HEAVY customization

by Steven J. Guisgond, general manager, Ci Metal Fabrication

A large parts fabricator relies on its customization skills to serve customer needs

Ci Metal Fabrication stands out in the industry by taking a more traditional approach. The company is celebrating its 50th anniversary of offering high-quality custom metal fabricated components to the power generation, pulp and paper, chemical and automotive industries. Located in Meridian, Miss., Ci Metal utilizes highly skilled craftsmen while meeting precise specifications in presswork, power forming, welding, cutting and shearing.

Under the wide umbrella of metal fabrication, metal is bent, shaped and joined. From there, value is added to the process by making components and assemblies according to customers' particular designs. To bring these parts to fruition, industrial metal fabrication relies on turnkey machines in which schematics are fed to a computer for the mass production of metal products, reducing the need for human effort.

Ci Metal blends technology with traditional fabrication techniques that can only be executed through a skilled handcrafted process. Clearly, the team at Ci Metal believes the key to producing high-quality fabrications is through a hands-on, custom approach versus relying solely on automated machines. Its customers agree.

PRODUCING BIG PARTS

The initial stage of any project begins with Ci Metal's layout and detailing department where all aspects of the project are broken down into

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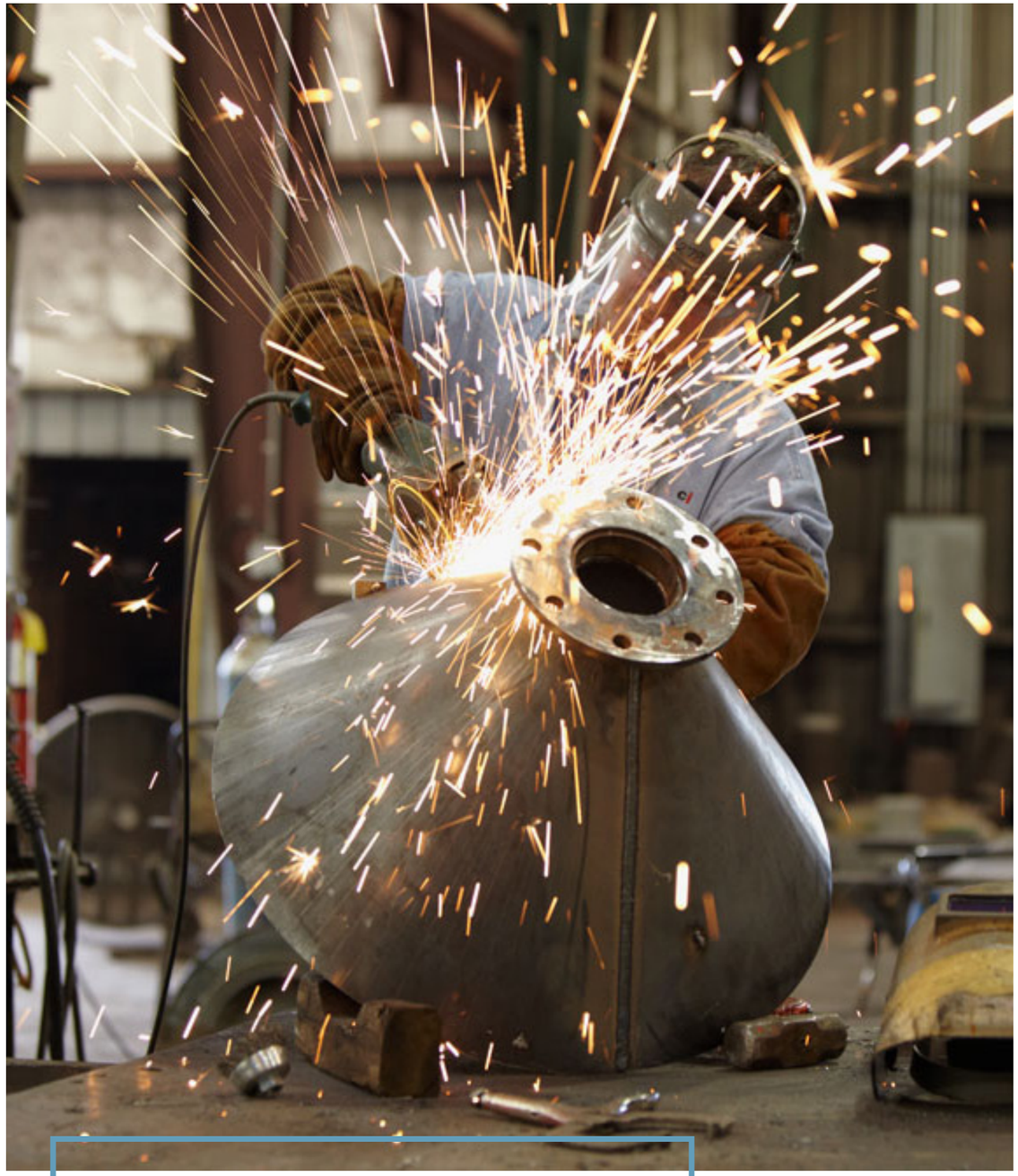


A custom cone segment with flanges during the cutting phase.

the parts required for fabrication. This is then programmed into the shop's high-definition plasma cutting machine for parts cutting. From this point, all work phases are detailed out with packages to be delegated to the proper workstations.

The experienced craftsmen study every detail of a customer's drawing and specifications to provide the most cost-effective, custom solution. Ci Metal utilizes its skilled craftsmen to manually cut, bend and assemble one-of-a-kind parts for its customers.

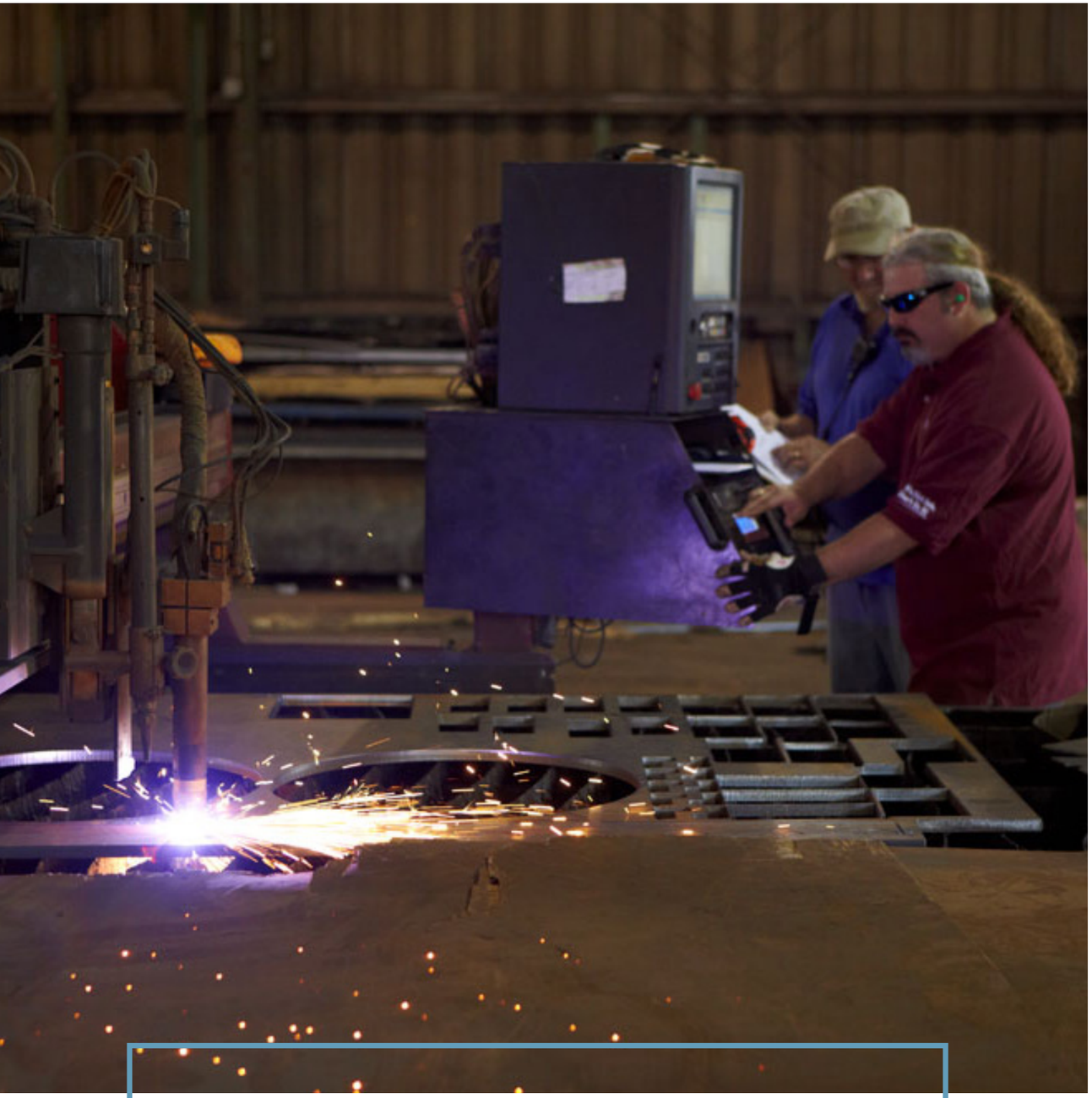
As a preferred supplier and main fabricator for companies such as General Electric, Clyde Bergemann Power Group, Babcock & Wilcox and Alstom, a big part of Ci Metal's customization is big parts.

Large assemblies always present a challenge for Ci Metal, and all metal fabricators, for that matter, because some weldments can weigh up to 40,000 lbs., ultimately making automated machines useless. The shop's upfront detailing is AutoCad based and the team programs the CNC high-definition plasma cutting table. The remaining operations throughout the shop are manually operated, such as welding, bending, shearing and sawing.

Large assemblies require careful planning, and many aspects must be welded in a particular sequence to avoid closing off or locking out future areas that will require added assemblies. Other processes, such as planning sub-assemblies, fixturing and handling, become difficult for large and heavier fabrications, as well.

The nature of custom fabrication also entails flexibility. Ci Metal's fabrications require multiple position changes to put the weldment in the proper position. Welders have to crawl in and around the weldment to achieve the different positions and angles required to complete a project.

It's important to keep overall tolerances of the weldment in check to know when to skip welding in certain areas, when to use cooling rags and when to add additional bracing or stiffeners.



Ci Metal Fabrication's s high-definition plasma table cutting parts.

CUSTOM CONVEYORS

As the preferred supplier for Clyde Bergemann Power Group, Ci Metal took on the task of fabricating three submerged scraper conveyors (SCCs) and two remote submerged scraper conveyors (RSCCs). These large, heavy conveyors are the primary means of removing bottom ash, a critical process that ensures the continued operation of a utility power plant.

The fabricators at Ci Metal knew that this project would be challenging from the start. The large SCCs had to be fabricated to close tolerances. With only a ±1/8-in. buffer over the length of the 100-ft. unit, Ci Metal's fabrication had to be precise. All of the conveyors were fabricated with complete access steel, such as ladders, chairs, platforms and handrails. All of the material was carbon steel with floor liners being AR400 abrasive resistant steel.

Prior to being approved for shipment, the SSCs had to pass a shop assembly dimensional inspection. Another challenge was the customer requirement to test run portions of the conveyor. Ci Metal had to connect and install major components together in the shop in order to physically drag the chain to simulate operation for customer approval.

This was a difficult process as the operators had to handle these large sections, bolt multiple sections together, install wheels, bearings, shafts, chain and drags then pull the chains to put equipment in motion. In the end, the test was successful, satisfying the customer's need.

Making the project more complicated was the fact that SSCs and RSCCs are large weldments weighing up to 30,000 lbs. that require shipping in sections. All of the conveyors were designed to the largest possible size dimensionally to be legally shipped on a tractor trailer for road shipment. These loads are considered super loads and required special permitting and routing.

MATERIAL CHALLENGES

Flux-cored arc welding (FCAW) is the welding technique that Ci Metal uses

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a majority of the time, as well as MIG welding on occasion. FCAW is used on mild and low alloy steels, stainless steels, some high nickel alloys and some wearfacing/ surfacing alloys.

As all metal fabricators know, certain materials are more challenging to weld than others. One of the most difficult to weld is stainless steel because it presents challenges in discolorations, weld appearances and keeping the weldments from warping and bowing due to expansion then contraction of the metal during the heat from welding to the cooling after welding.

Stainless steel requires some tricks of the trade to keep welds straight and within tolerances, including monitoring the temperature for the weld metal and base metal. Failing to stay within the specified temperature ranges results in poor performance of the material. It's important, therefore, to check the temperature of the steel in one of three ways: temperature-indicating sticks, electronic infrared thermometers or electronic surface temperature probes.

Joining dissimilar materials is a common practice in custom metal fabrication as it allows for the creation of tailor-engineered parts. This presents a set of challenges as a part may need high-temperature resistance in one area and good corrosion resistance in another. Parts or structures may need toughness or wear-resistance combined with high strength.

Joining dissimilar materials is often more complicated than joining the same material or alloys with minor composition differences. However, many dissimilar materials can be joined successfully with the appropriate joining process and specialized procedures, including knowledge of the proper welding wire or electrode for the metals.

Ci Metal works with stainless steel as well as other materials, such as A588, A606-T4, SA-387 Gr.11 alloy, SA-387 Gr.22 alloy, duplex stainless, high

A 127-ft. submerged scraper conveyor designed and fabricated to mate with a transition chute for removing bottom ash at a utility power plant.

grade stainless and abrasive resistant steels.

STRONG FOUNDATION

To overcome these challenges and produce its custom parts, Ci Metal's 57,000-sq.-ft. facility consists of three bays with two 10-ton overhead cranes each containing a 24-ft. under hook. An on-site storage area covers seven acres. The shop is equipped with three Miller Dimension 452s, one Miller Deltaweld 452 MIG welder, six Lincoln Electric IdealArc DC600 multi-process welders and four Hobart 300 welders. Ci Metal's AWS D.1.1-certified welders are capable of working on a variety of materials, including light and heavy gauge metals, stainless steel, aluminum, carbon steel, Hastelloy, Inconel and rolled plate.

Custom metal fabrication is a very intricate and delicate process that requires experience and considerable attention to detail. Ci Metal's team of knowledgeable craftsmen average more than 30 years of industry experience in presswork, power forming, welding, cutting and shearing. Creating an atmosphere that encourages employees to take pride in their skills, Ci Metal has built a strong infrastructure filled with motivated staff.

In addition to building an exceptional team of craftsmen, Ci Metal is committed to the safety of its employees. All employees receive safety orientation when hired and continue to receive updated safety training throughout their tenure with the company.

Built on the foundation of family and experience, Ci Metal has a long history of generations working side by side and handing down the honorable craftsmen title to family members.

As the tremendous wealth of knowledge is passed down from generation to generation, the skillful team of craftsmen at Ci Metal continues to grow. The company's foundation of family, commitment to education and experience and professionalism will continue to propel the custom metal fabricator forward for another 50 years and beyond. ■

CI METAL FABRICATION