SUCCESS

LINCOLN ELECTRIC
THE WELDING EXPERTS

WAVEFORM CONTROL TECHNOLOGY™

Surface Tension Transfer® (STT®)

STT on Sheetmetal

tube.tec (Advanced Tubing Technology, Inc.)

Three-year-old tube.tec™ (Advanced Tubing Technology, Inc.) in Statesville, North Carolina manufactures structural tubing assemblies to the booming All Terrain Vehicle (ATV) market. As demand continued to exceed supply, tube.tec turned to Lincoln's automation group for help.

- PROBLEM -

As demand for their products increased, tube.tec had to produce more high quality, aesthetically pleasing parts at a lower cost in order to stay competitive.

- SOLUTION -

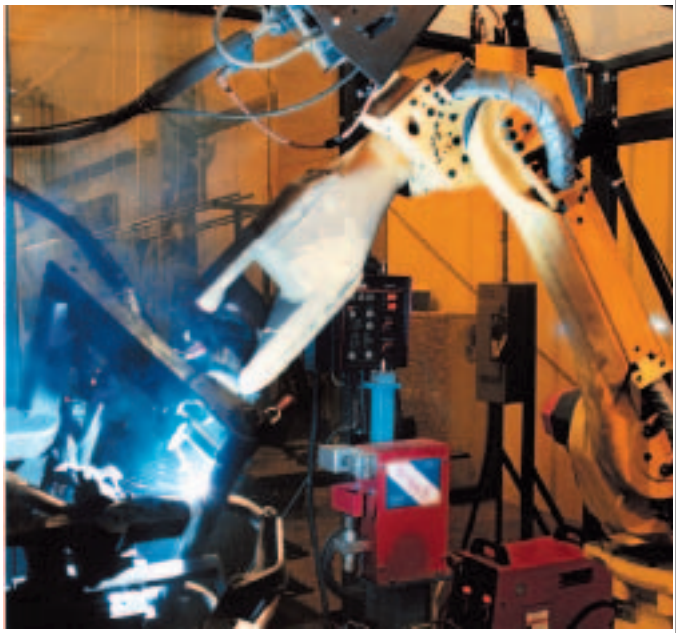
A high-tech shop stocked with the latest equipment including FANUC Arc Mate 100i six-axis robots equipped with STT power sources and STT-10 wire feeders and RJ robotic controllers.

- RESULTS -

From its initial purchase of one robot when the plant opened in 1997, tube.tec has added six more robots that produce 8,500 parts per week.

LINCOLN ELECTRIC NEXTWELD™

"When we opened our manufacturing facility, we decided right from the beginning that we would outfit our shop with the latest technology available," says Doug Smyth, President of tube.tec. "The first item we purchased was the robotic welding system. We decided on automation because of the consistency it provided and the add-on capabilities it offered."



From its initial purchase of one robot when the plant opened, tube.tec has added six more robots that produce 8,500 parts per week. During the company's busiest season, these robots work 24 hours a day for up to 142 days straight. tube.tec's product offerings include cargo carriers, bumpers, footrests, handrails and other structural tubing components.

According to Smyth, tube.tec researched a number of robotic suppliers before deciding on Lincoln. "After reviewing all of our options, Lincoln rose to the top because of its technical expertise. When we met with other suppliers, they would have to bring in automation specialists from their headquarters. With Lincoln, our local representative had robotic training and was very familiar with the product. In addition, Lincoln promised 24-hour support should we experience any downtime. Both of these factors made them the logical choice."

"We were immediately impressed with the STT. Spatter was virtually eliminated with this power source."

But it wasn't only the service factor that led tube.tec to Lincoln. First and foremost, the company needed a first-rate welding machine that could do the job with the best possible quality. "We were impressed immediately with the STT," said Smyth. "Compared to what we had seen previously, spatter was virtually eliminated with this power source. Reducing spatter is critical because a cargo carrier is one of the most visible parts on the ATV and creates showroom appeal. In addition, little spatter means little rework so that we could keep costs down."

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Specifications

Robotic welding at tube.tec is accomplished with FANUC Arc Mate 100i six-axis robots. This high-speed, GMAW welding unit welds one component while the operator simultaneously loads the pieces for the next component onto the other side of the fixture. The turnstock then rotates so the next part can be welded while the operator unloads, inspects and reloads the other side. The cells also utilize the STT power source, Lincoln's system-matched STT-10 wire feeder and RJ robotic controllers.

What makes this application unique is that the part has to adhere to very tight tolerance to mount to the ATV in an exact location.The robots may be required to make 21 to 35 separate welds per part. Welds include butt and fillet welds and may require the robots to move from uphill to flat to downhill positions that couldn't be attempted in one continuous bead by manual welding methods. The robots use .035" Lincoln SuperArc® GMAW wire with an AWS classification of ER70S-4 and a mixture of 75 percent argon and 25 percent CO_2 shielding gas.

The heart of the systems, the STT power source, uses high frequency inverter technology with Lincoln's Waveform Control Technology to produce a weld with reduced spatter and smoke. It does this by sensing and adjusting the weld current during the welding process to optimize the finished bead.

Tooling and Fixturing

Smyth notes that tube.tec now takes on more of the process internally. "With the first robot we basically had it delivered to us as a turnkey package ready to weld. But as we have become more familiar with robotic capabilities, we have designed and built more of the weld tooling, fabrication dies and gauging in-house."

Consistent Welds, Produced More Efficiently

Not only do the robots provide repeatable, consistent welds, they also manufacture seven of tube.tec's popular carrier products in the time it would take to produce one using a manual welding process. "Using robots has also helped us to keep up with demand by allowing us to easily add extra capacity," notes Smyth. "If we had to rely on hiring skilled welders each time our production increased, I don't know if we could have kept up, especially with our location where skilled labor is hard to find."

"The STT robotic units are outstanding in terms of accuracy, productivity, penetration and overall quality," notes Smyth. "These robots have helped us to be competitive. Manufacturers come to us for our quality, they also appreciate the fact that we can keep costs down because we don't have to spend time trying to remove spatter or weld manually. You can even hear the difference in the arc — the STT has a different sound than standard GMAW equipment."

Service and Support

tube.tec is extremely pleased with the service provided by Lincoln. "Our first robotic installation occurred over a weekend. We talked to the Lincoln automation expert in Cleveland at 10 a.m. on a Sunday regarding a problem we had with the installation. Not only was he available at that time, the next day he was in our plant and ready to help."

tube.tec has also received excellent service from its local Lincoln representative who is on-site to check the robots and offer technical advice. The local distributor, Machine & Welding Supply, has also been ready to help. Smyth reports that the robots have been virtually maintenance free.

WHAT IS NEXTWELD?

The challenges facing industrial fabricators today are increasingly difficult. Rising labor, material, and energy costs, intense domestic and global competition, a dwindling pool of skilled workers, more stringent and specific quality demands.

Through our commitment to extensive research and investments in product development, Lincoln Electric has established an industry benchmark for applying technology to improve the quality, lower the cost and enhance the performance of arc welding processes. Advancements in power electronics, digital communications and Waveform Control Technology™ are the foundation for many of the improvements.

NEXTWELD brings you a series of Process, Technology, Application and Success Story documents like this one. NEXTWELD explains how technologies, products, processes and applications are linked together to answer the important questions that all businesses face:

- *How can we work faster, work smarter, work more efficiently?*
- *How can we get equipment and people to perform in ways they've never had to before?*
- *How do we stay competitive?*
- *How do we maintain profitability?*

NEXTWELD is the future of welding but its benefits are available to you today. Ask your Lincoln Electric representative how to improve the flexibility, efficiency and quality of your welding operations to reduce your cost of fabrication.

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THE LINCOLN ELECTRIC COMPANY
www.lincolnelectric.com
1.216.481.8100