

Utilisation up and wastage slashed

Fourfold Precision Mouldings has built a bright future by moving to new premises and using simulation systems to transform its production efficiency and flexibility

Yorkshire plastics mouldings firm Fourfold Precision Mouldings' use of Delmia Quest factory simulation software won it the coveted first prize for the huge results delivered just weeks after relocation to its new premises. Fourfold managing director Martin Wilson says that, for example, with a robot on the machines, production on each shift was increased by more than 40% while scrap levels reduced to less than 0.5%.

Beyond that, on smaller machines with sprue pickers, one operator can now run up to five machines with the sprues fed direct into granulators at the machines and then back into hoppers – meaning zero waste of raw materials. The new facility is already showing savings in labour costs and overheads, as well as material costs (eg: a new silo providing savings to cover its £21,000 cost within 12 months while ensuring that Fourfold remains competitive in a volatile marketplace).

Fourfold was, until a few months ago, operating on a cramped site in 19th century mills in the Yorkshire village of Silsden. The layout of its machines, manufacturing processes and clean room had developed over many years, constrained by an old building with restricted access. Now, without disruption to its output, the company has managed an ambitious relocation to large, modern, purpose-built premises in Keighley.

"This move represented an enormous investment in the company's future," says Wilson. "Some £3.5 million have been spent on new equipment, infrastructure and our new building... With proper planning and layout, we could make the business more efficient and hopefully ensure the future for our customers, suppliers and the employees... Our new, lean manufacturing operation will enable us to operate more efficiently than ever before and thus increase our profitability still further."

There were only a few thousand square feet between the old and new buildings, but the similarity ends there. With the old set-up, finished product had to be carried through the mould shop prior to transportation, as did raw materials. It was proving almost impossible to keep expensive equipment at consistent temperature and humidity, and the constant inefficiencies around products were keeping personnel busy unnecessarily.

So to help with planning the new facility Paul Bateson, manufacturing specialist with technology transfer and process development consultancy

Northern Technologies, was asked to provide a shop floor layout and flow chart using Delmia simulation software. Bateson spent three months working with the management team, starting with close observation of the manufacturing processes. He then laser measured all equipment and its footprint before generating Quest layout variants. All employees were asked for input and, over a four-month period and several meetings, a plan was formed that would create a smooth flow through of raw materials to production to secondary operations and finally to despatch.

The production line at the new plant is now U shaped, with deliveries leading to the granulation and colour mix area and then to the mould shop. Next to the mould shop is the state-of-the-art clean room, with both the clean room and mould shop having ready access to secondary operations and despatch areas.

Involve everyone

Although not substantially bigger than the old factory, there is now significant room for expansion, owing to the more logical layout. A new gantry crane serves the whole of the mould shop, replacing an old block and tackle that previously made changeovers to new products so time consuming. In addition, changeover times for tools have been reduced by better access to tool storage and further utilisation of the overhead crane.

Says Bateson: "During my 15 Quest model iterations, I was able to involve almost everyone at Fourfold, so best results were achieved. When I was showing the latest model to the management team, I used my laptop and for bigger groups, including shop floor workers, I showed the model via a projector. In this way, the real issues came to the fore. We were even able to build in the lead times for ordering new equipment, as well as to prepare the pipework concepts."

One of the biggest areas of wastage in the business was machine stoppage: every down machine means 10kg of materials dumped. With 21 machines and the cost of materials varying from £800 per tonne to £3,900 per tonne, it amounted to a significant impact on Fourfold's bottom line. However, the new factory's improved process flow has considerably reduced stoppages at source.

Also, by grouping machines by process and sharing robotic resources between them, the firm has been able

Key Benefits

- Achieving cost savings of 10%
- Production per shift increased consistently by more than 40%
- Scrap levels reduced to less than 0.5%
- Savings in labour costs and overheads
- Reduced material costs throughout
- Reduced fuel consumption
- Substantial new business already and much more to come



to reduce staff levels. In one instance, a single worker now looks after six machines. As a result, despite maintaining the same level of automation and reducing the payroll, Fourfold's production capacity has increased.

Says Wilson: "The move to Keighley was in February 2006 and it took almost two weeks to move our 20 moulding machines, ancillary equipment such as dryers, loaders, conveyors etc, plus the stocks of raw materials and finished goods and, finally the office equipment. Because of the forward planning, there was very little break in production and, therefore, very few late deliveries to customers."

Transformed logistics

And he adds: "Thanks to the Quest model, we were able to: install a material silo to feed the clean area, resulting in less handling and cheaper material; install central drying facilities and material feed to the machines in the general moulding shop for, in particular, acrylic, polycarbonate and talc/glass filled polymers, again reducing manual handling and enabling cheaper materials; and install an overhead crane for tool changes, also reducing manual handling and allowing for quicker tool changes."

The tool room is also now sited near the production area and served by an overhead crane, while machines with robots run back-to-back to enable one operator to look after two machines or more, thus saving labour on all three shifts. Also, Fourfold has installed a recycling water chilling system which reduced consumption.

"The move has already shown significant savings,

and additional savings will be made in future as we re-train staff to perform extra duties and lose others through natural wastage," says Wilson. "Our machines are running more efficiently, as there is now a constant ambient temperature, which means less power is used to control temperatures on the process equipment.

"We have already seen an increase in enquiries for new work... While it was difficult maintaining two partially operational plants as we switched production from our old building to our new one, the benefits to us as a company have been tremendous and Quest even helped us through the logistical nightmare of this transitional phase.

"If you just take one of our product lines, the plastic shot glasses, we estimate that costs savings of up to 10% can be achieved. This is because we can take advantage of lower material costs now we can order in bulk and store the materials in a silo – and this benefit is combined with reduced scrap levels and more efficient use of labour in the clean room.

"Staff reductions are being made without a reduction in output. Savings are being made on fuel consumption while still running all machines. Already we have won new work worth over £250,000 pa due mainly to the fact that the whole presentation of the new factory gives customers confidence in our ability to supply their requirements. There are also potential orders worth over £1m that have been quoted for since the move."

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