

# Smart managers eliminate scrap

Apply the five do's of welding control to lessen cycle time and welding costs. The third of five articles tells how to make sure products are error-free.

By Jack R. Barckhoff

**H**aving reduced weld-metal volume and arc time per weldment, the first two "do's" of welding control, the manager next tackles scrap and rework.

Parts inspection after a series of operations, which is quality control by identifying repairable or reject parts, does little to prevent flaws. The better approach is to identify the cause of flaws, correcting the cause and preventing rejects and need to rework.

## Do the job right

Welding operators must use correct parameters and technique to avoid time wasted in removal of weld spatter, smoothing of rough welds, and grind-out and reweld of defective welds. Cost of this work cuts into profits and inflates product price.

Set up a training program to teach welders and other workers how to control their work and to understand and appreciate the importance of their jobs. For welders this includes demonstrating proper techniques for each process, material, and position; explaining why engineers set parameter limits; examining parts before and after welding to determine when to raise or lower settings; and recognizing defective equipment and consumables. Such training convinces each employee that he is on a team, holds responsibility for product quality, and has a large share in the company's future.

## Give workers control

Giving the individual control at his work station makes each worker part of a company-wide effort to increase quality. No worker controls the quality of materials or parts delivered to his station, or whether equipment can perform properly. Nor does he control standards for workmanship and quality. But the worker who understands his operation will return defective parts received at his work station, assure

that his equipment is working properly, and that every part he makes is good.

## Training saves money

A manufacturer of fabricated building-roof rafters eliminated weld spatter, burnthrough, and undercut on light-gage materials by lowering arc voltage and increasing travel speed of semiautomatic GMAW. These changes improved fusion and joint penetration. They also reduced weldmetal volume and allowed welders to remove heavy leathers worn for protection from spatter and arc heat. The result: 20 operators saved 6,000 hours annually spent reworking welds, and the company had a potential \$160,000 annual profit improvement.

To assure that these improvements would not fade away, the company added a lecture-demonstration training program that explained to the operators the cause, effect, and cure for improper settings. Operators came to understand the effect and importance of welding variables, increasing their job satisfaction.

## Track reject costs

Plant surveys we have made nationwide show that many companies do not know what scrap and rework is costing them. Most have no procedures for charging these costs. Even when a company has rework accounts, workers commonly charge major rework to the rework account, but charge short-duration rework to a fabrication number. As a result, costs charged to fabrication are higher than actual, and rework costs lower.

Managers must collect accurate rework and scrap costs. When they see these costs, they will take corrective action. Smart managers will reduce such costs by providing control methods and guidelines, and by making the lowest levels responsible for inspection and quality. Properly trained, operators will control the variables they can and report those they cannot. ■

## 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.



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## A WELDING CONTROL PROGRAM TO DO THE JOB RIGHT THE FIRST TIME

Fabricating a 1,600-ton roof of beams, welded tubing, and plate for the 15,000-seat Carver Hawkeye Sports Arena, University of Iowa, construction managers called in welding and quality control engineers and inspectors who instituted a plan to make welds right the first time:

- Check drawings and procedures to ensure that welded connections meet design and code requirements.
- Develop a qa-qc plan to monitor machines and operator techniques, to forestall improper welding, rework, and delays in shop fabrication and field welding.
- Provide detailed inspection and ndt procedures, verifying that welds meet design requirements.

In-process control detected deviations from procedures and techniques *before* operators completed welds. See WELDING DESIGN & FABRICATION, April 1985, pages 62-65, for the complete report.

## STEPS TO REDUCTION OF WELD REJECTS

- Communicate quality-control standards clearly and concisely to all employees.
- Explain the effect of welding processes and variables on weld quality to engineers, supervisors, inspectors, and operators.
- Design joints and specify procedures for good access to joints for electrode manipulation and operator vision.
- Specify weld procedures to avoid distortion.
- Qualify operators through proper training, then monitor their work to assist them in producing qualified welds.
- Set workmanship standards consistent with product application.
- To detect decreasing product quality quickly, give line managers and inspectors responsibility for monitoring work performance, auditing in-process inspection, and reporting, feedback, and evaluation.