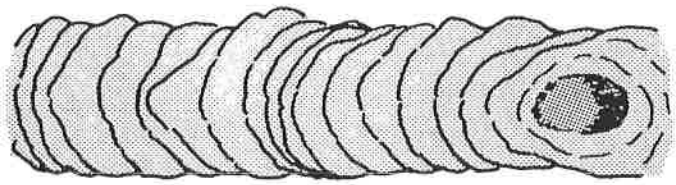
NAME _____ SCORE _____

Unit 16

WELDING PROBLEMS– HOW TO SOLVE THEM

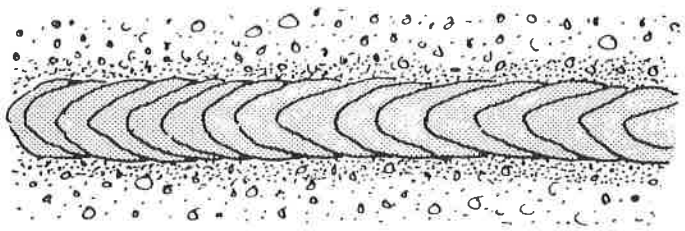
No doubt by this time you have encountered several of the most common welding problems. These problems, their causes and solutions are presented in this unit so they will be handy for easy reference.

POOR APPEARANCE



CAUSES	HOW TO SOLVE
1. Current setting too high or too low.	1. Correct current setting.
2. Wrong type of electrode.	2. Use proper electrode.
3. Faulty electrode.	3. Check electrodes before use.
4. Overheated work.	4. Allow work to cool between passes.
5. Incorrect speed of travel.	5. Adjust speed so that proper bead is formed.
6. Electrode manipulated improperly.	6. Use proper welding technique.

EXCESSIVE SPATTER

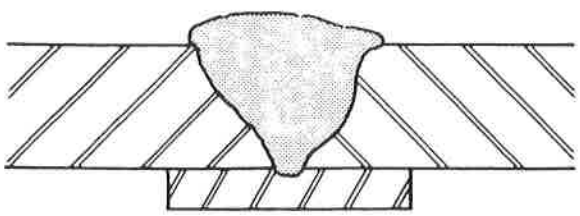


CAUSES	HOW TO SOLVE
1. Current setting too high.	1. Use correct current setting.
2. Arc too long.	2. Adjust to proper length arc.
3. Arc blow.	3. Minimize arc blow.
4. Wrong polarity for electrode being used.	4. Use correct electrode and polarity.
5. Faulty electrode.	5. Select suitable electrode.

ARC HARD TO START

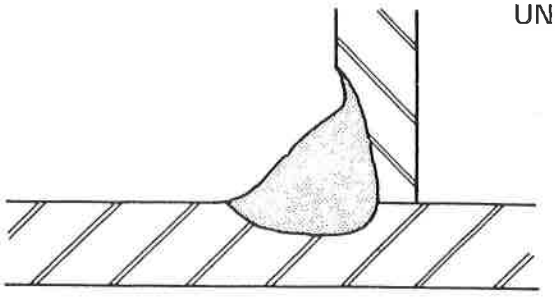
CAUSES	HOW TO SOLVE
1. Current setting too low.	1. Correct current setting.
2. Work not cleaned.	2. Clean work.
3. Work not properly grounded.	3. Clamp ground solidly to bare metal.
4. Flux covered electrode tip.	4. Clean electrode tip.

POOR FUSION



CAUSES	HOW TO SOLVE
1. Current setting too low.	1. Correct welding current.
2. Incorrect welding speed.	2. Adjust welding speed to insure melting of both sides of joint.
3. Wrong type electrode.	3. Use proper electrode.
4. Arc too long.	4. Hold correct length arc.
5. Work not properly prepared for welding.	5. Make sure joint is clean. "V" or groove joint if necessary.

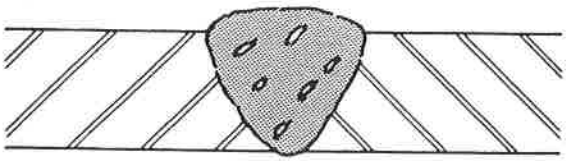
UNDERCUTTING



CAUSES
1. Current setting too high.
2. Welding speed too fast.
3. Arc too long.
4. Wrong size electrode.
5. Incorrect electrode to work angle.
6. Faulty electrode manipulation.

HOW TO SOLVE
1. Correct welding current.
2. Reduce speed of travel.
3. Hold correct length arc.
4. Use correct size electrode.
5. Adjust electrode angle so that arc force will hold molten metal until undercut fills.
6. Use a uniform weave.

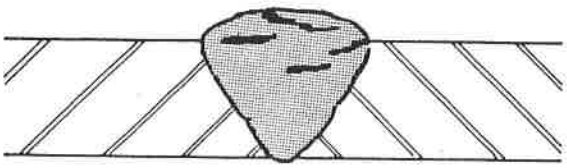
POROUS WELDS



CAUSES
1. Short arc.
2. Welding speed too fast.
3. Welding speed too slow.
4. Insufficient puddling time.
5. Impurities in or on base metal.
6. Wrong type electrode.

HOW TO SOLVE
1. Hold correct length arc.
2. Reduce speed of travel.
3. Increase speed of travel.
4. Allow enough puddling time for gases to escape.
5. Clean base metal thoroughly.
6. Use proper electrode.

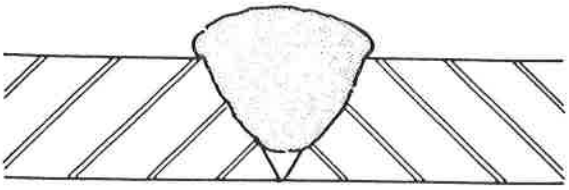
SLAG INCLUSION



CAUSES
1. Current setting too low.
2. Arc too short.
3. Welding speed too slow.
4. Welding speed too fast.
5. Faulty electrode manipulation.

HOW TO SOLVE
1. Correct welding temperature.
2. Hold correct arc length.
3. Increase welding speed.
4. Decrease welding speed.
5. Use correct electrode to work angle so that arc force prevents molten metal from overtaking slag.

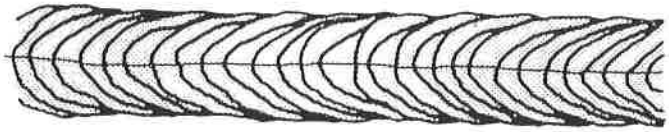
INCOMPLETE PENETRATION



CAUSES
1. Welding speed too fast.
2. Electrode too large.
3. Current setting too low.
4. Impurities in or on base metal.
5. Weld groove not proper size.

HOW TO SOLVE
1. Weld more slowly.
2. Select electrode according to welding groove size.
3. Correct welding current.
4. Clean base metal thoroughly.
5. Allow sufficient space at bottom of joint.

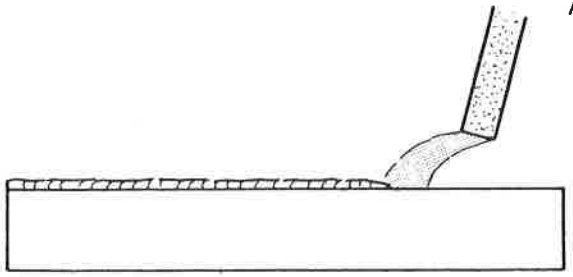
CRACKED WELDS



CAUSES
1. Wrong type electrode.
2. Base metal high carbon steel.
3. Weld cooled too rapidly.
4. Work too rigid.
5. Weld and parts sizes unbalanced.

HOW TO SOLVE
1. Use proper electrode.
2. Cool work slowly.
3. Cool work slowly.
4. Design work to eliminate rigid joints.
5. Heat parts before welding. Cool slowly after welding.

ARC BLOW



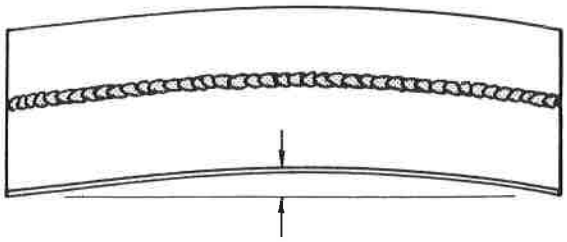
CAUSES

1. Magnetic fields cause the arc to wander from its intended course.

HOW TO SOLVE

1. Use steel blocks to alter magnetic path around arc.
2. Use AC machine.
3. Relocate ground connection.
4. Use very short arc and point electrode in direction of blow.
5. Weld away from ground.

WARPING



CAUSES

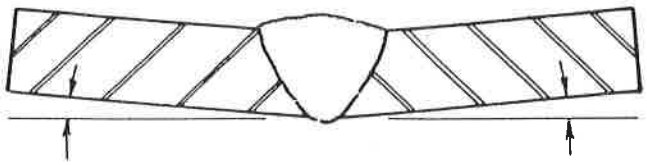
1. Shrinkage of weld metal.
2. Faulty clamping of parts.
3. Overheating of joint.
4. Faulty joint preparation.

HOW TO SOLVE

1. Use intermittent or skip weld.
2. Clamp parts properly.
3. Weld rapidly. Use high speed and moderate penetration electrodes.
4. Avoid excessive space between parts.

See Unit 17 for additional information on how to prevent warping.

DISTORTION



CAUSES

1. Uneven heating.
2. Overheating.
3. Incorrect placement of parts to be joined.
4. Incorrect welding procedure.

HOW TO SOLVE

1. Tack or clamp parts properly.
2. Use short beads. Allow to cool between welds.
3. Adjust pieces so that they warp into position.
4. Use proper bead placement and welding sequence. Keep weld deposits at a minimum.

See Unit 17 for additional information on how to prevent distortion.

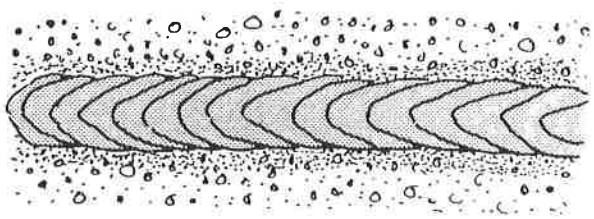
CHECK YOUR PROGRESS

Carefully study the illustrations below. Name the problem and list two or three ways to correct the welding condition.

Example of _____

Solve by:

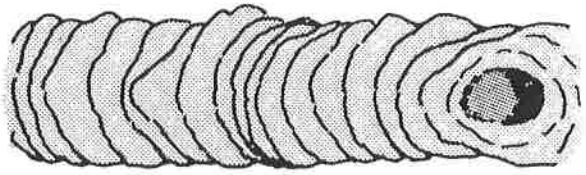
1. _____.
2. _____.
3. _____.



Example of _____

Solve by:

1. _____.
2. _____.
3. _____.



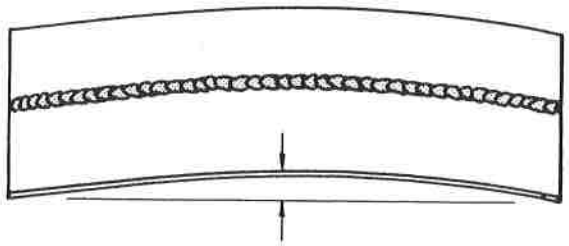
Arc Welding

Carefully study the illustrations below. Name the problem and list two or three ways to correct the welding condition.

Example of _____

Solve by:

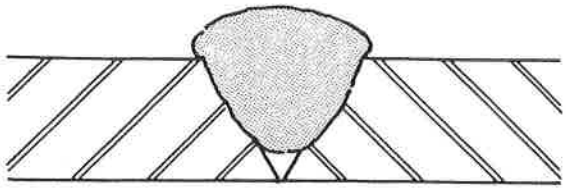
1. _____.
2. _____.
3. _____.



Example of _____

Solve by:

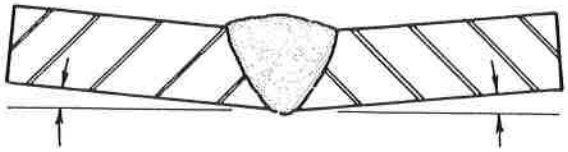
1. _____.
2. _____.
3. _____.



Example of _____

Solve by:

1. _____.
2. _____.
3. _____.



THINGS TO DO

1. Look around the shop or your home for items or products that have been arc welded. Carefully observe each weld to see if any welding problems exist. Make a list of the items and indicate any defects you found. Suggest ways in which each welding problem could have been corrected.

   _____

   _____

   _____

   _____

   _____

   _____

2. Select a piece of scrap steel and deposit a bead at least three inches long. Use a very high current setting for the electrode being used. Chip away the slag and observe the bead. Write down all the poor characteristics about the bead due to the excessive current setting.

   _____

   _____

   _____

   _____

3. Perform the same experiment as in number 2 above, except deposit the bead at a very slow rate of speed. Chip away the slag and note the welding problems you observe.

   _____

   _____

   _____

   _____