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Above from left to right: The box bending station can form parts up to 1.5 m deep; in the past Triumph would have made a flat panel and welded stiffening pieces to it, but the Pivatic line can form a box section into the panel to stiffen it; the bending stations can be fed directly from the punching machine or by pre-cut blanks; the tool cassettes in the Pivatic line's punching station allow rapid tool changing.

Coil-fed punches allow quick product changeover for custom **JIT** products

Flexible equipment, solid results

Once known as the iron capital of the world, Merthyr Tydfil, in the heart of South Wales, was a key center of the British industrial revolution. Although the heavy engineering industries of yesteryear may have moved on, one Merthyr-based company is helping to support the financial and service-based industries that today are at the heart of the U.K. economy.

Founded over 60 years ago and still a family business, Triumph is one of the U.K.'s most established and successful names in office furniture and storage equipment. The company offers a comprehensive range of products designed

to meet the needs of modern corporations with an emphasis on quality, customer service and technical expertise.

It not only markets its products through wholesaler and dealer channels, but also works with architects and specifiers to provide service for major projects. Here, the combination of price, specification and time are crucial to the project's success, and these can't be compromised if a project is to be delivered on plan, on time and to budget.

At the heart of Triumph's manufacturing facility is a coil-fed CNC punching, blanking and forming line supplied by the Finnish company Pivatic that provides the necessary flexibility and productivity to meet these stringent requirements.

Installed in 2004, Triumph's third Pivatic line complements a blank-fed forming line installed in 1996 and a coil-fed punching and forming line installed in 1997.

Although it's unusual for a coil feeding system to supply a



punch press in most operations, Pivatic's products are designed to be integrated with just such a system. It allows its customers to be more flexible by getting steel into the punch quickly without a material handling system that puts steel-sheet stock or formed blanks into the punch. More parts can be produced from a continuous coil, and coil stock is usually less costly than sheets.

Production on the line starts with mild-steel coil. This is uncoiled, straightened and precisely fed by a roll-feed unit into the CNC punching station. It uses standard turret tooling held in two quick-change cassettes, each holding 26 tools. Punching is freely programmable and the twin cassette approach means that both sides of the coil can be worked on simultaneously. After punching, a guillotine shear cuts the blank to length before it passes through to the bending stations.

The CNC bending cell first forms the two sides of the blank and then passes the component through to the end bending cell. As these parts are concurrently formed, the overall cycle time is equivalent to the longest forming operation.

A turnover station before the first bending operation ensures that any burrs from the punching operation are hidden on the inside of the finished product.

The punched and formed component then comes off the line to an operator station before being placed in the final station for box bending.

As well as operating as an integrated line, the Pivatic system can also operate as stand-alone lines. Blanks from the punching station can be automatically stacked rather than passed straight through to the bending stations, and the bending stations can either be fed by the blanks coming from the punching cell or from a separate blank de-stacking station.

The maximum coil width is 800 mm, but the bending cells can take blanks up to 1,200 mm wide and produce panels up to 2,200 mm long. The side and end bending cells can form features up to 110 mm high, and the box-bending station can bend up to 1.5 m deep.

Supporting new products

The investment in the third Pivatic line was driven by the launch of a new range of products. In the past, one of the options might have been to hard-tool the new products and use conventional presses for blanking and forming, but that can be very expensive and also means that production is dedicated solely to the current product mix.

But as Triumph's technical manager Anthony Dicks explains, "Our market changes so quickly that we need to be as

flexible as we possibly can. This is where the advantages of the Pivatic equipment come into play. You get the same benefits as a turret punch, which means you can change tools very quickly, but it's also coil fed so you get a high rate of throughput. You aren't picking up blank sheets, putting them on the punch press and then moving them somewhere else to form them. You start from coil and you end up with a finished product."

This flexibility is crucial. In the past, a product range might be in production for 10 years, whereas now the design might be updated in a matter of months. The diversity of products and the range of sizes offered also means that a huge number of different components have to be made using the same production process.

What makes the requirements even more demanding is that every single product is made to order rather than pulled from stock; what is on the machine one day could be shipped to the customer just three or four days later. The factory is given instructions on what to produce for the current order book, so a wide range of different products may be on the line on any given day.

This means that production planning is critical to the whole operation, and Triumph has designed and developed its own system to cope with this. To give the most efficient production schedule,

Coil Handling

batches could be anything from 10-off to several hundred-off and comprise either kits of parts for a particular product or long runs of the same component.

A standard tooling setup allows most parts to be produced with no tool changes, but if changes are required, the cassettes can quickly be loaded with new tools. This means that normally it's only the coil that needs to be changed to allow for different widths and thicknesses. Again, this is a quick process and on a typical day there may be up to eight coil changes.

Both the punching and bending operations are programmed offline, which also helps to ensure that there are no delays switching between products.

The amount of tooling available in a standard setup is not a limiting factor for Pivatic. If the application requires it, Pivatic can offer systems



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with fast tool cassette change and auto-index options, as well as modular hard-tooled units.

Cutting out second operations

Triumph aims to minimize the number of secondary operations after parts come off the line, and if there is some sub-assembly spot-welding work to be done, it's generally done by the line operator.

An important feature of Triumph's new furniture range is that each item has a fully welded frame for strength and rigidity. As a consequence, parts go straight from the Pivatic line to final assembly and robot spot-welding before being painted as a complete unit.

According to Dicks, the Pivatic line has allowed Triumph to streamline its production processes and improve the product at the

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