

Steel castings: cost estimating/product costing in Cook foundries

1. As in many industries data from the shop floor are extremely difficult to collect, and this is made worse by having to maintain minimum sand to metal ratios, the optimum levels of which are normally based on more than one pattern per plate. There may be, for example, two or three different jobs on a plate which, provided there are orders for all three, may result in a sand to metal ratio of 3 to 1. If, however, there is an order for only one of those patterns, the sand to metal ratio could be as high as 10 to 1 with the resultant higher costs for that particular item.

2. Of critical importance to unit cost is the work mix existing at the time of manufacture. A large number of different jobs have to be made at any one time. The moulds for these jobs have to be matched to the output of the melting furnaces. Moulds have to be provided to accept that minimum quantity of metal that can be economically melted in a day. The number of moulds required for that minimum quantity of metal clearly varies according to the work mix offered by the order book.

3. Thus, if one particular order consists of 15 moulds and this is insufficient to accept a heat of steel (that is, the output from one furnace) then the balance of the heat of steel has to be put into another order. If another order is available which will consume the balance of that heat of steel, in say, three moulds, then a total of 18 moulds is sufficient to accept that heat of steel. If, however, the only other available order to accept that heat of steel requires, say, 10 moulds then a total of 25 moulds are required for the heat.

4. Clearly, therefore, the unit cost of each casting will vary according to the number of moulds required to consume the steel output. This mixing and matching is all the more complex when the wide variety of different metal specifications is taken into account unlike an iron foundry where few grades of metal are produced. In a steel foundry the variety of metal specifications produced in response to the requirements of the order book result in frequent difficulties in finding an order or orders to consume residual quantities of steel. In the worst case, steel has to be 'pigged', that is to say put in ingot moulds and remelted later. This is expensive and wasteful.

5. In each of Cook's subsidiary companies a small estimating section has been established (generally within the Sales Department). The function of these sections is common although the detail of their day-to-day working varies from company to company. Of particular importance within these sections is the weight estimation of the finished casting, the quantity of feed metal additionally required in the casting process, the general level of complexity (and, by implication, the quantity and complexity of the cores required in the moulding process), the likely time in processing or repairing defects, and the level of testing to assure quality for purpose.

6. Each of the Cook subsidiary companies have calculation procedures for weight estimating and metal flow/solidification simulation to ensure accuracy in this crucial stage of the product cost estimating. From this point onwards, however, the companies vary widely as to their finished cost estimating systems.