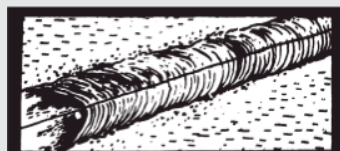




Causes and Cures of Common Welding Troubles



Cracked Welds

Why

- 1) Insufficient weld size.
- 2) Excessive joint restraint.
- 3) Poor joint design and/or preparations.
- 4) Filler metal does not match base metal.
- 5) Rapid cooling rate.
- 6) Base metal surface covered with oil, grease, moisture, rust, dirt or mill scales.

What to do

- 1) Adjust weld size to part to thickness.
- 2) Reduce joint restraint through proper design.
- 3) Select the proper joint design.
- 4) Use more ductile filler.
- 5) Reduce cooling rate through preheat.
- 6) Properly clean base metal prior to welding.



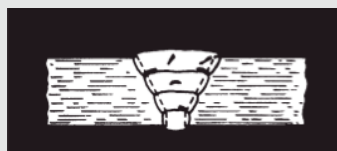
Distortion

Why

- 1) Improper tack welding and/or faulty joint preparation.
- 2) Improper bead sequence.
- 3) Improper set-up and fixturing.
- 4) Excessive weld size.

What to do

- 1) Tack weld parts with allowance for distortion.
- 2) Use proper bead sequencing.
- 3) Tack or clamp parts securely.
- 4) Make welds to specified size.



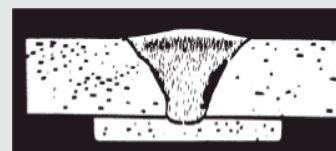
Inclusions

Why

- 1) Incomplete slag removal between passes.
- 2) Erratic travel speed.
- 3) Too wide a weaving motion.
- 4) Too large an electrode.
- 5) Letting slag run ahead of arc.

What to do

- 1) Completely remove slag between passes.
- 2) Use uniform travel speed.
- 3) Reduce width of weaving technique.
- 4) Use a smaller electrode size for better access to joint.
- 5) Increase travel speed or change electrode angle or reduce arc length.



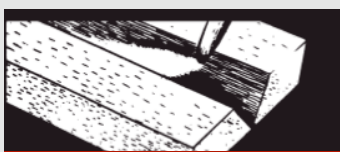
Lack of Fusion

Why

- 1) Improper travel speed.
- 2) Welding current too low.
- 3) Faulty joint preparation.
- 4) Too large an electrode diameter.
- 5) Magnetic arc blow.
- 6) Wrong electrode angle.

What to do

- 1) Reduce travel speed.
- 2) Increase welding current.
- 3) Weld design should allow electrode accessibility to all surfaces within the joint.
- 4) Reduce electrode diameter.
- 5) Reduce effects of magnetic arc blow.
- 6) Use proper electrode angles.



Magnetic Arc Blow

Why

- 1) Unbalanced magnetic field during welding.
- 2) Excessive magnetism in parts or fixture.

What to do

- 1) Change the location of the ground connection on the workpiece.
- 2) Reduce welding current and arc length.
- 3) Use alternating current.



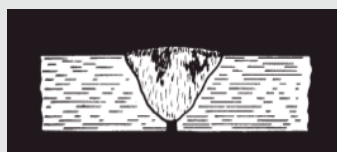
Overlapping

Why

- 1) Too slow travel speed.
- 2) Incorrect electrode angle.
- 3) Too large an electrode.

What to do

- 1) Increase travel speed.
- 2) Use proper electrode angles.
- 3) Use a smaller electrode size.



Poor Penetration

Why

- 1) Travel speed too fast.
- 2) Welding current too low.
- 3) Poor joint design and/or preparation.
- 4) Electrode diameter too large.
- 5) Wrong type of electrode.
- 6) Excessively long arc length.

What to do

- 1) Decrease travel speed.
- 2) Increase welding current.
- 3) Increase root opening or decrease root face.
- 4) Use smaller electrode.
- 5) Use electrode with deeper penetration characteristics.
- 6) Reduce arc length.



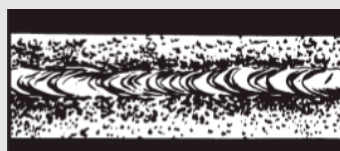
Porous Welds

Why

- 1) Excessively long or short arc length.
- 2) Welding current too high.
- 3) Too fast travel speed.
- 4) Base metal surface covered with oil, grease, moisture, rust mill scale, etc.
- 5) Wet, unclean or damaged electrode.

What to do

- 1) Maintain proper arc length.
- 2) Use proper welding current.
- 3) Reduce travel speed.
- 4) Properly clean base metal prior to welding.
- 5) Properly maintain and store electrode.



Spatter

Why

- 1) Arc blow.
- 2) Welding current too high.
- 3) Too long an arc length.
- 4) Wet, unclean, or damaged electrode.
- 5) Unclean welding surface.

What to do

- 1) Attempt to reduce the effect of arc blow.
- 2) Reduce working current.
- 3) Reduce arc length.
- 4) Properly maintain and store electrodes.
- 5) Clean welding surface.



Undercutting

Why

- I. Faulty electrode manipulation.
- II. Welding current too high.
- III. Too fast travel speed.
- IV. Arc blow.

What to do

- I. Pause at each side of the weld bead when using weaving technique.
- II. Use proper electrode angles.
- III. Use proper welding current for electrode size and welding position.
- IV. Reduce travel speed.
- V. Reduce effects of arc blow.

