are another matter completely, you could (and really should) let your imagination go wild. Any costs not directly related to product go here. Some classify these costs as overheads, miscellaneous rates, running costs, etc. But even here a little organisation goes a long way. After all if these types of costs are to be added in they will need to be proportioned to the product correctly. Many people will take an easy route and will summate all the overheads and proportion to the product costs based upon finished weight (over overall production output). Indeed some still use this method for all costing and estimating (a bad practice to get into). But for certain types of company where the same type and size of product is being made out of the same material, it can make sense for indirect cost distribution. However, with a little more effort indirect costs can be divided into categories that make their distribution more logical. For example, indirect power consumption should be attributed to the proportional amount of time from start to finish of manufacture (and possible storage). Indirect material handling and transport costs could be in proportion to weight, indirect departmental costs could be applied proportional to product complexity. The lesson here is that the more effort you put into being creative with your indirect costs the more accurate your final costing and estimate will be.

Profit

I'll leave you to add the all important reason for business. At the end of the day this addition will mean the difference between boom or bust. But ask yourself this question, if your costs are not accurate how do you know what your actual profit is? The topic of costing and estimating is as important to your company as any other contributory factor. Ignore it at your peril...

About the author

Chris Collins (now MD/CEO of R & D Concepts Ltd - Creators of Synchro32) was first involved in ERP/MRP software design and implementation over twenty years ago. Specialising in the foundry and cast metals manufacturing arena Chris Collins contributed greatly to early production control system design which eventually culminated in the creation of Synchro32, the latest incarnation of ERP/MRP software specially written for the cast metal market. www.synchro32.com