

## MetalCraft Marine Charts a Course for Improved Productivity and Energy Efficiency



*Final construction of a custom Firestorm 70 for the Port of Houston located at the MetalCraft Marine shipyard in Kingston, Ontario.*

Nearly five years ago, Ontario-based MetalCraft Marine, an integrated designer and builder of custom high-performance aluminum work boats, faced a much needed welding equipment upgrade. Old machines were failing, and downtime for maintenance and repairs was on the rise. In addition, inefficiencies in energy consumption forced the company to run fewer machines than their workload required. All of these issues undermined productivity. It was time for the boat building company to plot a course for more reliable equipment, lower operating costs and more efficient processes.

MetalCraft Marine, located in Kingston, Ontario, Canada, with a facility in Cape Vincent, NY makes boats for firefighting, marine patrolling, search-and-rescue and related functions. Founded in 1987, MetalCraft Marine supplies government agencies in North America and around the world. Their customers include the U.S. Navy, the U.S. Coast Guard, and various local and regional port authorities. Although 70 percent of their customer base is in Canada and the U.S., they also service customers in

Oman, Zambia, Kuwait and Australia. The company employs a staff of 140 in Canada and 17 in the U.S. – and finished 2013 with \$20 million in sales.

MetalCraft Marine's profile of typical construction materials is exactly what the company description above would suggest. The vast majority (97%) of alloys used in the production is aluminum. Other materials include the occasional mild steel (2%) and stainless steel (1%). Thicknesses range anywhere

from 5/32-inch to 1-inch. All welds are either butt or fillet welds, with occasional plug welds.

Regardless of materials or types of welds, aesthetics is an important part of the MetalCraft Marine work ethic. Sound welds may be the backbone of a well-constructed boat, but every member of the MetalCraft construction team also takes pride in the appearance of every weld on every panel.

### Energy and quality

Five years ago, MetalCraft Marine was using welding equipment that was approaching the end of its service life. It was time for an equipment update, a transition that MetalCraft General Manager Michael Allen and his crew saw as an opportunity to harness some energy-consumption, improve productivity and efficiencies.

“We had been using the same welding equipment for 15 or 20 years, and it wasn’t very automated,” says Allen. “So this whole idea of having welding equipment with some intelligence built into it was new to us. We really didn’t know what to expect and didn’t initially know how to operate it.”

“In addition to improving production efficiencies and reducing energy costs, adherence to quality standards in the midst of updating equipment and processes was a big concern”, says Allen. MetalCraft had already established an industry-leading 10-year warranty on their hull seams, and they were committed to maintaining that warranty during the transition process.

“We had to make sure we did not fall behind in terms of quality so we could continue to offer that warranty,” he says. “The transition process wasn’t simply a matter of bringing in a new piece of equipment and taking an existing one out. We had to make sure we were defining the right procedures in terms of weld speed and operations so that the quality of the work did not suffer, and in fact, continued to move forward.”



*Constructing the hull of an aluminum high-speed patrol boat.*



*Completed Firestorm 50, fire and rescue vessel.*

### “The right tools to do the job”

Because of the age of the previous machines, the need for maintenance, repairs and proper calibration was becoming increasingly frequent, and replacement parts were getting harder to find. In addition, the older units were larger and heavier, and often got in the way of operations.

Energy consumption was also prohibitive to the overall workflow. The old machines drew a full 30 amps whenever they were running limiting practical use to only four machines running at a time. “That’s enough for one metal team, and there’s one team per boat, so we could only weld one boat at a time, or two at a time at a slower pace...This combined with the frequency of the equipment breakdowns would often put us behind schedule.”

Lincoln Electric’s Power Wave® S350 welding power source, along with the Power Feed® 25M wire feeder, dramatically improved energy efficiency at the Kingston facility – enough for MetalCraft to run eight machines at a time rather than just four.

“By running eight machines,” says Allen, “we were able to double our weld output per day – or even tripled it in some cases – because the machines were all working and they only drew between eight and 12 amps most of the time, so our house power didn’t need to be adjusted.”

But more than just an infusion of new equipment, the solution also included some technical welding support and on-site education.

“Lincoln spent a great deal of time with us, spec’ing out exactly what we needed,” says Allen. “And then when we brought the equipment on board, they spent four or five months returning periodically to work with our welders to bring them up to speed and identify any tweaks that could be made – both in terms of the equipment itself and the peripheral equipment, such as the welding guns. They worked very closely with us to get us exactly the right solution – including helping us redefine our welding procedures to take full advantage of the new and more advanced equipment.”

Once the Power Wave machines and operators were up to speed and in sync, MetalCraft Marine introduced SuperGlaze® 5356 aluminum MIG wire into its welding wire consumable stream. “When it comes to weld wire, I’m looking for something that provides consistency day in and day out,” says Allen. “With the SuperGlaze wire, I don’t have any problems with it not coming off the spool properly. I don’t have problems with porosity or any of the other issues associated with poor weld wire quality. SuperGlaze is consistently good, and that’s what I’m looking for in terms of weld wire. Since then, I was approached by another company to try a different type, and I said I wasn’t even interested.

The quantifiable and dramatic improvements in MetalCraft Marine’s overall operation were almost immediate, says Allen.



*Prepared Firestorm 70, ready for bead blasting.*

“The Lincoln equipment, and the consulting advice that came with it, probably enabled us to improve our aluminum welding efficiency by 20 percent,” he says. “That’s a 20 percent reduction in the time it takes to build a boat.”

“Those machines all paid for themselves in less than a year...The end result was less rework, better appearance, fewer quality inspections required, and improved efficiencies as well. Before that, the guys were spending a lot of time changing the parameters on the machines, and spending a lot of time

just making things work instead of having the right tools to do the job.”

The utility savings has enabled Allen to double his welding capacity. “The Power Wave uses less power draw than other technology we had been using previously,” he says. “When we were getting ready to make this changeover, we looked at other companies, and one of the big initial sway points was the fact that the Power Wave required less electricity, and also could accommodate fluctuating loads of electricity in the local area, because the electrical supply isn’t all that stable. That allowed us to increase capacity right away.”



*MetalCraft Marine personnel seam welding the hull of a work boat.*

The increased capacity to build more boats at a level of quality that meets or exceeds the terms of the company’s ten-year warranty equates to an increase in sales by more than 300 percent over the past five years, says Allen.

### **Other opportunities**

But the MetalCraft Marine story doesn’t end with the installation of Power Wave machines five years ago. Allen is always considering ways to improve productivity and efficiency, and Lincoln Electric has been on hand to provide guidance along the way. One option he’s considering is Lincoln Electric’s Advanced Module that adds TIG, AC TIG and hi-frequency TIG welding capabilities to the Power Wave machine.

“We think that has some real potential,” he says. “We don’t need a TIG welding machine full-time, but every team – which consists of about four to



*MetalCraft Marine employee welding cabin doors.*

five welding machines – at some point needs to do some TIG welding. So it could be a big benefit by giving us flexibility without requiring a huge investment.”

Allen also considered improvements to air quality in the 10,000-square-foot manufacturing plant. The first option they considered would have pushed fresh air through the top of the plant environment and collected particulate from the bottom.

“We build boats, and the boats move around a lot within the shop, so the airflow would not be very manageable that way,” says Allen. “The environmental specialist from Lincoln Electric who came to look at the plant brought that to light and explained why the system we had been considering wouldn’t work with the airflow at our site, and why we needed to go with a filtration system that’s up in the ceiling and pushes air from one side and pulls particulate from the other. We’re really happy with the system that we developed with Lincoln Electric.”

### **Investing in workers**

In addition to improving efficiency, productivity and environmental safety, MetalCraft Marine’s ongoing relationship with Lincoln Electric has opened up training opportunities for new hires who might lack the necessary experience to weld aluminum hulls.

“We set up a program, and the feedback we get is that the machines are relatively easy to use,” says Allen. “We have good procedures identified in preset user memories, and that makes it easier...you can program the setting you want. So the guy just has to press a button or two and everything gets set up. He’s not tweaking the controls a great deal. Plus, it has a couple settings on it that make it easier for a relatively new person to use compared to an experienced person, and still get good results.”

In the years since MetalCraft Marine first brought the Power Wave machines onboard, “Lincoln Electric has become an important part of our team,” says Allen. “Lincoln products are industry leading, and the quality of the technology is sound. But even more than that, Lincoln Electric and the people who work there are what sets the company apart. When I have a question, when I’m looking for an opportunity to improve, when I have a problem, there’s a team that addresses that and will work with me right away. I continue to be impressed with how well everybody in the organization will work with us to help us improve our operations. That’s what sets them apart, without a doubt.”