



ROBOTICS: A COMBINATION OF THE TRADITIONAL AND THE MODERN

The metal rainwater industry has a long history in the UK market dating back over a century when lead and cast iron were the materials of choice. Today the industry uses the latest in manufacturing technology to produce a wide variety of high quality solutions in cast aluminium and iron, fabricated steel and aluminium.

Hall & Botterill, a member of the Metal Gutter Manufacturers Association (MGMA), is one company that has taken advantage of the latest technology to develop and install an industrial robot to fettle (to trim or clean the rough edges) gravity die aluminium castings, many of which are based on original Victorian and Edwardian designs.

Managing director Alex Paterson explained that there were a number of reasons for wanting to install a robot; "Fettling castings is hard work, with the risk of repetitive strain injury (RSI) from using the finisher (belt sander); the danger of using the band saw; the noise created by the band saw and the finisher, the risk of hand arm vibration problems again from using the finisher. We also wanted to improve productivity as well as quality."

Two years ago, Alex decided to design his own robotic fettling cell; finding experts who were capable of building an acoustic chamber and specialist tool providers who could supply robotic compliant tools. The robot was installed and a computer programmer was commissioned to program the process for the first of many castings; with a product range of over 500 castings this would be no mean feat!

Everyone that has been and still is involved with the robotic production cell insists that they have never seen a cell like it anywhere in the world. The reason the Hall & Botterill cell is so different, is that unlike robots in the automotive industry their robotic cell is a multi-tasking machine. It picks the casting up from a turntable, carries it to the circular saw, from there to the rough debur tool, to the linisher, to the fine debur, and if necessary to the drill. Then it ejects the casting down a chute and repeats with the next casting. Because we have so many different castings in production we have to have different gripper “fingers” for each casting as well as different pads for the turntable. Changing from one component to another takes 10 minutes.



Gripper fingers

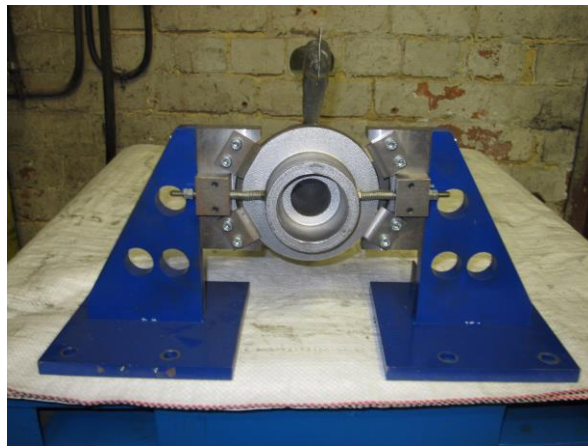
With over 41 different components programmed in and another 18 ready to be programmed, it was always going to be the case that eventually the robot would be too busy to meet the demanding production schedule and to that end Hall & Botterill purchased another robot to complement the production cell.

The installation of a robotic production cell in such a small foundry has resulted in a number of benefits both for the company and its employees. Health and safety risks have been reduced; castings which were deemed to be the most dangerous to handle were programmed first which meant that operations involving machinists and high risk band saw were removed which eradicated the risk of injury altogether.

In fact, thanks to the robot the company is now in a position to take on new work which has never been manually fettled, because it was previously deemed too dangerous.

The effects of both hand arm vibration and RSI have been significantly reduced because fewer castings are going through the linisher. The robot operator is no longer required to sit in one position and this increased mobility lessens the risk of possible musculoskeletal pain and fatigue. In addition, noise levels have also been reduced significantly.

The installation of the robot has also seen productivity levels double. The lead time from cast to sale is now reduced from one week to 24 hours. Previously, a casting would come out of the die; the following day it would have the risers sawn off on the band saw; the day after would see it being linished; the next day would have it being de-burred and punched and finally it would be ready for sale.



Gripper fingers holding a casting

For example, one particular casting that would have taken 90 seconds to hand fettle now is fettled by the robot in 42 seconds. The quality of the finished product is uniform with no sharp edges.



Pad with casting on it

Hall & Botterill believe they have created the world's first affordable "jobbing" robotic production cell and indeed their efforts were recognised at the 2015 Cast Metals Federation Awards where they received a 'highly commended' award in the Innovation of the Year category. To see an example of robotic aluminium fettling on the MGMA website, go to www.mgma.co.uk.

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