

# Time after time

## A modular welding fixturing system increases accuracy and repeatability for Sauber Mfg.

**W**orkers at Sauber Mfg. Co., Virgil, Ill., previously used tape measures, saw horses and other supplies to create the different fixtures necessary for welding the company's utility products—a method that was time-consuming with varying accuracy part to part.

Started in a converted dairy barn in 1969, Sauber has grown to develop, manufacture and distribute multiple products for utilities and the contractors that serve them, including trailers, trailer accessories, crane pads, torsion bars and tensioning equipment. Manufacturing on average 400 trailers annually, the company produces small unit runs, with many products having customized aspects. It's rare to receive a single order for 20 units or more, says Jim Sauber, company president. Most orders are one or two items at a time, which means workers need flexibility to switch among multiple product styles as they complete projects.

Consistency also is important to Sauber. "As a company, we value uniformity and process control," says Sauber. "Having our standards be company standards and not individual standards is a very important concept for us."

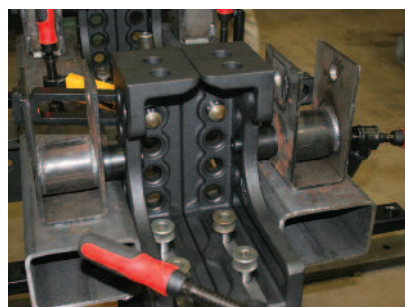
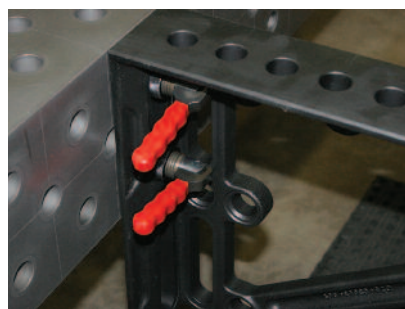
To ensure workers have the flexibility they need combined with the ability to fabricate parts consistently, Sauber in late 2009 purchased the first of two Demmeler modular welding fixturing systems from Bluco Corp., Aurora, Ill. The company purchased its second system in late 2010.

Manufactured in Germany, the Demmeler modular fixturing system consists of

box-like tables made of 25-mm-thick steel plates welded into five-sided structures with ribs and gussets on the underside. The tables run from 1,000 mm by 1,000 mm (40 in. by 40 in.) to 2,000 mm by 4,000 mm (6½ ft. by 13 ft.). They are hardened to 55 Rc to protect against spatter build up. The bores in the tables and all components are machined to  $\pm 0.001$  in. to ensure accurate assembly and repeatability. A collection of patented bolts, angles, stop bars, v-blocks, spacer blocks, gauge rings, clamps and adapter pieces are included in the more than 400 standard components in the modular fixturing system.

Because of the modular nature of the system, there is no limit to the size of a fixture, says Bob Ellig, president of Bluco. "It is a simple matter of joining components together to create the fixture required," he says. "You don't need a fixture to weld anything. You can do it on the floor, but the problem is the floor is not flat—ever."

The "tables" at Sauber are not standard tables, says Ellig. Sauber's fixtures use the system's U-form and L-form spacer blocks, so named for the cross-section appearance of the letters "U" and "L." The company's fixtures are 5,600 mm (223 in.) long and 2,000 mm (80 in.) wide. The blocks are



joined using the system's positioning and clamping bolts through the bores in the ends and along the sides of each block. "The legs that support the fixture have a ball-and-socket pad with a fine pitch screw that allows leveling of the fixture regardless of the condition of the concrete floor. With a laser level, it is possible to bring the entire fixture within a few thousandths level from end to end," says Ellig.

# Welding

## Accuracy and repeatability

With the modular welding fixturing systems from Bluco, Sauber workers can produce weldments at least three times as fast as they did before adding the systems, says Mike Heyob, a team leader at Sauber. The increased speed in part comes from eliminating most of the measuring required to construct a fixture.

Mike Oliver, mechanical engineer at Sauber, creates drawings in SolidWorks that show how the company's parts fit onto the modular system, what components are required and how to arrange them on the system. Creating a drawing can take from 30 minutes to multiple hours, depending on how many fixture components are involved, says Oliver. The time required to set up the fixtures also varies, though Heyob estimates it takes roughly one hour.

The modular system has increased repeatability for the company, says Heyob. "Before [it] worked fine, but now someone will say, 'Can you send this part?' and we know for sure now we can do it, and we know it's going to be exactly the same" as other parts made before it, he says. The system helps the company hold very tight tolerances. "There's not a small enough measure on our tape measure for the tolerances we hold" with the tools from Bluco, says Heyob.

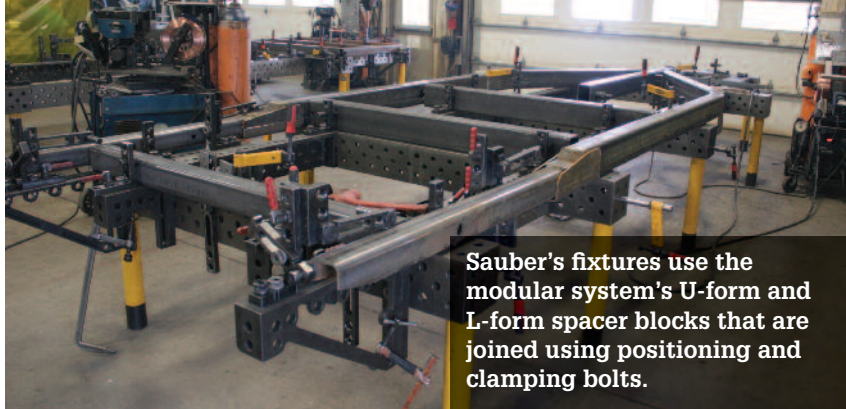
"The system helps to maintain a consistent level of squareness," Oliver says. "It helps to know you have the parts oriented in the right way." Sauber no longer is using dedicated fixtures, which must be built, stored and maintained, to create its parts, he notes.

Workers save the most time when fabricating multiples of one product. "Any time there's more than one trailer—two, three, four trailers—that's when you save money and time," says Oliver. With this in mind, the company has started to batch orders and projects together to increase the number of multiples workers fabricate.

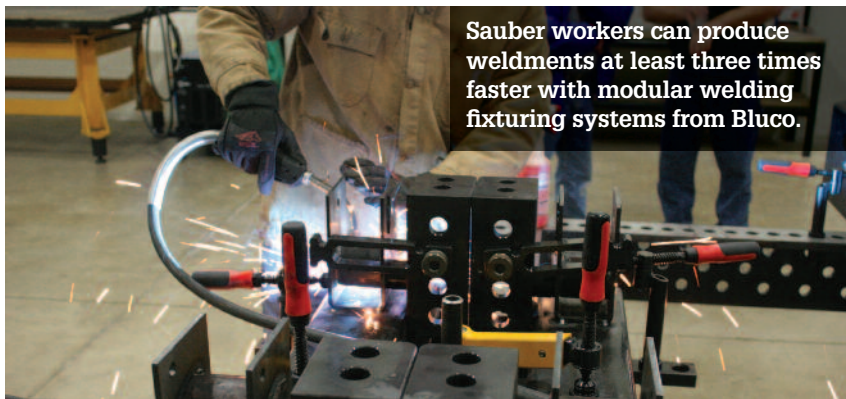
"We're changing the way we do things out here," says Heyob. "It's quicker if the trailers are similar."

## Collaborative effort

When Sauber first considered adding Bluco's modular welding fixturing system,



Sauber's fixtures use the modular system's U-form and L-form spacer blocks that are joined using positioning and clamping bolts.



Sauber workers can produce weldments at least three times faster with modular welding fixturing systems from Bluco.

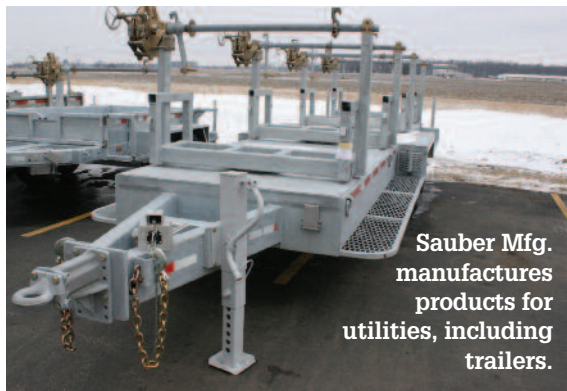
company workers met at Bluco's facility to create a weldment using the system. Sauber workers brought loose material from their facility to Bluco, and Bluco employees showed them how to weld a product using the modular system.

"At the front end, we'll do a computer-aided design layout for their part," says Ellig. "We have a facility set up where we can build the fixture physically, so we invited [Sauber] to bring their people in, bring their truck and bring their loose pieces."

The fixture system requires parts to fit it exactly, which is why accuracy and repeatability often increase. "In weldments, you can't take a part off the saw and put it together with another part and expect it to be right," says Ellig. "It could be, but you need to have the fixture stand for itself, and the part needs to fit the fixture. If the piece doesn't fit the fixture, then there have to be adjustments made to the piece in order to make it work."

Bluco has been very good to deal with, says Heyob. The company "made sure we got the right package" and worked hard before the sale to demonstrate how the Demmeler system could help Sauber.

Once a customer has the modular system, Bluco continues to support employees



Sauber Mfg. manufactures products for utilities, including trailers.

with training. There is a learning curve, but the system becomes easier to use the more one works with it, notes Oliver. "The more you use it, the more you want to use it for other things," he says.

The quality also is impressive, says Heyob. "It will be here forever. This stuff won't wear out," he says.

"If we felt like we could have made something anywhere near as good as that, we would have tried it," says Sauber. But the quality of the modular welding fixture system from Bluco and the benefits received from it outweigh its costs, he says. **FFJ**

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