

## Welding and Allied Processes

The dangers in welding, cutting, heating and grinding should never be underestimated. Everyone doing these tasks should be properly trained to use the equipment safely and to understand the hazards involved.

### Spot the hazard

Hazards associated with welding include:

- **The arc itself.** The temperature of the arc can reach 6000 C. Intense ultraviolet and infra-red rays can be harmful to both the welder and anyone else nearby. Damage to uncovered skin can be similar to severe sunburn. Unprotected eyes can become extremely red and sore and in extreme cases suffer permanent damage.
- **Welding gases.** In gas welding, leaking oxygen can enrich the atmosphere so that a naked flame, cigarette, spark or electrical fault can be dangerous.
- **The fumes.** Welding in confined and unventilated spaces should be avoided, because welding fumes can be fatal. Where it's not possible to ensure good ventilation, it may be necessary to wear an air-line fed respirator with Australian Standard certification.
- **Fumes and explosions.** Avoid welding, cutting or heating empty drums. People have been killed this way when undetectable fuel residues vaporize and explode. Always check what's been inside, and if necessary clean the drum thoroughly before cutting, welding or heating. Welding heat can also generate toxic fumes from chemical residues. Avoid welding on metal coated surfaces, such as galvanized iron.
- **Heat.** Hot metal surfaces, metal fragments and sparks can cause severe burns to unprotected skin.
- **Electric shock.** The risk of electric shock in welding is high. Any electrical hazards should be identified and addressed. Check manufacturers' instructions.

### Assess the risk

Check each of the above areas for potential to cause an injury or hazardous incident. Refer to accident records, safe work procedures, training and the experience of operators doing hazardous work. If risk of injury or harm is identified, take steps to minimize or eliminate the risk.

### Make the changes

Here are some suggestions for making welding safer. Appropriate protective clothing should include:

- a shield or helmet with a suitable grade of filtered lens;
- a felt skull cap or beret;
- fire resistant gloves and leather apron;
- boots and leather spats;
- arm protection - long sleeves, leather if possible;
- fire resistant overalls.

To prevent deterioration, all protective clothing and equipment should be stored carefully, and kept clean and in good working order.

### Machine welding

- Never attempt to connect or change welding cables before switching off mains power.
- Always install the welding machine as near as possible to the power point.
- Always keep the welding machine terminals and cable connections clean and tight.
- Only use welding cables that are fully insulated throughout their entire length.
- Work on a well insulated floor wherever possible.
- Wear rubber insulated shoes.
- Always wear dry gloves when handling equipment that is live, e.g. when placing an electrode in a holder.
- Always get a qualified electrician to do any electrical repairs.
- Don't use gas pipes or water pipes as part of the welding circuit; it can cause an explosion or give someone a shock.

## Gas welding

Leaking gases are a major hazard in gas welding. While fuel gas is usually recognized by its odor, oxygen leaks are potentially more dangerous because they are not easily recognized. Leaking oxygen can enrich the atmosphere so that a naked flame, cigarette, spark or electrical fault can be dangerous. Oils and greases may spontaneously ignite in the presence of pure oxygen.

- Do not allow any fittings of oxy-acetylene equipment to be contaminated with grease or oil under any circumstances.
- Do not oil unions, gauges or other components.
- Have regulators regularly maintained by a competent person.
- Regulators can fail in two ways - by the controlled forward flow of gas which is known as regulator "creep", or by the reverse flow of another gas in the gas lines. Regular maintenance can avoid these situations.
- Either of these failures can be recognized by a higher than expected reading on the operational or low pressure gauge. The gauge needle creeps beyond the pressure set for actual welding or cutting. If this happens, stop work, close down the cylinder valves, and have the equipment repaired.
- Take care not to drop or damage gauges and regulators.
- Excess pressure or the presence of a different gas in a regulator can cause fire and explosions of varying severity, resulting in damaged equipment and operator injury.
- Never use equipment fitted with a regulator in which a "creep" condition is known to exist.
- Use the correct color and type of hoses and fittings recommended by the manufacturers. Copper must never be used on acetylene lines, as unstable substances are formed that may spontaneously detonate.
- Flashback arresters should be fitted to all oxy-acetylene equipment to overcome the danger of flashback.
- Oxy-acetylene or oxy-LPG equipment should not be left near hot equipment or metals that could burn the leads. Gas leaks can be detected using soap and water.
- Proper maintenance of equipment is necessary to prevent accidents.
- Don't light up welding equipment using cigarette lighters or matches. Use an appropriate flint or electric ignition device.
- Don't smoke when welding or near welding jobs, and don't keep your lighter in your pocket - it could explode. Simple prevention could save your life.
- Have a suitable fire extinguisher close by for all welding, cutting, heating and grinding activities.
- Obtain and refer to MSDSs (material safety data sheets) for all welding electrodes, welding rods and hazardous fluxes.