Cautionary Tales Part XXV Costing: Is the price right?

Was there ever a better subject for a cautionary tale? Under estimating your costs will lead to too low a price, which you won't easily be able to increase. Over estimating your costs and your price will be too high and your competitor will get the job. This assumes that the link between costs and price are accurate, but it is not, and the price is seldom right – it is too low. This could be because your salesman has reduced the price, maybe below cost, in order to secure an order that is good for the long term strategy of the company. Other times the salesman will be confronted with fierce competition and will return to his company with the story that this was the top price he could secure, but he has the order for several years, so now they will have to find a way to drive their costs down.

How to drive your costs down is beyond the scope of this tale, and it is my intention to keep to more technical and less business oriented subjects. However, it is impossible to discuss technical issues without having a clear understanding of the cost and business implications. The technical aspects of costing the manufacture of a new part are certain to be influenced by past experience of making similar parts, but getting the relationship right between batch quantity and price requires more sophisticated costing than basing price upon "past experience and a gut feel".

It is clear that a salesman should be armed with as many facts as possible before negotiating a price. He will have a drawing or blueprint for the spring and some notion of the quantity required, and an estimate of the number of years that it will be used. He will know roughly what the spring is expected to do, but not always, and is seldom given enough information about function, and this is another point of this cautionary tale.

A spring company recently supplied double torsion springs for a public transport door closing system. They checked the design using the operating positions that were provided by the buyer. No problems were apparent – the spring ought to have met the spring design life (years and number of cycles) without problem, and this assurance was provided (verbally) with a written quotation. Six months later, the springmaker was surprised to hear that springs had started to fail, and two months later still they were provided with an example failed spring without its operating legs, which were lost. Inspection quickly revealed that the double torsion spring had been operated in the unwind direction, whereas it was presumed to operate in the conventional wind-up direction (see Cautionary Tale 3).

This history is much more likely to happen in a large company, where engineering design a part, and give the blueprint to buying to procure. But the majority of the spring industry's customers are large companies and do this. Your salesman sees their buyer, all reasonable design checks are made about the part, a price is agreed together with a 5 year supply agreement, but the springs start to fail after six months because one vital fact was overlooked.

Would a more sophisticated costing system have avoided this problem? Of course not. But most springs have no hidden problem and the large company buyer is able to secure a good deal for his company. Probably too good a deal, the price will be low and getting lower long term. The small springmaker trapped between the large steel companies who supply the industry and their large company customers will have to accept the low price because their competitors will if they don't. That's the way business life is.

Accepting the low price, however, should be done based upon the best costing data available. Costing should be undertaken at the time of checking the design of a new part, and for this reason IST have recently developed a costing module which can be added onto any of their CAD programs. This allows this spring manufacturers cost estimator to produce a cost estimate for manufacture and a nominal selling price, as shown in Figure 1. Of course, this is only an example of a cost estimating form, but it emphases the incontrovertible link between spring design and costs of manufacture. The CAD program will tell you whether prestressing or shot peening is required, but more importantly, it will highlight tight manufacturing tolerances, or risk of buckling, which would affect your costs significantly. Furthermore, use of a CAD program as the basis for cost estimating allows for the production of a drawing of the spring, which can be taken to the shop floor by the estimator to obtain first hand guidance about set-up times and production rates from the person who will have to achieve or better the estimate.

When the order is secured the shop floor personnel known they were part of the process by which the order was secured, and the team ethic will be reinforced. The salesman will have had his price squeezed of course, but he'll know accurately how far he can yield to the buyers pressure. He will have to assume the buyers information about the spring is complete, but then it generally is.

Mark Hayes is the Senior Metallurgist at the Institute of Spring Technology (IST) in Sheffield, England. He manages IST's European Research Projects, the spring failure analysis service, and all metallurgical aspects of advice given by the Institute.

Readers are encouraged to contact him with comments about this cautionary tale, and with subjects that they would like to be addressed in future tales, by telephone at (011) 44 114 252 7984, fax (011) 44 114 2527997 or e-mail m.hayes@ist.org.uk.