

SUCCESS

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ELECTRIC
THE WELDING EXPERTSSM

WAVEFORM CONTROL TECHNOLOGY[®]

Pulse-on-Pulse[®]

Aluminum

Mission Marine, Ltd.

Mission Marine, Ltd. of Sandusky, Ohio produces aluminum catamarans used for general patrol, drug enforcement, search and rescue and special forces.

- CHALLENGE -

Mission's welding team sought to control distortion in 3/16" to 3/8" aluminum as well as improve weld appearance.

- SOLUTION -

TOTAL s2f™ (Start 2 Finish) Nextweld[®] aluminum welding solution:

- Power Wave[®] 455M/Power Feed™ 10M semiautomatic welding system for thicker materials
- Power MIG[®] 300 Push-Pull Wirefeeder/Welder system (recently replaced with the Power MIG 350MP)
- Lincoln Pulse-on-Pulse[®] GMAW welding process modes for enhanced aluminum arc starting, bead appearance and weld end cratering
- SuperGlaze[®] 5183 aluminum MIG welding wire.

- RESULTS -

Reduced distortion and enhanced bead appearance allowed Mission to cut rework and increase production levels to meet greater demand.



The fear that terrorists could strike again within U.S. borders has placed Americans on alert and increased the demands on today's law enforcement officers. Now, with the bar raised higher to provide a safe and secure nation, the dedicated men and women who patrol our major waterways from terrorists and drug runners are faced with a tough job that requires proper equipment.

The fabricators at Mission Marine, Ltd., in Sandusky, Ohio, know this all too well. They take their jobs very seriously with each customized aluminum patrol boat they produce.

"We make vessels that go out at night with winds at 50 or 60 miles per hour," said Mission Marine President Bill Waldock. "Our customers are betting their lives on our welders. These are boats that only go out when no one else will – when people could die. If a weld fails, you have potential for the boat to fail."

With welding equipment from The Lincoln Electric Company, the five-year-old company fabricates aluminum catamarans used for general patrol, drug enforcement, search and rescue, and special forces. Each boat is customized to the specifications of the client – often government and military agencies. Using a unique two-hull design for stability in rough water, some of the boats can be outfitted with armored shielding and can be equipped with

The future of welding is here.®

Pulse-on-Pulse®

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50-caliber machine guns. Some boats even have other special security features which cannot be revealed to the public. But regardless of the specifications, each one must be light, strong, and seaworthy in the toughest conditions.

Stronger than any fiberglass model, Waldock said demand for his aluminum boats has steadily increased since the inception of U.S. Homeland Security following the terrorist attacks of Sept. 11, 2001.

As with most shops that deal with aluminum welding, Mission Marine's biggest challenge is distortion. The frames are aluminum sheet metal. Frame materials range in thickness from 3/16- to 3/8-inch, and the skin ranges from 3/16- to 1/4-inch depending on the area of the boat. In certain places, Kevlar backing can be installed for better protection from bullets. Hard-to-reach areas and out-of-position welding is common for the Ohio boat builder.

To minimize distortion and increase reliability, Mission Marine uses Pulse-on-Pulse® Technology from Lincoln Electric with Lincoln's Power Wave® and Power MIG® – both used in MIG welding with 100% argon shielding gas.

“What we do in this shop is very important. We can't make mistakes. I like Lincoln because there are good people there who respond to our needs. They understand what we do and what we need to do it well.”

The added arc control made possible by the Waveform Control Technology® embedded in the Power Wave® and Power MIG® allows Mission welders to adapt more precisely to each application, joint design, material type and thickness, shielding gas, and other parameters. With added control comes more consistent quality and more forgiving arc characteristics. This added control has helped minimize distortion, said Mission welder Mo Madyun.

“The Lincoln welders are real smooth, and we can change modes without thinking about it,” he said. “I've worked with other machines, but I really prefer this technology for its controllability.”

“These are smart machines,” Mission President Bill Waldock said. “They can be tuned to an individual's technique and help make individuals better welders. We customize the pulse-on-pulse to each position.”

In an industry dominated by fiberglass products, Mission Marine needs to produce surfaces free from bumps and dimples. So for Mission, weld appearance is an important factor for their finished products. Waldock said Lincoln welders help achieve the look they need, and that the company's service is what ultimately caused him to switch from another brand.

Over the past five years, Waldock has worked with U.S. naval architects and U.S. marine engineers to design boats to tight specifications, as well as standards set by the American Bureau of Shipping. His customers include government agencies, police departments and coast guards, as well as homeland security officials.

The catamarans can be custom made with two to four engines and injected with foam for positive floatation should enemy fire jeopardize the integrity of the hull. Mission uses both the Lincoln Power Wave® 455M and the Power MIG® on their shop floor. The Power MIG® tends to be more mobile.




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“The Lincoln welders are real smooth, and we can change modes without thinking about it. I’ve worked with other machines, but I really prefer these Lincoln models for their controllability.”



The Lincoln Power MIG® 300 (now Power MIG® 350MP) is a multi-process welder designed for aluminum welders, like Mission Marine, who demand the aluminum arc welding performance and improved feeding for soft aluminum wire. It features Lincoln’s  Chopper Technology® for improved performance over a wide range of arc welding processes. This multi-process capability includes MIG, Pulsed MIG, Synergic MIG, Pulse-on-Pulse® MIG, flux-cored, Stick and TouchStart™ TIG.

The Power MIG® was the first combination wire feeder/welder on the market to include synergic capability, which offers the simplicity of single knob control to set welding procedures.

“This is so easy to use,” Madyun said. “You could literally take someone off the street and have them working this in 15 minutes.”

Mission Marine also benefits from the Power MIG’s Waveform Control Technology®, which includes waveform programs specifically designed for aluminum applications, such as those for Lincoln’s Pulse-on-Pulse® process.

The Power MIG® delivers improved arc heat control, making it ideal for welding thinner materials, Madyun said. It provides good penetration and better surface oxide cleaning than standard

MIG or pulsed MIG, as well as a TIG-like bead appearance, Waldock added, with the productivity and simplicity of the MIG process.

When in push-pull mode, the Power MIG® drive motor characteristics are modified to become an assist motor, which works in conjunction with the push-pull Python® gun’s pull motor.

Working together as a drive system, the two motors deliver Mission’s welders with optimal feeding of soft or small diameter aluminum wire, which can be especially difficult to feed.

Mission welders say that birdnesting is not an issue, Waldock said.

The push-pull systems offer advantages of traditional push or spool gun systems, without the limitations. For example, with push-pull, Mission can feed longer distances, use large spools of wire, and use a less bulky gun for accessibility in tight spaces.

“The wire is soft,” said Madyun, who uses Lincoln’s 3/64” SuperGlaze® 5183 aluminum MIG wire. “I like the feed because it makes it easier to change wire.”

Waldock said he is proud of his employees because they know their welding performance is critical to the work of hundreds of law enforcement officers.

“What we do in this shop is very important,” he said. “We can’t make mistakes. I like Lincoln because there are good people there who respond to our needs. They understand what we do and what we need to do it well.”

“Ultimately,” Waldock said, “at the end of the day, what Mission Marine does is to help better defend our families by equipping those on the front lines with the best tools to do the job.”



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Featured Lincoln Products**Power MIG® 350MP***Power MIG®. The Professional's Choice.*

When you want the flexibility of more than just a MIG machine, the Power MIG® 350MP is the choice for you. Lincoln's *CT* Chopper Technology® delivers more welding processes than just MIG or flux-cored. The Power MIG® 350MP also welds excellent in stick, TIG, and advanced processes such as Power Mode™ and Pulse-On-Pulse®. In addition, future waveform improvements can be downloaded into the machine. This means the machine you buy today won't be obsolete tomorrow. Also, with the simplicity and sophistication of synergic control, no other power source in this category offers so much!

**Power Wave® 455M***Superior Arc Performance. Revolutionary Communication.*

For welding thicker materials in robotics, hard automation and semiautomatic applications, choose the Power Wave® 455M. For those applications where heat input control, minimal distortion, and reduced spatter are essential, opt for the Power Wave® 455M/STT®. Both models feature Waveform Control Technology® for superior arc performance on a variety of materials, including steel, stainless steel, aluminum and nickel alloys, and custom control of the arc for each wire type and size for consistent welds time after time. The Power Wave® 455M and 455M/STT® are designed to be part of a modular, multi-process welding system in which power sources can be added or removed and still communicate with other industrial machines to create a highly integrated and flexible welding cell.

WHAT IS NEXTWELD®?

The challenges facing industrial fabricators today are growing in number and complexity. Rising labor, material and energy costs, intense domestic and global competition, a dwindling pool of skilled workers, more stringent and specific quality demands all contribute to a more difficult welding environment today.

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

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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