

SUCCESS



Pipeline Equipment Manufacturer Finds 87% Time Savings in Automated Welding

Power Wave® 455M Robotic
and Power Feed™ 10R

T.D. Williamson Inc. of Tulsa, OK

T.D. Williamson Inc. fabricates the hot tapping and plugging equipment which allows pipeline repair and maintenance to be done without having to stop the flow of oil or gas.

- CHALLENGE -

- Substantial increase in orders due to growth in the industry.
- Needed to dramatically decrease the time it took to produce fittings.

- SOLUTION -

- Power Wave® 455M Robotic power source
- Power Feed™ 10R wire feeder
- Integrated with an AMET automated welding system
- SuperArc® L-56,
- UltraCore® 712C
- Lincolnweld® 880M
- Lincolnweld® L-61
- Lincolnweld® LA-71

- RESULTS -

- 87% decrease in overall manufacturing time.
- Reduced the overall cost by purchasing less wire as well as decreasing the labor needed per project.
- Decreased weld passes needed from six to two.
- 100% pass rate for all of its parts.



Finished Branch Connection Fittings used for hot tapping pipe.

Energy delivery has become one of the world's fastest growing industries with thousands of miles of oil and gas pipeline planned or under construction in countries such as the United States, Russia, India, China and Brazil. Every mile of pipeline requires welding – both for pipeline construction and the fabrication of the equipment required to maintain and repair pipelines.

Based in Tulsa, Okla., T.D. Williamson Inc. fabricates the hot tapping and plugging equipment which allows pipeline repair and maintenance to be done without having to stop the flow of oil or gas. This includes both above-ground and underground pipelines, which operate under high pressure, as well as offshore pipelines, where a line can typically run 1,000 feet or deeper underwater.

The company recognized a substantial increase in orders due to the

unprecedented growth of the industry, and rather than rush into costly expansion, its engineers decided to reevaluate the overall welding operations.

One of the company's main production concerns was pipeline fittings, made in 4-inch, 6-inch and 8-inch diameters. They are used to attach the company's hot tapping and plugging equipment to pipelines for construction, maintenance and other applications.

"We needed to dramatically decrease the time it took to produce the fittings," said Mike Phillips, T.D. Williamson manufacturing engineer. "It was taking 30 minutes to manually weld the tacks and the root, hot and cap passes, in addition to the time spent grinding in between passes."

So the company began investigating the benefits of automation.

T h e f u t u r e o f w e l d i n g i s h e r e .®

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Move to Automated System

After extensive review, the decision was made to convert the company's manual welding operations to an automated process. The change decreased fabrication time by 87%, but the firm needed a new welding process that would not only achieve the new fast-paced production schedule, but preserve consistency and quality.

Working with team members from Lincoln Electric Tulsa, its Cleveland headquarters and AMET (a manufacturer of automated welding systems), T.D. Williamson installed its automated system complete with Lincoln's Power Wave® 455M Robotic power source and Power Feed™ 10R wire feeder integrated with an AMET automated welding system.



Lincoln Electric Technical Sales Rep, Joe Murlin, shows T.D. Williamson's robotic operator how to program the AMET system.

"The company is able to maintain quality, productivity and more than adequate penetration on thicker carbon steel and perform the root and fill passes much faster."

The integrated AMET/Lincoln system is designed as an automated, electronically controlled welding system for large production welding where consistency and repeatability are important. The system also uses fixtures and positioning equipment as part of the weld process.

The Power Wave® 455M Robotic is designed for welding thicker materials in robotics, hard automation and semiautomatic applications, where heat input control, minimal distortion and reduced spatter are needed. The Power Wave® 455M Robotic features Lincoln Electric's Waveform Control Technology™ which allows the user to better match the arc with the welding task, and it quickly and easily adapts to a wide range of welding material specs, weld positions and strength requirements – all of which were considerations for T.D. Williamson.

"The welds on our equipment and fittings are subjected to tremendous strain and pressure, as pipeline systems have become more complex with higher operating pressures and temperatures, larger pipe diameters and more volatile products," Phillips said. "Waveform Control Technology™ allowed us to meet these requirements,



Smooth bead appearance made possible by Lincoln's Waveform Control Technology™ and SuperArc® wire.

increase the amount of control we had on the welding procedure, and get parts done faster"

Productivity Increased with Elimination of Weld Passes

The Power Wave® 455M Robotic allowed the company to use Lincoln's pulsed MIG waveforms. Switching to this process allowed T.D. Williamson to eliminate issues the company faced with getting the root to tie-in properly. The Power Wave® 455M Robotic also allowed for better control and decreased spatter. The company is able to maintain quality, productivity and more than adequate penetration on thicker carbon steel and perform the root and fill passes much faster.

"At Lincoln's recommendation, we switched from .035" to .045" diameter UltraCore® and SuperArc® wire, which eliminated our problem with the wire wanting to shoot through the pipe, and it allowed our operators to perform less weld passes," Phillips said. "This was just one more thing which contributed to our increase in productivity. We reduced the overall cost by purchasing less wire as well as decreasing the labor needed per project."

"We're able to work in real-time, meeting current demand as orders come in."

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Another contributing factor to the company's increase in productivity was its elimination of four welding passes. "Before the new system, we were making six passes. We were easily able to reduce that to two, which has made a huge difference in project throughput," Phillips added.

The pipeline fittings enter the plant as flat steel plates. They are positioned in a 1,800° F oven and pressed in a hydraulic press. They are then sandblasted and positioned on the automated weld table using both fixturing and positioning equipment, where the flange is MIG welded onto the sleeve that was previously created. The fittings are then cleaned, fully assembled, numbered and painted.

The last step includes X-ray testing each weld to ensure its integrity. With the new Power Wave® and AMET system, TD Williamson has experienced a 100% pass rate for all of its parts. In the past, the pass rate had hovered between 95 to 98%.

Before installing the new welding system, T.D. Williamson performed nearly all welds manually. The sleeve was mounted to a fixture, and the flange was added with spacers tacked by hand. The main weld was put in and then the spacers were removed. The new hard



Manual welding of Spherical 3-WAY™ Tee is possible with Lincoln Electric's Power Wave® 455M and Power Feed™ 10M.

automated system has eliminated the need for the tacking and the fit up. It has also eliminated the need to grind out the root weld.

87% Decrease in Manufacturing Time

"What used to take eight weeks to run through our plant can now be done in 48 hours," Phillips states. "We're able to work in real-time, meeting current demand as orders come in – whereas we previously had to guess what our customers would need two months out and have trouble meeting orders if we hadn't guessed correctly."

"We're producing higher quality welded parts and more of them."

With this 87% decrease in overall manufacturing time, the company has saved significantly on labor costs and increased the overall quality of the welds on the fittings. This translates into better weld penetration, more up time for the equipment, less required rework and faster turnaround time to deliver the fittings to the jobsite.

Phillips added that much of the company's success with the new system is due to Lincoln Electric and AMET's willingness to spend time on site at the Tulsa plant, work through installation and start-up with the company's team, and always be on call when needed.

"Our productivity is up considerably. We're producing higher quality welded parts and more of them," Phillips said. "This translates into faster turnaround time to meet customer demand, and in our business, nothing is more critical than this. The AMET/Lincoln Electric system gives us a competitive advantage." ■



T.D. Williamson welding operators now use a combination of MIG, Submerged Arc and Robotic welding to create many of their pipeline fittings.

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Featured Lincoln Products



Power Wave® 455M Robotic

The Power Wave® 455M Robotic is a high performance, digitally controlled inverter power source designed for robotic, hard automation and semiautomatic applications. It is designed to be part of a modular, multi-process welding system that can be arranged in a variety of ways for optimum, customized performance and easy maintenance. Optional DeviceNet™ and Ethernet communication modules provide networking capabilities and allow the power sources to communicate with other industrial machines to create a highly integrated and flexible welding cell. Available as a standard model or with Lincoln's STT® process for applications in which heat input control, minimal distortion, reduced spatter and low fumes are essential.



Power Feed™ 10R

The Power Feed™ 10R is a high performance, digitally controlled wire feeder designed to be a part of a modular, multi-process welding system. It is specifically designed to mount to a robot arm or to use in hard automation applications. Modular systems can be arranged in a variety of ways for optimum, customized performance and easy maintenance. This four drive roll feeder operates on 40VDC input power and is designed to be used with ArcLink™ Robotic Power Wave® power sources. Close integration of the feeder, power source and existing equipment creates the foundation for a system with superior welding performance and reliability.

WHAT IS WAVEFORM CONTROL TECHNOLOGY™?

Waveform Control Technology™ is the ability to customize waveform output. It is the ability to choose a weld program from a predefined set of programs, and to manipulate the parameters of that program to best fit your application.



Lincoln Electric

strives to

understand the customer's needs in order to make the job easier. That is why Waveform Control Technology™ was designed: to empower the people who use the equipment, our customers. Waveform Control Technology™ allows the user to choose from a library of pre-programmed weld "modes" that have been developed by expert welders. Then, Waveform Control Technology™ offers the opportunity to change those values, within a programmed range, to find the combination of wire feed speed, voltage, current, and arc control that the application requires. But Lincoln has even taken it one step further. Waveform Control Technology™ also provides the ability to use a single source to perform Stick, TIG, MIG/MAG, Flux-cored, and Submerged Arc welding procedures. With a Waveform Control Technology™ product, the days of configuring different systems to make different welds are over.

SuperArc®

Lincoln Electric's SuperArc® copper coated, mild steel, engineered alloy MIG wire leads the industry in arc performance, wire feedability and consistency, as well as extended contact tip life. Suitable for a variety of welding applications from heavy fabrication to offshore, SuperArc® wire is ideal for hard automation and robotic welding solutions.

ULTRACORE®

UltraCore® is Lincoln Electric's premium gas-shielded flux-cored wire product line and the choice of welders all over the world who demand quality, consistency, reliability, and performance. It is recommended for a wide range of structural and general fabrication applications.

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www.lincolnelectric.com
1.216.481.8100