OXY- ACETYLENE GAS WELDING MANUAL

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Introduction to Oxy-Acetylene Welding:

Learning Outcome

By the end of this unit each apprentice will be able to:

Describe the applications of oxy-acetylene welding in the pipefitting

- Trade and the type of materials that are suitable for joining using this process Identify and state the function of common items on oxy-acetylene

- Welding, brazing, cutting and heating equipment Identify and describe the safety precautions to be observed when using

- Oxyacetylene welding equipment Set up and assemble oxyacetylene welding station and check for leakage

- Describe the correct lighting up and shutting down procedure

- Describe the different sizes of welding nozzles and explain their uses

- Describe the different types of welding flame and welding techniques

- Complete welding exercises as required.

Pipe Fitters uses of Oxy-Acetylene:

Pipefitters use oxy-acetylene as a heat source for many different types of functions:

- Brazing and soldering plumbing pipes

- Welding heavier mild steel pipes

- Cutting of mild steel plate and pipes

- Source of heating to apply thermal shock to seized components

Pressure Regulators:

Some parts of this illustration are labelled. It is important to learn the names of these equipment components.

Always treat a pressure regulator as a precision instrument. Do not expose it to knocks, jars or sudden pressure surges caused by the rapid opening of the cylinder valve. Always open the cylinder valve slowly and smoothly using the special Spindle Key. Periodically check the bullnose seating on the pressure regulator. If the seating is damaged, it will leak gas. The pressure regulator should be replaced immediately.

Never use a pressure regulator with other than the gas for which it was designed. Release pressure using the pressure adjustment screw when shutting down, after cylinder valves have been closed and pressure in the hose has been released. If gauge pointers do not return to zero when the pressure is released, the mechanism is faulty and the regulator should be replaced.

Hoses:

It is always recommended to buy and use fitted hoses. Factory fitted hose offers the customer the additional advantage of a ‘gas system’ which has been assembled and tested on a closely monitored production line to BS 1389.Hoses should be fitted with the correct end connections attached by permanent clips.

Do not expose hoses to heat, traffic, slag, sparks, oil, grease, or sharp edges of metal. Test for leakage at working pressure by immersing in water; leaks may be repaired by cutting out a faulty section of hose and inserting an approved coupling. Never use copper couplings with acetylene. Doing so could permit the formation of copper acetylide. Worn ends should be cut back and re-fitted with hose connectors using permanent clips.

In general, do not fit more than two or three couplings in a length of hose. Consider replacing the hose entirely as parts are likely to be perished or damaged. Ensure hoses are not wrapped around cylinders when stored or in use.

Flame Arrestors:

Flame traps are designed to give automatic protection to personnel and equipment against the hazard of mixed gas explosions in gas welding or cutting equipment. The explosion (flashback) can occur when backfeeding of gases has taken place. A mixture of gases is then present in either the oxygen or fuel gas hose and if the operator fails to purge the hoses sufficiently, a flashback can occur when the blowpipe is ignited. Flashback can be avoided by adhering to recommended operating procedures and the use of flame traps does not enable the operator to ignore good operating practices

Welding Torches:

Once the gases having been reduced in pressure by the gas regulators are fed through suitable hoses to the welding torch. Each gas can be controlled by a valve on the torch. The two gases mix in the torch and after they are ignited they burn at the nozzle. Different size nozzles are used depending on the thickness of material to be welded.

Oxy-Acetylene Welding Safety:

Always wear protective clothing, i.e. flame retardant overalls. Always wear the correct eye goggles.

- Always check for leaks with a soapy solution, NEVER with a naked
- flame. Never carry out makeshift repairs on welding equipment.
- Never allow oil or grease to come in contact with oxygen equipment.
- Never weld an enclosed vessel, i.e. petrol / oil drums until they have
- been thoroughly cleaned. Never work in an enclosed vessel on your own and always leave the
- cylinders outside. If working in an enclosure vessel, adequate ventilation should be provided and fire fighting equipment should be available. In the event of a serious flashback or backfire plunge the blowpipe in a
- bucket of cold water, leaving the oxygen running to prevent water entering the blowpipe.

Blowpipes:

Gas leaks can be detected by 1% Teepol® or proprietary leak detection solutions or hissing and, in the case of fuel gases, also by smell. Leaks at the head nut or welding nozzle should be cured by cleaning the seat with a soft cloth. If the leak continues, the blowpipe should be replaced. Do not carry out blowpipe repairs.

Fire:

Take care that there is no combustible material within reach of sparks; sparks from cutting may travel as far as 10 metres (35 feet) along a floor. Ensure that sparks and falling slag do not fall over the cylinder or hoses. If necessary protect anything in the neighbourhood of the work with sheet metal guards or fibreglass sheets down to the floor - tarpaulins do not give sufficient protection. Where it is necessary to work close to combustible material, keep fire fighting apparatus handy and post a man at the scene of the work for at least half-an-hour after the work has finished. In dusty or gassy atmospheres consult the responsible official in charge before starting work. Clothing should be free from grease and preferably made of wool which is not so readily flammable. Goggles, collars, combs, buttons, etc., of flammable material should not be worn.

Ventilation:

In a confined space, ensure that there is a suction fan to give adequate ventilation (a fume hood, at the source of fumes, is the best method); DO NOT USE OXYGEN OR AN AIR BLOWER and always post a trained helper outside for emergencies. Test all equipment for leaks before entering and remove the equipment outside during periods when it is not in use and on completion of daily work. The welding of brass or galvanised materials should be carried out in well ventilated areas and if the work is likely to be prolonged suitable breathing apparatus should be worn.

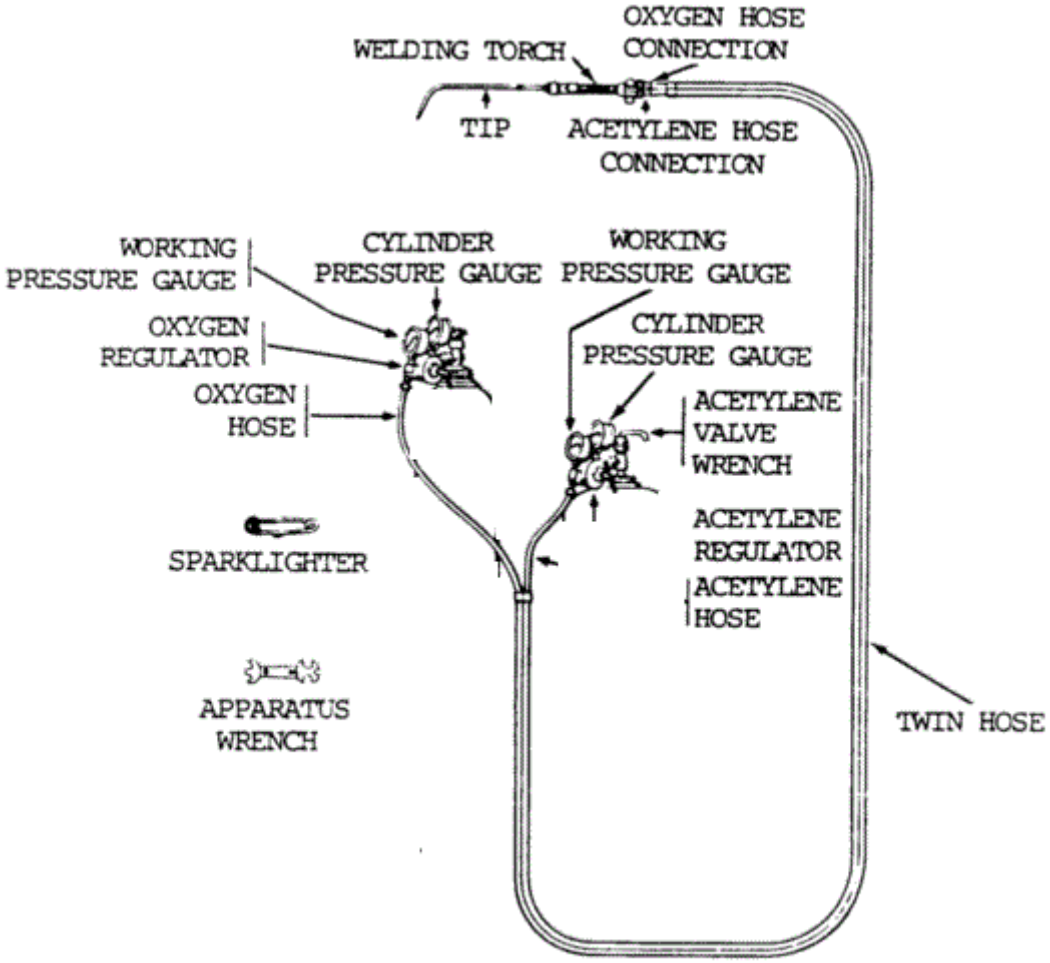
When cutting painted or galvanised steel, unless ventilation is very good, fume extraction should be installed at the point of cutting. In some cases it may be necessary to wear a respirator as well.

Protective Clothing:

Goggles should be worn at all times whilst welding and cutting and should conform to the Protection of Eyes Regulations. Leather or suitable protective clothing should be worn for heavy cutting or welding. The feet should be protected from sparks, slag or falling off-cuts.

Assembling Oxy-Acetylene Welding Equipment:

- How to safely assemble a set of Oxy-acetylene equipment for welding.
- Step by step procedure for lighting an oxy-acetylene flame



Portable oxyacetylene welding and cutting equipment.

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