# MARKET SHARE WILL BE WON ON UNIT COST

In this article, Andrew Hawes of Newton Industrial Consultants argues that the future of plastics or rubber companies can only be guaranteed if they are able to beat the competition on cost. Nowadays quality is rarely a differentiator – customers expect high quality as standard. Nor is customer loyalty guaranteed; existing customers will soon leave if they can buy the same product cheaper elsewhere. Unless a company is in the fortunate position of having a unique, patented product in a growing market it will be unit cost that determines sales, profit, success and future security.

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The future of plastics or rubber companies can only be guaranteed if they are able to beat the competition on cost. Nowadays quality is rarely a differentiator – customers expect high quality as standard. Nor is customer loyalty guaranteed Existing customers will soon leave if they can buy the same product cheaper elsewhere. Unless a company is in the fortunate position of having a unique, patented product in a growing market it will be unit cost that determines sales, profit, success and future security.

> **'..there are two basic options for reducing unit cost. Minimise the overall cost or increase the number of units.'**

Breaking down and prioritising the costs individually is the best approach to minimising the overall cost. Each cost can then be attacked in turn. The largest costs are likely to be labour, raw materials and factory overheads. We could expect to get some small labour savings through headcutting, but these will be one-off and unsustainable.

***Andrew Hawes**, Newton Industrial Consultants*

On raw materials costs, it will be difficult to have an impact, as most are commodity materials with small price variances and attacking factory overheads will only yield small results by pruning off the less critical functions, outsourcing etc. Cost cutting will certainly yield benefits, but they will require a great deal of effort and could be painful, to achieve small savings.

## Spreading costs over more units has the biggest impact on unit cost

The second option is to increase the number of units over which costs are spread. This requires increased productivity and selling the extra capacity. At first glance this may seem like wishful thinking. It relies on two requirements to be practical: 1: *The output of the existing equipment can be increased* and 2: *The extra output can be sold.*

Before we go along this route, let us look at what it would mean if we could squeeze an extra 10% of capacity from a factory with no additional costs other than raw materials and shipping? This would mean that for the extra 10% there are no additional labour, overhead or factory costs, so profit margin is very high – typically 4 to 8 times the normal margin. This allows a reduced sales price, making it easier to sell whilst still giving a much higher than usual profit margin. The business implications of this are very significant.

## Can you sell the extra product?

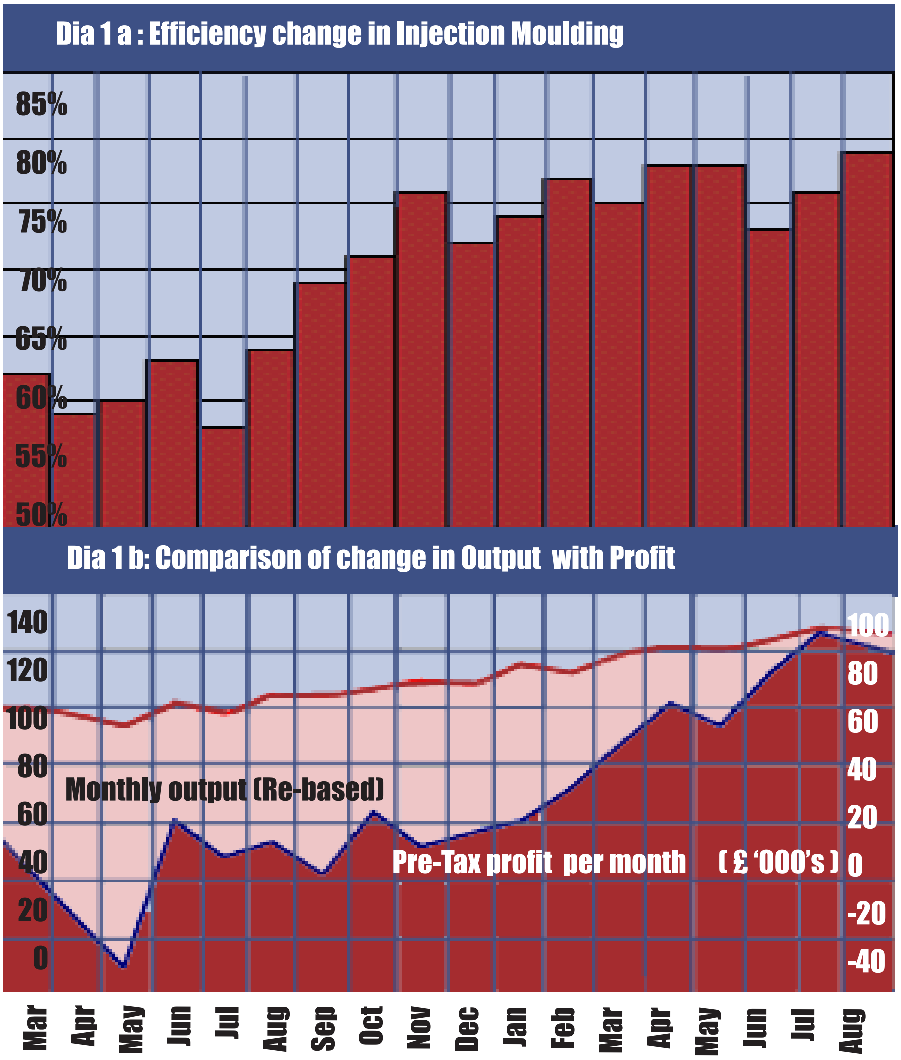
Ten years ago, there was a price war in the British supermarket, where prices of baked beans fell dramatically. The origins were obscure and little known. An Italian canning company who had seasonal demand for their tomato canning process had excess capacity out of season. Instead of letting their crews and machines stand idle they looked for a new opportunity. They found that the raw materials for baked beans were extremely cheap, their process was capable of processing them and by filling a container ship they were able to flood the UK market with cut price baked beans. Because their overheads had been paid for by their existing tomato business they were actually making profit from selling cans at less than half the price of their competitors.

The same is true in our industry today, except for us it is even better, as there is little brand loyalty and so no need for such dramatic price cuts, and therefore we can increase sales with an extremely high profit margin. Even if the extra sales are not immediate, taking advantage of demand fluctuation and aggressive marketing will increase sales over time. One injection moulding company increased its efficiency by 27% in 4 months. Initially it had to stand down a number of machines, but with the pressure now on the salesmen the additional capacity was filled in 12 months. The company had 27% more revenue with the same overheads and same labour bill.
The graphs in Diagram 1 opposite show how the efficiency improved rapidly while the total output and profit increased over 12 months.

## Existing plant holds the key to increased capacity

Increased capacity is often perceived to mean new machines or new facilities and hence additional costs which eat into the new profits. This makes it difficult to commit to increased capacity plans. The truth, however, is that all manufacturing processes the world over have the potential for significant increases in capacity and so new costs are not necessary.

Whether a process makes injection moulded widgets, tyres or waste bins it will have many different production problems. Downtime problems, waste problems and problems resulting in reduced operating speeds exist everywhere. Process efficiencies typically range from 50% to 80%. Even at best-case this means 20% of the capacity is lost due to these problems. This means that a significant increase in capacity must be possible, provided we can solve these problems in a rigorous and methodical manner



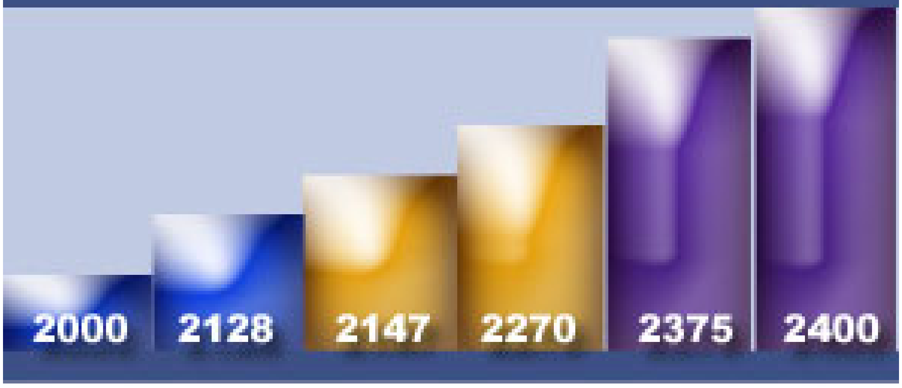

Every problem has a financial value - the amount that it costs the company each time it occurs. If the process stops due to the problem then it will be the cost of being unable to sell the product you could have made, or the cost of having people, plant, buildings etc. stood idle while the problem is resolved. If the problem causes waste then it will be the value of the wasted material, and so on. As each of these is quantifiable it is possible to financially value every problem and prioritise it.
It is therefore remarkable that even in most of the world's biggest and most successful companies, problems are not effectively financially valued and prioritised. During a recent project at a plastic extrusion site, part of a multi-national company, the situation was typical. At the start of the project the four most senior managers in operations were asked to list the top 3 most valuable problems on the site, and to state the annual value to the company if the problems were solved. The four managers did not agree on the 3 top problems and chose 9 between them. Their estimates of financial values were

staggering, from £20,000 per annum to £1,000,000. The implications of this are important – how can a company focus on the most valuable problems if they do not know what they are or how much they are worth? With limited focus, fewer problems are solved and those that are may not be the most important ones.

## Valuing Individual Problems

The second stage is to prioritise the problems and opportunities financially. To do this the potential of each process needs to be understood. The injection moulding business mentioned that was referred to earlier in this article achieved this on its main product by breaking the moulding cycle down into seven stages. The minimum time for each step was recorded across the four machines. They calculated that, if they could run at this speed all of the time, they could produce 5760 units per hour per machine. When they looked back at their production records they saw that they averaged 3680 per hour, an efficiency of 64% (which is typical for the industry). They were missing 2080 units per machine per hour! These "lost" units were due to downtime, waste and running below optimum speed. By doing a detailed analysis of the process over a week the reasons for all of these lost units were identified and prioritised. The losses were then converted into a financial value – using the knowledge that they had the potential to sell 20% more product if they could increase their efficiency. With this information it was clear how to proceed. The result of this is shown in Diagram 2 below. Frequently this process uncovers 'hidden problems'. If we cannot see a problem, it is very unlikely that anyone will try to solve it. This means that if the hidden losses can be found, they may be quite easy to solve. In the above example it was found that one machine was 30% faster at unscrewing and ejecting the parts. This was due to it having a 1½ inch piston driving the rack rather than a 2 inch piston on the other machines. Less hydraulic oil was needed so it operated faster. A quick investigation resulted in all four machines being fitted with a 1 inch piston and the overall cycletime being reduced by 12%. This opportunity was hidden because no one had looked for it. These hidden losses exist because of the way that process performance is measured and how perfect performance is defined.

**Dia 2 : An increase in efficiency allowed 20% higher sales**




A good example is in a batch process, where steps that are done sequentially could be put in parallel to save time. Because each of the steps is seen as productive time, and measured as such, there is nothing to tell us that we are losing time because of this, so it is hidden loss and the process must be looked at more closely.
A British plant producing polymers found this situation in the filling stage of the manufacturing process. Each raw material was put in one at a time, and once all the raw materials were in, the mixing commenced. There are separate solids and liquids weighing systems in this process, so the first improvement they made was to allow them to operate simultaneously. This saved 9 minutes on the cycle. On top of this, they started the mixing earlier, when 25% of the raw materials were in the vessel. This removed another 16 minutes from the cycle time. This was 25 minutes from a 4 ½ hour cycle time – a 10% increase in the capacity of this process.

## Increasing Productivity

Knowing the most valuable problems is clearly only the start – it is only by solving them that improvement happens. There are two common reasons why companies are unable to do this – failing to allocate individual problems to individual people, and secondly by not having the skills within the team to resolve difficult problems.
This was illustrated well at a British blow-moulding plant. Whenever a problem stopped a machine they were extremely effective at allocating an engineer to get the machine running again. However many of the problems re-occurred as often the engineer was focused on getting over the problem rather than permanently eliminating it. They decided to continue to allocate most of their engineers to this 'fire-fighting' approach, (getting machines up and running), and allocated two to solving problems permanently.
More specifically they gave both engineers three of the biggest problems each, and freed them from their normal day to day activities. These 6 problems accounted for 40% of the total downtime. With this level of focus and time the engineers were able to dedicate themselves, and within 7 weeks four of the problems were eliminated and the other two halved. This gave the site a 22% increase in output, worth over

£600,000 per year. Meanwhile a Problem Tracking and Review system was installed so that the scale of individual problems could be tracked over time.

> **'..solving difficult problems requires dedication, belief, skill and ability.'**

This type of problem has often existed for a long time, and the first obstacle that needs to be overcome is to believe that any problem is solvable. An engineer working on a polymer overheating problem in the plastics industry was told by his colleagues that the problem had existed since the process was installed, it was an inherent part of the process and therefore could not be solved. The problem became a priority at the start of an improvement project – historically the problem was known about but tolerated, it was only when it was valued at £250,000 per year in waste and lost time that the true scale of the problem was realised. The engineer used a problem solving tool called 'split solving', which guided him to the solution within 3 days. It transpired that the wire between the PLC and one of the thermocouples was wired alongside a 110V cable. This caused the PLC to receive incorrect signals, which in turn meant it delivered too much power to the heating elements.

## Summary

With few exceptions, Lowest Unit Cost will determine the successful companies in the rubber and plastics industry. The biggest single lever on this is the number of units over which costs are spread. Increasing this requires an increase in capacity and selling the extra units. If we can make more units with no additional costs except raw material and distribution costs, these extra units typically have 4 to 8 times the usual profit margin. This makes it possible to increase sales with a highly competitive price whilst still maintaining a high margin. Capital expenditure is not necessary to achieve the extra capacity, which can be unlocked by solving the multitude of problems which afflict all production processes. With rigour by following a systematic process that values problems financially, allocates resource to them and ensures that individuals have the time, skill and support to resolve them permanently, this can be achieved.
The results of these efforts can be seen within months, ensuring a competitive unit cost and long-term success assured.

**The author's consultancy work has covered projects in the Paper, Pharmaceutical and Brewing and Plastics Industries.**

Andrew is a graduate of Loughborough University in Industrial Design and Technology, and a postgraduate of Cambridge University, where he studied Advanced Design, Manufacture and Management. During his career, Andrew has worked on projects with major manufacturers in both the UK and the USA including Kimberley Clark, Smith-Kline Beecham, Quaker and Guiness.

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Newton Industrial Consultants
10 Main Street, Shenstone,
Lichfield, WS14 0NB
+44 (0) 1543 481557