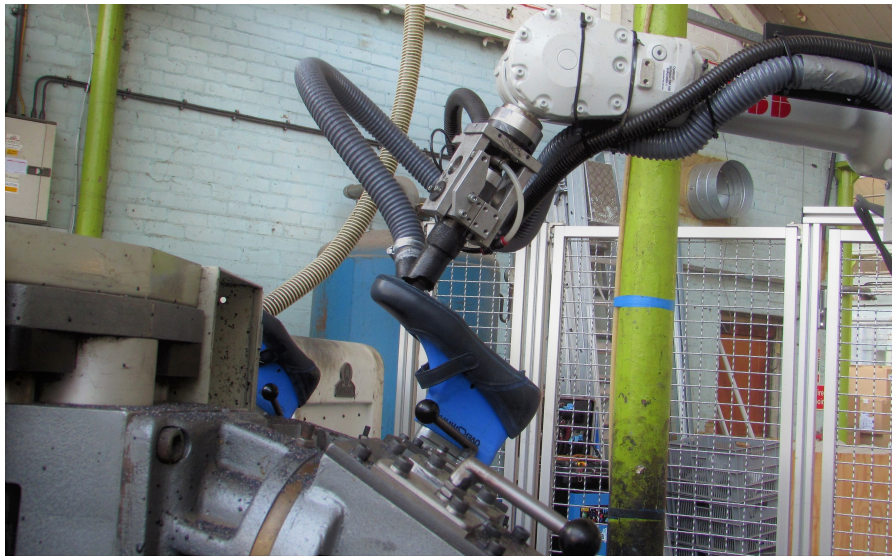


SOLUTION

ABB robots prove the best fit for specialised footwear SME



Improved flexibility to cope with an expanding product range and the reassurance of prompt service and support were two key factors that convinced DB Shoes to replace its existing production robots with the latest ABB robots.

With a history dating back to 1840, Northamptonshire-based DB Shoes offers a wide range of footwear, including specialist wide-fit ladies' shoes.

Improved performance brought by ABB robots, helps shoe manufacturer boost competitiveness and create a reputation for big choice.

From its factory in Rushden, which employs 20 people, the company offers its ladies shoes in a range of styles with a choice of four different fittings. Specially made for customers with wider feet, the shoes feature a distinctive deep-fit design which helps to hide their depth, with the sole of the shoe running part way up the leather upper.

To achieve this, the upper is bonded to the sole in a polyurethane (PU) direct injection mould. Much stronger than adhesive and quicker than stitching, the moulding process creates a strong yet flexible shoe that can withstand over 11 million flexes without the bond failing.

A key challenge in DB Shoes' manufacturing process is the range of different parameters that need to be applied. As well as different designs being needed according to whether a shoe is for a left or right foot, the company also offers seven different sizes with five different sole moulds plus an additional choice of three stretch panel designs. Combined, this amounts to around 210 different options, each of which needs to be turned into a distinct program for the robots.

To help maximise output, the company uses two PU injection moulding machines, each equipped with an ABB robot. Each machine has twelve stations, enabling six pairs of shoes to be produced at a time. The production process is comprised of two stages. First, the leather uppers are placed onto shaped moulds, known as 'lasts', which are offered upside-down to the ABB robot to be 'roughed'.

The roughing process involves a rotating abrasive disk being guided around the area of the shoe where the upper and the sole will meet, known as the 'bite line'. By abrading the smooth surface of the leather, the roughing process helps to maximise the bond between the sole and the upper by enabling the polyurethane to fully penetrate during the moulding process.

By automating this process, DB Shoes has eliminated the need to manually mark the bite line and rough the surface of the shoe, which can be time-consuming and sometimes result in potential inconsistencies in product quality.

Once all the shoes have been roughed, the uppers are then manually inverted, with each placed into a mould into which a mixture of resin and chemical is injected to create the sole. As the resin and chemical mixes, it creates an exothermic reaction, with the total moulding process lasting around four minutes per shoe. As the initially liquid polyurethane sets, it penetrates the roughed areas of the shoe to create the strongest possible bond.

Before installing the ABB robots, DB Shoes had previously been using 20-year old robots of a different make to handle the roughing process.

Although these robots had worked well, they were struggling to cope with handling the multiple programs needed to produce DB Shoes' full range.

"Although our old robots were continuing to operate perfectly well and could handle the different programs that were needed for the 12-station mould, it was becoming difficult to manage the mounting range of programs needed to produce our expanding range of shoes," says David Denton, Managing Director for DB Shoes. "To help make things easier, we needed an upgrade that could handle our full current requirements for multiple shoe designs and be easily adapted to handle new designs in the future."

Initially turning to its incumbent supplier, DB Shoes found that it was unable to obtain the right replacement solution or the level of support that would meet its needs.

"As the robots are a key part of our production process, we were looking for a solution provider we could rely on to be on hand quickly in the event of any problems," explains David. "Unfortunately, the company we were previously dealing with just didn't have the right expertise or infrastructure in place to be able to support us."

After contacting Bedfordshire-based ABB Authorised Value Provider, Premier Automation, David was recommended a solution utilising two ABB six-axis robots.

"Changing to ABB presented a solution on two fronts," says David. "Firstly, the two new robots have more than enough memory to accommodate all 210 of our current production programs, with the ability to handle more if required. Secondly, both ABB and Premier Automation are near our factory, and have the resources in place to provide a fast response in the event of a problem or query."

Given the key role of the automated roughing process in the production of the shoes, it was important to minimise any disruption during the installation and commissioning of the new robots. For this reason, Premier Automation spent around six months developing and testing the replacement robot cells, including creating a library of template programs for each shoe type that can be easily adapted by DB Shoes for new shoe ranges.

"Having an aesthetically pleasing product is a core part of our commitment to providing our customers with the highest quality footwear. It was therefore imperative that the robots were correctly set up to ensure that the roughing process was carried out on the correct part of the shoe, particularly when it comes to our stretch panel options, which need to be carefully handled as the roughing wheel could tear the material," says David.

"Premier Automation worked hard to learn and understand our production process and to address any potential issues that might affect the quality of our products."

As a result of this pre-preparation, the time taken for the new cells to be installed and set up was reduced to just three days, with little overall impact on the company's production output.

"To help reduce the impact of installing the new cells, we had been operating on overtime the week before to build up extra stock," explains David. "To help further minimise disruption, we also upgraded each machine individually rather than having them both out of service at the same time."

Since the robots were installed in December 2017, they have worked perfectly, enabling DB Shoes to produce around 300 pairs of shoes each day, with the potential to handle 700 if required. For David, a key benefit of the robots is their ability to be quickly switched between any program in the company's full shoe range.

"The flexibility of the robots, coupled with the templates set up by Premier Automation and the training they provided to myself and other members of my team, means that it is very easy for us to change between different shoe types and sizes," says David. "If we want to change a template or set one up for a new type of shoe, it's as easy as just copying one of the existing templates and making the edits needed to create a brand-new template using ABB's handheld teach pendant controller."

Overall, David is very pleased with the new robot cells, which are well on course to offer a payback on investment within three years. "With 60 percent of our sales coming from our online business-to-business and business-to-consumer retailing activities, we need to be able to offer the broadest range of shoes and deliver them quickly without compromising our quality standards," he says. "Thanks to the expanded capabilities of the robots, we are able to offer the sort of production performance and turnaround that you'd expect from a much larger operation."

With many smaller UK manufacturers still unsure about whether to make the switch to robotic automation, David advises: "In my opinion, the key to success in an installation like this is to know what it is you are trying to achieve from the very outset and to make sure that you have someone who owns the project and knows the production process very well. It also helps to be able to count on the support of both the robot supplier and the system integrator, who can be on hand and give help if needed."