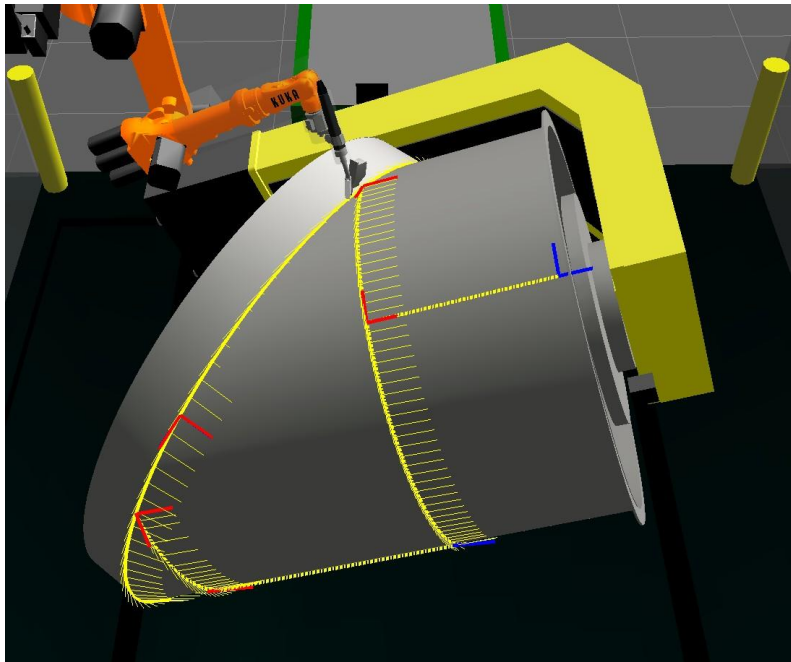


SmartTCP

Automatic Welding

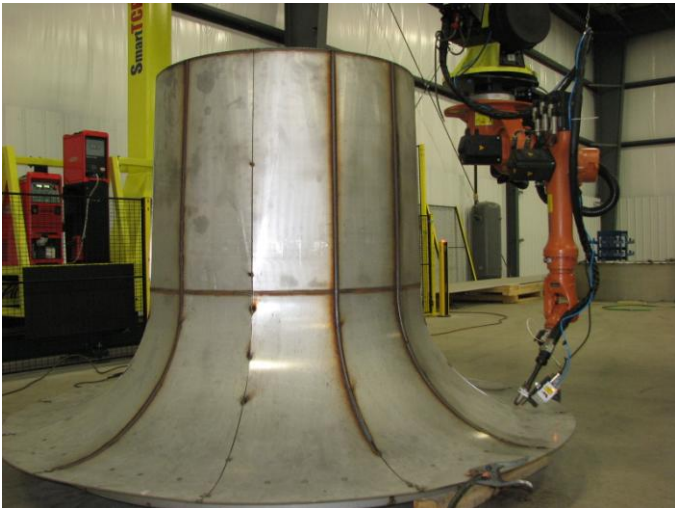


AUTOMATIC WELDING FOR SMALL BATCH FABRICATION: A CASE STUDY

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PRECISION FABRICATOR AUTOMATES WELDING PROCESS WITH FLEXIBLE SOFTWARE/ HARDWARE AUTOMATION SYSTEM FEATURING NEW LASER SEAM TRACKING CAPABILITY

Northern Manufacturing Company, a leading precision fabricator of custom sheet metal parts and assemblies has been providing its customers with customized metal products for over 58 years. In that timeframe they have established a reputation for being a leader in adapting new manufacturing technologies in order to rapidly respond to its challenging customer demands. The company, based in Oak Harbor, OH, specializes in precision stainless steel fabrications but also work with carbon steel, aluminum, copper, titanium and exotic alloys. Its customers both domestic and international include companies in the architectural, automotive, farm machinery & equipment, food processing equipment, furnaces & ovens, glass tooling, medical equipment, metal structural components, power generation equipment, pulp paper equipment, trucking components, vending machines & waste water treatment industries.



Over the last 30 years Northern Manufacturing has continually researched and implemented the most advanced technologies and techniques to improve and increase their production capabilities and quality. To this end the company has invested in automation to address many of its production improvements including its welding processes. While analyzing their welding process the company looked to go another step further in improving the automation of this particular task. The

company's welding projects vary widely with many custom products in low quantities, with some welding projects consisting of just one part. The company needed a complete solution capable of quickly moving from one welding task to a totally new welding task without complex programming required or long part set up time. Additionally, the majority of Northern's parts consist of thin stainless steel components with corner to corner and butt joints that cannot be welded precisely and reliably by standard "through the arc" tracking systems. With this in mind the company was looking for a comprehensive system that could quickly and efficiently handle high mix low volume parts without complex programming as well as provide accurate laser seam finding and tracking that would be able to adjust the weld path to the actual path of their joint types on parts made of material that naturally distorts when welded.

INTEGRATED SOFTWARE & HARDWARE SOLUTION WELDS ANY COMBINATION OF WELDING REQUIREMENTS

"In today's competitive environment and challenging economy we believe it is vital to continually look for the best methods to increase production, throughput and quality," said Quintin Smith, CEO of Northern Manufacturing Co. "We wanted to find a solution that could do that and allow us to focus on our value added services which in turn will further help us compete on a global scale."

The company turned to SmartTCP of Farmington Hills, MI a leading supplier of automatic welding solutions for steel fabrications in small batch production. The SmartTCP Robotic Welding Solution is the only comprehensive welding system that provides the speed, quality and ease-of-use Northern was looking for without sacrificing the flexibility that its welding operations required.

INNOVATIVE SOFTWARE WITH CUSTOMIZED LASER SEAM TRACKING PROVIDES ACCURATE AUTOMATIC WELDING



The system SmartTCP installed for Northern features a flexible and modular working envelope that allows the manufacturer to weld any weld-able part within the predefined working envelope. The hardware is composed of multiple off-the-shelf industrial products from leading industry manufacturers including a 60' long bridge gantry system with one SmartTCP J- positioner (6,000 lbs. capacity), a ceiling mount 6 axes robot and additional welding equipment.

To accommodate Northern's need to accurately control the position of the welding robot due to the types of welds most of its products consisted of, SmartTCP customized a Meta Vision's laser vision system (Laser Pilot) and integrated new tools for laser seam finding and seam tracking set up into the SmartTCP automatic offline programming software for small batch production. This provided accurate automatic control of the head position of the welding robot without the need for operator intervention or start and stop welding. The customization and integration of the laser seam tracking technology was key to the welding automation project as it allowed the system to automatically work on weave welds. Laser seam tracking gives the system the ability to follow the true weld path which results in higher quality welds, reduced weld defects, improved productivity and reduced scrap.

“Traditionally, laser vision systems can accurately adjust the robot path to the actual joint path when the robot is moving in a linear fashion with no weaving motion. However, a number of Northern’s parts require a weave welding technique to weld butt joints with large gaps, achieve proper weld penetration and other weld requirements for thin stainless steel fabrications,” said Efi Lebel, founder and CEO of SmartTCP. “By customizing the laser seam tracking technology to work on a weld process that requires the robot to oscillate in a weave pattern and integrating it into our offline programming software, we were able to give Northern a solution that accurately controls the position of the welding robot without the need for operator intervention or welding interruption.”

“A fully integrated automation solution is what we needed for our stainless steel part welding projects,” said Mr. Smith. “The SmartTCP system with integrated laser seam tracking capability allowed us to produce high quality welds quickly and cost effectively for our small batches.”



CONTINUOUS IN POSITION WELDING INCREASES THROUGHPUT AND QUALITY

Northern’s new welding system has been successful welding different parts every week. The system’s continuous in-position welding makes it possible to have full penetration welds (on for example cylinder tanks) on first pass. Also, by no longer having to start and stop the welding process, the company

virtually eliminates the potential for cracks that start and stop welding typically creates. Welding times have significantly decreased for the company. One example being a weld of flange rings on a cylinder which took the company a minimum of 80 minutes to weld now only takes 20 minutes, which is 4 times faster than the company’s previous methods. Another example is a jet diffuser weld that took 4 hours to weld now takes 40 minutes - 6 times faster. With the new system in place the company has increased throughput and quality and is even better poised to deliver projects to customers on short timelines.