# CHAPTER 26 WELDING AND CUTTING

# WELDING AND CUTTING

Responsibilities

1. The County Safety Officer is responsible for providing appropriate safety instructions for supervisor's use on welding and cutting.

2. It is the responsibility of the supervisor to provide training in the proper care and use of cutting and welding equipment and to educate employees in safe work habits. The immediate supervisor shall instruct and direct the activities of their employees and shall enforce all safety regulations.

Safety Standards

The safety regulations governing cutting and welding procedures are derived from these agencies:

1. State of California Division of Industrial Safety California Administrative Code Title 8.

    a. Group 2 - Article 7 - Misc. Safe Practices.

    b. Group 2 - Article 10 - Personal Safety.

    c. Group 10 - Article 80 through 87 - Gas Systems for Welding and Cutting.

2. National Fire Protection Association (NFPA #51).

3. Occupational Safety and Health Administration - Subpart Q - 1910.251.

# CARE AND USE OF CUTTING AND WELDING EQUIPMENT

DANGER: OIL, GREASE, AND SOLVENTS EXPOSED TO OXYGEN CREATE AN EXPLOSIVE MIXTURE. KEEP ALL FITTINGS FREE OF CONTAMINATION AT ALL TIMES!!!

1. Cylinders

   a. All gas cylinders must be secured in an upright position.

   b. The protective cap must be in place when gas cylinders are in transit or not in use.

   c. Cylinders with excessive damage due to corrosion, dents, or leaking valves shall be tagged unsafe and returned to the distributor.

   d. Cylinders may never be used as a work support.

   e. Oxygen and acetylene cylinders shall be stored separately.

   f. Do not drop or drag cylinders.

   g. Mark empty cylinders "MT."

   h. Keep cylinders away from the welding zone to prevent accidental striking of an arc on the cylinder.

   I. Oxygen and acetylene cylinders shall never be stored near highly combustible materials such as oil, grease, solvents, etc.

   j. Cylinders must not be stored where they are subjected to absorption of excessive heat.

   k. Cylinders must be transported, either in full or empty condition, with cap on and securely fastened on a suitable truck.

   l. Cylinders must be hoisted only in suitable cradles, nets, or skip boxes and shall never be hoisted by magnet or by rope or chain slings.

   m. Persons using burning and heating equipment must maintain a safe distance from oxygen and acetylene tanks and avoid burning above oxyacetylene hoses and equipment.

n. Oxygen shall never be used for the following purposes:

(1) to purge pipelines, tanks, or any confined area.

(2) to supply head pressure in a tank.

(3) in pneumatic tools.

(4) in oil preheating burners.

(5) to start internal combustion engines.

(6) for ventilation.

(7) for dusting clothing.

(8) in any way as a substitute for compressed air.

2. Regulators and Valves

a. Inspect regulators and valves for damage prior to each use.

b. Valves shall be closed when unattended or not in use.

c. Crack the valve briefly to blow out any dust or other particles before connecting the regulator to the cylinder.

d. Inspect the threads on all oxygen connections to ensure that they are free of grease and oil.

e. Release the pressure adjusting screw on the regulator to its limit by turning it counter-clockwise.

f. Open the cylinder valve slightly to let the hand on the high pressure gauge move up slowly. On an oxygen cylinder, gradually open the cylinder valve to its full limit. On an acetylene cylinder, make no more than 1¼ turns of the valve spindle.

g. Always stand to one side of the glass faces of the pressure gauges when opening valves.

h. Adjust oxygen regulator pressure adjusting screw clockwise to 40 PSI maximum working pressure.

i. Adjust acetylene regulator pressure adjusting screw clockwise to 10 PSI maximum working pressure.

j. Inspect the regulator and valves for leaks.

k. Cylinder valves not provided with fixed hand wheels shall have keys or handles on valve spindles or stems while cylinders are in service.

l. Regulators and valves must be sent to an authorized dealer for repairs.

3. Hose and Fittings

a. Inspect hoses and fittings for leaks. Repair or replace damaged hose. Hoses shall be repaired with approved couplings only. DO NOT USE TAPE.

b. Inspect fittings to ensure that they are free of grease and oil.

c. Purge each hose before using.

d. Protect hose from damage. Keep hose out of aisle ways where it may be damaged by traffic and off floors that are wet, oily, or greasy.

e. Check valves shall be installed between the torch and hoses for both oxygen and acetylene.

4. Torches

a. Use only the welding heads, tips, or cutting nozzles recommended by the manufacturer of the equipment.

b. Shut off the gas at the regulator before changing torches. Do not crimp hose.

c. Do not use matches to light torches. Use a torch friction lighter.

d. Turn off the cylinder valves and relieve the pressure on the regulator and hoses when taking lunch breaks or for longer durations of non-use.

5. Welding Cables

a. Keep welding cables dry and free of grease and oil to prevent breakdown of the insulation.

b. Keep welding cables out of aisle ways to prevent damage to the insulation.

c. Use cable connectors only for splicing and repairing damaged cables.

PERSONAL PROTECTIVE EQUIPMENT

1. Protective Clothing

a. Wear a skullcap to prevent sparks from burning the hair or scalp.

b. Wear flame-resistant gauntlet gloves, except on very light work.

c. Leather aprons or other flame-resistant material should be worn to protect against radiant heat and sparks.

d. Do not wear low-cut shoes because of the spark hazard. Trousers should be worn on the outside of the boots.

2. Eye Protection

a. Use goggles and/or shields with properly shaded lenses for the type of work being done.

b. Welder's helpers must wear shaded eye protection.

c. Use screens to protect employees working in adjacent areas.

3. Respiratory Protection

a. Avoid breathing welding fumes in confined areas by one or more of the following methods:
   (1) Use forced ventilation.

   (2) Use an exhaust blower.

   (3) Use an approved respirator.

b. Welders working in confined spaces must have an attendant standing by to effect rescue in case of any emergency.

c. An effective exhaust system or approved respirator must be worn when welding or cutting stainless steel.

d. All tanks and vessels must be tested for oxygen deficiency and toxic vapors prior to commencing work in them.

FIRE PREVENTION

One fire underwriter insurance company reports that costs fires caused by cutting torches and welding exceed $40,000,000 annually. These fires can be prevented by establishing and enforcing hot work permit systems. A minimum program for the County shall be governed by the County and shall be governed by the following rules:

1. There shall be no cutting or welding in areas outside the welding shop unless a hot work permit is signed and authorized by the supervisor.

2. Hot work permits shall be required in all areas where combustible materials are being stored and/or in structures which are constructed of combustible materials.

3. On issuing a hot work permit, the supervisor shall:

    a. Inspect the area while completing the hot work permit.

    b. Remove and/or shield any combustible materials in the immediate work area.

    c. Seal off all openings where sparks may travel to adjacent rooms or fall to floors below.

    d. Ensure that an adequate amount of proper fire extinguishers are available at the work site.

    e. Post a fire watch on all jobs that require a hot work permit. The fire watch should remain at the work site for 30 minutes upon completion of cutting or welding.

    f. Measure the atmosphere in confined areas to determine the presence of explosive gases before performing any hot work.

MISCELLANEOUS HAZARDS

1. Cutting or welding on drums or vessels which have contained flammable chemicals shall not be permitted until the container has been thoroughly cleaned, purged, and tested to ensure that an explosive mixture is not present. Containers should be filled with water or charged with an inert gas when possible.

2. Oxygen or gases shall not be used for dusting personal clothing or equipment.

3. Grease or oil and oxygen do not mix! Make every effort to keep equipment free of oil and grease and inspect all connections thoroughly to ensure that they are not contaminated. Do not wear greasy gloves to change cylinders, fittings, etc.

SAFETY TRAINING

Supervisors shall administer annual safety training to all employees who perform welding and cutting operations, using these procedures.