

Smart managers reduce overwelding

Apply the five do's of welding control to lessen cycle time and welding costs. This first of five articles explains how to save by controlling weldmetal volume.

By Jack R. Barckhoff

Managers who rely on welders to select welding processes and set parameters lose the power to control welding productivity, guaranteeing high manufacturing costs. I advocate decision-making at the lowest possible level, but managers, supervisors, and engineers must set operating guidelines, select processes, and establish parameter ranges. They can leave it to welders to determine whether parts fit together properly and whether parameters need adjusting within specified limits to accommodate non-standard conditions.

How do you move welded product out the door with greater consistency and repeatability? By establishing practices that reduce cycle time and that improve quality.

One step at a time

Focus on small steps, reducing costs by implementing the five do's weld sizes; select weld processes and set procedures; plan and direct production of welded parts; and set quality standards.

The first Do

How does reducing weldmetal volume help to control welding of welding management, listed in the box.

Followed by product design, manufacturing-industrial engineering, production, and quality assurance departments, the do's reduce excessive cost. If you don't have those departments in your company, your waste-reduction team should include the people who determine costs? Consider a situation where an organization consistently overdesigns or overwelds fillets. If 3/16-inch fillets will do the job where 1/4-inch fillets are used, typically to ensure "strong" joints, the extra 1/16 inch will increase arc-on time 78 percent above what it should be. Preventing this overwelding can save \$8,400 per operator per year.

FIVE DO'S

for management and control of welding:

- Reduce weldmetal volume.**
- Reduce arc time per weldment.**
- Reduce scrap and rework.**
- Reduce work effort and fatigue.**
- Reduce motion and delay time.**

The saving is based on 40-percent arc-on time, 240 working days per year at 8 hours per day, at a labor cost of \$25 per hour.






The table details, for several fillet sizes, fillermetal volume per linear foot of weld, percent overwelded when fillet size increases by 1/16 inch. Reducing fillermetal volume saves without spending a cent on equipment.

Minimize volume other ways

Take further steps to minimize the volume of deposited filler metal:

- Where weld size is not specified, make continuous double-fillet welds no larger than 3/4 the thickness of the thinner member, which provides full joint strength.
- Unless otherwise specified, deposit equal-leg fillets, since thickness of the smaller leg determines joint strength.
- Avoid concave beads: weldmetal at toes is excess since weld strength is determined by weld throat.
- Minimize weld-face reinforcement or buildup.
- Tighten up weld joint fitup.
- Weld vertical down on light sheet metal.
- When welding light plate, work in the flat (trough) position where possible to help maintain proper bead shape and to minimize filler-metal consumption. ■

OVERWELDING FILLETS BY 1/16 INCH WASTES FILLER METAL AND ARC TIME

Fillet	Specified fillet size, in.	Weldmetal volume, in. ³ /ft	Overwelded volume, percent	Wasted arc time, percent
	1/8	0.094	125	56
	3/16	0.211	78	44
	1/4	0.376	56	36
	5/16	0.586	44	31
	3/8	0.844	36	26

Overwelding 3/16-in. fillets by 1/16 in. increases arc-on time by 78 percent and can cost \$8,400 annually in labor.



Jack Barckhoff, P.E., president of Barckhoff and Associates, Inc., has offices in Minneapolis, (612) 934-6000