Fixing Welding Gun Problems in the Forge

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Virtually every forge has an arc-welding machine on hand. This article is a guide to keeping your MIG gun from turning a good day into a bad one.

I've had some really good days in nearly 25 years as a forging tool and die welder. The die is hot enough, the radio is playing loudly, and the boss is on vacation. All I have to do is keep the wire running at 20 pounds per hour. In most cases, this wire is for flux-cored arc-welding (FCAW) applications.

Easy, right?

However, few things can turn a good day into a bad one faster than feeding problems for a welder running wire. In my experience, the feeder itself is usually not the problem. The problem starts at the drive rolls and can run all the way to the tip. It starts off as what is described as "chatter" or "stutter." The wire refuses to feed smoothly, and the welder can feel the resistance in the handgun.

MIG guns come in many different sizes and can run a variety of diameters and types of wire. From mild steel to aluminum, tool steel to copper-based alloys, today's MIG welders are in use in every industry. It doesn't matter where it is found, whether in the robotics-rich environment of the automotive plant or in a neighbor's garage, the one thing they all have in common is the drive rolls, cable and torch that delivers the filler metal and shielding gas (or not) to the area being welded.

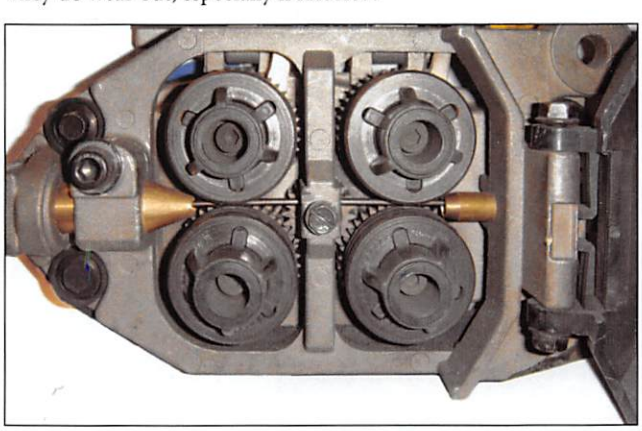
Whether you are running solid or flux-cored wire, shielded or open arc, even sub arc, wire-feeding problems are encountered in all these types of welding. You've run literally miles of wire through your gun flawlessly with just regular tip changes, and now it decides to act up.

Let's look at what I have found to be areas that, if regular maintenance is done, will prevent you from having a good day go bad.

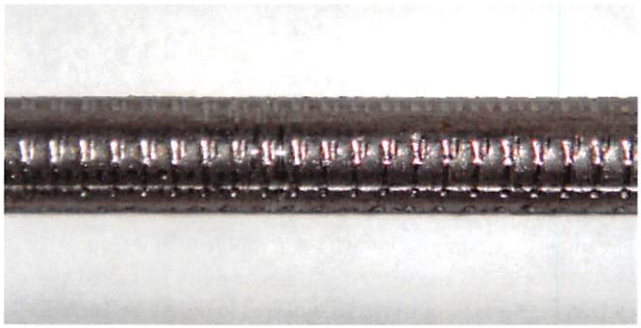
Drive Rolls Not Cleaned or Adjusted Properly

PROBLEM: The drive-roll groove (and knurls on rolls so configured) can become packed with the drawing compound. This compound is used in the manufacture of the wire to reduce the size of nearly all the solid or flux-cored wire used in MIG applications, industrial grit from grinding and smoke from welding. This can affect the tensioning and grip on the wire. Smooth rolls used for solid wire are less affected than knurled rolls used for FCAW wires.

SOLUTION: Periodically remove the drive rolls and clean them with a wire brush to eliminate the buildup of drawing compound, dust and dirt that affect the pressure and grip the rolls would have on the wire. At the same time, inspect the drive rolls for wear. They do wear out, especially if knurled.



Drive rolls must be kept clean and properly adjusted, or they may get fouled with drawing compound or other contaminants.



Welding wire can develop "teeth" if the drive rolls are too tight on it.

The MIG gun's tip gets the most wear of any part and should be replaced regularly.

Drive-Roll Pressure Too High

PROBLEM: It is common, when a feeding problem arises, to tighten the drive rolls to grip the wire better to overcome the dilemma. This is especially true when using knurled rolls for flux-cored wire. Because of its construction, flux-cored wire is easy to reshape, from round to oval, with drive-roll pressure, and the wire develops "teeth" when using knurled rolls. These "teeth" will start to wear the liner, guides and tip like a saw. When used with knurled drive rolls, solid wire won't change shape like flux-cored wire but will develop the "teeth" and similar wear.

SOLUTION: Periodically, before feeding the wire through the cable/hose assembly, use an air nozzle and shop air pressure to blow out the liner, first from the torch end and then, if convenient, from the feeder end. The amount of small debris blown out of the liner will amaze you. Shavings from the wear and wire have a tendency to "pack up" the liner at noncontact points and junctions (diffuser/tip). This will cause the wire to chatter or stop feeding altogether. It will also wear the liner out more quickly.

Worn Spring Liner

PROBLEM: The spring liner used for almost all cable/hose assemblies is removable and replaceable. Almost all spring liners have at least two bends that are constant – one coming out of the feeder and the other in the torch neck. The wire rubs the same spot and wears

Spring liner wear can cause "birdnesting" of wire and clog the MIG gun.

Periodically check your ground.

a groove in the liner. This acts as a high friction area as the groove deepens. The more bends that are permanent increases the drag on the wire, causing it to "birdnest" at the torch inlet or just stop feeding. This is also one cause of the chatter that can frustrate a welder.

SOLUTION: Occasionally index the liner, remove and inspect it. A kink in the liner *will* cause a feeding problem. Blow out the liner guide, turn the liner 90 to 180 degrees and reinstall it. (You did index it before you pulled it out, didn't you?). This will present a fresh area in the liner to the wear of the moving wire. You will still eventually need to replace the liner, but doing this can extend the life three to four times what it would normally be.

Diffuser/Tip Problems

PROBLEM: The most commonly replaced item in a torch assembly is the tip. Because the tip is at the business end of the torch, it receives the lion's share of the abuse from the heat, spatter and the operator.

SOLUTION: Aside from normal wear-causing replacement, the tip is rarely the cause of feeding problems but does show the results

of the problem. If the tip has been replaced and feeding problems persist, then there is almost a guarantee that the problem has developed in one of the previously discussed areas.

Check Your Ground!

PROBLEM: A bad ground can present itself as a stutter and act like the wire needs voltage or speed adjustment; a lack of shielding-gas coverage; liner or tip grab; or base-metal contamination, causing porosity.

SOLUTION: Periodically check the ground at the power source, wire feeder and work clamp. A bad ground can destroy a tip with burn-back and spatter.

Wire Lube and Cleaner

One of the easiest ways to maintain good feeding characteristics if everything else is right is the use of commonly available wire lube and cleaner, good for MIG and FCAW. Another good idea for preserving the consumables (nozzle and tip) is nozzle dip. This product won't correct for drive-roll issues, worn liners or weak grounds. When used following the manufacturer's recommendations (and the previously mentioned tips), however, it will allow for much longer component life, fewer feeding problems and many more good days than bad.

Conclusion

The single greatest cause for MIG-gun problems and failure that I have experienced and witnessed is not having a gun rated high enough for the type of work it is required to do. An air-cooled, 300-amp, 60% duty-cycle gun will fail quicker than you think when required to run 3/32 wire at 300 IPM. Money spent on a high-quality, heavy-duty, water-cooled MIG gun and cooler – rated at greater than the highest foreseeable need – is money in the bank. Lost production, downtime waiting for parts and having to replace the equipment (sometimes several times a year) is far more costly than the initial investment. A properly rated and maintained MIG gun can last for years, and everybody can have more good days than bad … even the boss.

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