

How one fabricator's reevaluation of its consumables and guns reduced maintenance time and increased welder output.

Three Ways to Boost Welding Productivity

BY MIKE RUSSELL

FROM THE POWER SOURCE to the welding wire, each of the components in an arc welding operation can have a significant impact on productivity. The welding gun and consumables—nozzles, contact tips and diffusers—in particular, are often an overlooked aspect of the whole process, but these components directly affect quality, welder comfort, rework, downtime and more.

There are three key ways in which guns and consumables used in flux cored arc welding (FCAW) and gas metal arc welding (GMAW) can lead to improved productivity:

- Reducing time spent changing contact tips.
- Gaining better joint access and gas coverage.
- Increasing arc-on time through improved operator comfort.

Contact Tips

The contact tip is the last point of contact between the welding equipment and the welding wire, as well as the consumable responsible for generating the electrical connection to create the arc. As the wire passes through the contact tip, it can often erode the inside of the tip bore, leading to interruptions in the electrical current and causing poor arc stability. During the normal course of welding, especially at higher amperages, the contact tip can also become loose and cause a burnback (or the formation of a weld inside the contact tip). Burnbacks are often a significant source of downtime in a welding operation—and a big hindrance to productivity.

Having a contact tip that stays securely placed during the course of welding is key to combating burnbacks. Brooklyn Iron Works, an AISC member firm in Spokane, Wash., found just such a solution when they converted to Centerfire contact tips last year.

Like other structural fabrication companies, Brooklyn Iron Works faces stringent deadlines for its projects, so the ability to minimize downtime for burnbacks and any other equipment management is imperative. Welding personnel run their weld beads at high amperages (300 to 400 amps) using typically .052-in. or 1/16-in. FCAW wire diameters, which often proved too harsh on their previous contact tips. They would loosen after routine welding, causing the wires to arc back and create the burnback.

“Before we converted to the new contact tips, we had a substantial amount of downtime for contact tip changeover,” explained quality assurance manager Phil Zammit. “And that’s money. It’s lost arc time for tip maintenance. Now we are using a third fewer tips and don’t have to worry about the downtime like before.”

The company’s new contact tips don’t loosen because they “drop in” the diffuser and are locked in place by tightening the nozzle. They also feature a non-threaded tip design with a tapered base and large diameter seat. The other benefit of the design is that it helps generate consistent electrical conduc-

tivity and heat transfer, both of which help the consumables last longer and perform more reliably.

Better Shielding

Brooklyn Iron Works’ welders frequently encounter weld joints up to 2-in. deep. In the past, they often had to extend their electrode stickout as far as 2 in. to access the joints, a practice that risked generating porosity because it could compromise the necessary shielding gas coverage.

Porosity can also occur if a welder uses too small of a nozzle for the application, extends the welding wire too far beyond the end of the nozzle or tries to weld with a nozzle full of spatter. Air currents from outside or from fans can create the problem, too, by blowing away much needed shielding gas.

Brooklyn Iron Works has found its solution to porosity is to have the right size and shape of nozzle for the application. Switching to Centerfire consumables now allows them to reduce electrode stick-out and gain better gas coverage at the same time.

“These consumables direct the gas exactly where we need it,” Zammit explained. “It keeps our gas shielding coverage right at the weld, even when the doors are open or we have a breeze. We’ve never had a huge problem with porosity, but now we have even less of one.”

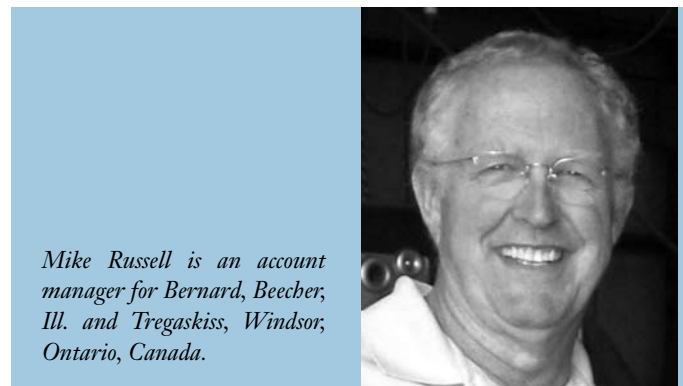
The nozzles feature a tapered shape that stays fixed flush with the contact tip. They also include a built-in spatter shield that acts as an additional gas diffuser and ensures a more consistent directional gas flow, even on deep joints or if there is a slight breeze present.

The Benefits of Comfort

The typical welder spends time during a shift allocated to joint preparation, part fit-up and movement, along with other activities that contribute to the throughput of the welding operation. But during the actual process of welding, it is critical that he or she remain comfortable. Good operator comfort lessens the chances of injuries associated with repetitive movement and reduces overall fatigue. And a more content employee also brings forth the potential for greater productivity.

Welders at Brooklyn Iron Works have addressed the issue of comfort through the various necks available on their guns, which include fixed, rotatable and flexible necks in various lengths and bend angles. These neck options help the welders better accommodate the varying welding angles they encounter on projects. They can reach the weld joints better and minimize downtime to address issues like wrist fatigue. The flexible necks

◀ Having nozzles that provide consistent shielding, gas coverage is imperative to preventing defects like porosity. Here, Brooklyn Iron Works welder Brian Hubbard uses Centerfire consumables on the 400-amp Q-Gun to complete welds on a current structural steel bridge project.

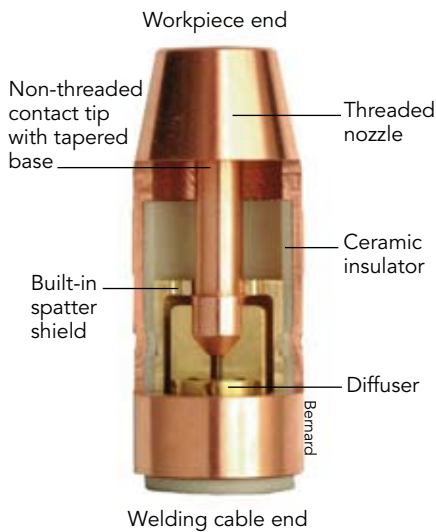


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◀ Using the proper size nozzle and shape can help welders gain better joint access and with it improved shielding gas coverage to prevent issues like porosity. A flexible neck torch can also help maneuver into difficult joints.

▶ Having a contact tip that stays securely placed during the course of welding can help combat downtime to rectify a burnback, as shown here.



▲ This cutaway view of Bernard's Center-fire MIG gun consumables shows the various components that contribute to better gas coverage, longer tip life and better arc starts.

are especially helpful on difficult joints, as they can be adjusted to weld around corners or to fit into complex shaped steel components.

Welder Ricky Curtis explains, "I can bend the neck in any direction I need. Even around the corners. I like that the gun does the work for me, instead of my wrist."

According to the company's maintenance supervisor, John Dahl, there have been additional benefits to the design of the gun as well.

"It takes only about five minutes to change a neck on these guns, compared to nearly an hour with our previous guns," he explains.

This ease of maintenance is another way in which fine tuning their equipment has helped Brooklyn Iron Works reduce downtime and get back to welding faster.

In the long run, companies can benefit from looking at how every aspect of their welding operation affects downtime. Time spent for changing out contact tips or maneuvering unnecessarily into difficult joints can ultimately hinder productivity, as can having welding guns that are time consuming to maintain. Addressing the problem of productivity may be as simple as looking at a new consumable option or finding ways to make the welders more comfortable. **MSC**