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plasma technology

BEVELING BOATS

Plasma beveling reduces manual labor, saves time at **North American Shipbuilding**

The shell plate on a vessel like the *Nathaniel B. Palmer* can be up to 2 inches thick. Cutting and beveling thick plate by hand can be time consuming for shipyards.

Photo: Adam Jenkins, National Science Foundation

BY LAUREN DUENSING

David Becker is the panel line coordinator for North American Shipbuilding, Larose, La., part of the Edison Chouest Offshore family of companies, and he knows quite a bit about beveling steel plates. So when he was sourcing new, top-of-the-line equipment for the shipyard, he handed out a tough task: cut an ellipse. Messer Cutting Systems Inc., Menomonee Falls, Wis., a subsidiary of Messer Cutting & Welding GmbH, Frankfurt, Germany, was up for the challenge.

"The hardest part to cut on a bevel machine is an ellipse," Becker says. "The reason for that is every movement is different. For example, if I were to cut a square with bevels on it, it's simple. You angle the bevel head, go a straight distance and then you turn it and go another straight distance. An ellipse is never constant; it's always changing. The machine is always adjusting and reacting to motion, both on the x and y axes, to maintain that line.

"When Messer came to visit me, I said, 'I'll tell you what. You make me an ellipse, and you send it to me and we'll schedule the next meeting from there.' It took about a week, and I got one. It was extraordinary. I'd never seen a company

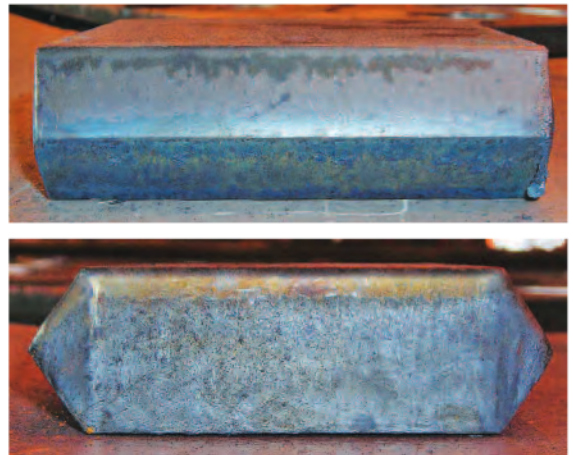
that could do one. Eventually, when we bought [the machine], I went to Messer in Wisconsin and I talked to the guy who created the ellipse. He said, 'You know a lot about beveling,' and I said, 'Well, a pretty good bit,' and he replied, 'You must because that was one of the hardest bevels I've ever had to make.'"

Specialized vessels

Edison Chouest Offshore started as Edison Chouest Boat Rentals in 1960. The company designs, builds, owns and operates its fleet, which includes research vessels and offshore service vessels that support the deepwater market in the Gulf of Mexico.

According to the company's website, North American Shipbuilding has built more specialized offshore vessels than any other shipyard in the world. Projects include the first U.S. Antarctic icebreaking research vessel, the largest and most powerful anchor-handling vessel in the U.S. fleet, the first dynamically positioned vessel in the U.S. fleet, the world's first floating production system installation vessel and the largest water throw capacity vessel in the U.S. fleet.

Becker says projects for the oil industry



are the company's bread and butter, but North American Shipbuilding also constructs boats for scientific research.

"We currently are working on an icebreaker that is going to work in Alaska," he notes. "In addition, we have an aluminum boat, which we call a bass boat. These are basically crew boats that bring crews and small supplies back and forth from the oil rigs to land. We also have tugboats. We call them pushers; they're designed to push the aircraft carriers and destroyers for the Navy."

Top performance

Messer Cutting Systems offers a wide range of plasma and oxy-fuel cutting equipment as well as other add-on products that help companies streamline operations, includ-



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ing programming and nesting software, material-handling equipment, cutting tables and equipment for part finishing.

To streamline workflow, North American Shipbuilding selected a TMC4500ST with plasma beveling capability, a machine that's built for tough environments like shipyards. According to Messer Cutting Systems, the machine's box beam steel construction gives the gantry frame a stiff backbone, supporting heavy cutting carriages. It can handle steel, stainless steel or aluminum from 36 gauge to 12 inches thick, depending on the process used.

North American Shipbuilding's unit has dual Global Rotator Infinity plasma beveling units as well as both plasma and oxy-fuel cutting capabilities. Global Rotator Infinity plasma beveling units provide continuous rotation and torch positioning to ± 52 degrees and can cut bevels on any contour.

The bevel rotators can bevel angles on the fly, which means they can go from no bevel (0 degrees) to a 45-degree bevel within five feet. And they “will do a 45-degree bevel, 360 degrees,” Becker says. “This allows us to pre-bevel the plate rather than have it manually beveled in the field by the welders.”

This capability has saved the company time. “We are currently building a 380-foot icebreaker,” Becker notes. “All the shell plate on that boat is about 1 $\frac{1}{4}$ inches to 1 $\frac{1}{2}$ inches all the way up to 2 inches thick.

If a person would have had to bevel that by hand, it would have taken an incredible amount of time.”

He gives an example of saving time by using the plasma beveling machine to cut two plates at once. For 10 $\frac{1}{2}$ -inch-thick pieces with bevels, “it took us approximately eight hours to cut and bevel,” Becker says. “If we did not have the beveling capability, we would cut it square and have somebody bevel it by hand. It would have taken approximately three days. So we went from three days manual labor and multiple people to one machine, one operator, eight hours.”

New options

After the parts come off the machine, they're done. “The guys in the field don't have to worry about edge prepping. There's no extra time spent manually beveling. It's an incredible time-saving tool. The guys who previously were going to have to do all the beveling now are concentrating on assembling, so our assembly has become faster,” Becker says. “We no longer have to have two or three guys just beveling parts for a week. Those two or three guys can now be assembling parts, so we've increased our productivity from start to finish.”

The plasma beveling capability allowed North American Shipbuilding to finish cutting the external thick hull of a ship in less than 11 months. In addition, the company can fabricate certain ship parts it

wasn't capable of doing previously, such as rope cutters, which need to be cut and beveled at 15 degree angles in some spots and 5 degree angles in others.

Rope cutters “go right behind the propellers of the boat,” Becker notes. “If the boat gets a piece of rope hung up in it, these cutters are shaped in a manner so that if the rope gets caught in there, it gets cut. Prior to the beveling capabilities, we either couldn't do them or we'd have to cut them square and someone would have to hand grind them. Whereas now, we cut them, they come off the table and they're beveled, cut, everything. We just put them on the boat.”

The versatility of plasma beveling not only increased production and decreased man hours at North American Shipbuilding, it has allowed the engineering and cutting departments to achieve a better understanding of beveling as well as work hand-in-hand to ensure everything is cut correctly.

“We were limited before, and with this, our limits are stretched much further,” Becker says. “We've seen new things that can benefit us down the line because we've increased not only the production, but with the beveling, we've increased our options. This has allowed engineering to expand what they can do with beveling and where they can use it. Across the board, it has given us new opportunities.

“We push the limits every day here,” Becker continues. “We're always looking for ways to improve and trying new things. We have to keep up. That's the key. With the new equipment, there is no doubt that it has pushed us into the future where we can speed up our production.” ■

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