HOWARD WRIGHT™
Medical Beds & Stretchers

CASE STUDY
Network Site Visit

POWERED BY

CallaghanInnovation
New Zealand's Innovation Agency

PROGRAMME PARTNERS

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INDUSTRY 4.0 Network

Overview

Howard Wright manufacture and export high quality hospital beds and stretchers worldwide. Starting in the 1950s, the organisation has won multiple design awards for their Simple, Smart & Human designs. Engineering, Manufacturing and Assembly are based in their New Plymouth headquarters with distributors and subsidiaries worldwide. Known for high quality and functionality at a competitive price point, Howard Wright pride themselves on value for money and impeccable customer service.

Challenge / Opportunity

The bottleneck process for Howard Wright historically has been welding. Being relatively early adopters of robotic welding, the throughput wasn't able to meet the time required for effective single piece flow through the operation. With a need to grow capacity to keep lead times in customer expectations, its efficiency at the robotic welding was a logical starting point.

The main contributor to downtime was change overs, with individually cut and orientated steel tubes originally requiring fixing to a jig, before being thoroughly visually inspected prior to commencing the welding programme. The vast majority of the changeover time is made up of fixing the new fabrication to the jig and inspecting the finished unit afterwards.

The original jig designs followed common practice using manual clamps pushed down in specific locations around the fabrication to ensure welds were correctly positioned and the resultant heat distortion is controlled.

The manual clamp handles sit proud of the fabrication and take up significant areas of the fixture. This can result in:

- Poor access for the welding torch at the preferred angle to increase likelihood of a successful weld
- Crashing of the robot on clamps that hadn't been fully depressed, or clamps that had been worn out through use
- Damage to the torch from rubbing against clamp positions

These issues meant that the manufacturing process still required a portion of manual welding to both check and touch up defects and finish off welds that could not be achieved through the robot welder at all, due to lack of access.

To improve changeover time and reduce defects requiring rework (which absorbed further capacity at the bottleneck) new jig designs were proposed.

Solution

To reduce downtime and rework impacting capacity, the team needed a better way to changeover, eliminate crashes of the robot against clamps, ensure greater consistency in successful welds and move to as much robotic weld as possible.

The tool-making team started experimenting. Firstly, with pneumatic clamps that could sit flush to the jig and be centrally controlled by a small control unit. SolidWorks was used to create the jig designs, with Phase 2 introducing the idea of using electromagnets to hold the fabrication in place where full access was required.

When a cost benefit was completed on the new jig proposal, each new jig was comparable in price to the traditional manual clamp equivalent – around $15,000 in this case.

Using an agile approach, nylon tube was tested and compared with copper tubing between the pneumatic cylinders, pulling on the extensive knowledge of the welding team to identify where weld splatter and heat would damage the tubing.

The next steps for this project are to introduce 'Smart clamping' where proximity switches or cylinder travel on the pneumatics will feed back automatically to the control system on the jig to verify that all positions are adequately clamped. This will remove the need for lengthy visual inspection and increase getting it right first time. Experiments with this are underway.

Benefits

The project, through a number of iterations, was extremely successful, allowing on the M9 product introduction for 100% robot weld and removing the manual welding bottleneck.

Crashes were eliminated, and greater consistency was achieved in weld pass rate.

Ultimately, the project aim was to increase capacity. With the new jigs, even with a more complicated design than previous models, the team were able to achieve 12 units a day with no overtime versus the maximum 11 that had been achieved previously. With the choice to focus on the bottleneck, this throughput was realised through the whole operation resulting in a 9% productivity gain with no introduction of labour.

Key Takeaways

- Where robotic welding forms or could form part of your process, review the suitability of jigs - could smarter jig design reduce errors, change overtime and machine crashes?
- Pull on skills of experienced welders to achieve the best possible jig design
- Can clamping verification feedback be automated to reduce errors and changeover time in your operation?

About the site visits and Industry 4.0

The purpose of the Demonstration Network is to drive uptake of Industry 4.0 technologies among New Zealand manufacturers with the aim of increasing their productivity and global competitiveness. The Network of Site Visits (NSV) are part of the Industry 4.0 Demonstration Network, which also includes a mobile showcase and smart factory showing cutting-edge Industry 4.0 technologies in action. The NSV takes selected companies through a fully-funded assessment process to help them accelerate their own journey towards Industry 4.0, and sees them share their knowledge with other manufacturers.

Further questions?

To find out more please contact

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