

## I. INTRODUCTION

- A. Purpose: To provide information and instructions in the following areas:
1. Maintenance of long handled tools
  2. Maintenance of fire extinguishers
  3. Use of Life and Safety Belts
  4. Maintenance and repair of wet water proportioners
  5. Operation of the Victor Cutting Torch
- B. Scope: This instruction applies to all personnel who use or may be required to use any the equipment listed.
- C. Author: The Deputy Fire Chief of the Administrative Bureau, through the Training Section, shall be responsible for the content, revision and annual review of this instruction.

## II. RESPONSIBILITY

- A. All Personnel shall be familiar with the information in this instruction.
- B. Station Captains shall:
1. See that the maintenance is performed as specified in this instruction by the personnel at the Captain's work site.
  2. See that the personnel under the Captain's supervision are proficient in the operation of all equipment addressed in this instruction through regularly scheduled drills.

## III. POLICY

- A. This instruction shall be considered the policy of the County of Los Angeles Fire Department.

## IV. APPENDIXES

- A. Appendix I – Long Handled Tools
- B. Appendix II – Extinguishers
- C. Appendix III – Safety Belts and Life Belts
- D. Appendix IV – Wet Water Proportioners
- E. Appendix V – Operating Victor Cutting Torch

### APPENDIX I

#### LONG HANDLED TOOLS

##### Wooden-Handled Tools

- A. Pike poles, plaster hooks and mechanical axes shall be inspected and cleaned daily. These wooden tools shall be kept well varnished with “Glyptol” and all parts checked for evidence of wear.
- B. Axes, sledges, shovels and other tools with wooden handles, exclusive of those listed above, shall not be varnished or painted. Handles shall be kept well oiled with Linseed Oil; excess oil shall be wiped off after oiling.
- C. Axes shall be sent to the Welding Shop at the Pacoima Warehouse for sharpening.

##### Bolt Cutters

- A. Shall be checked weekly for nicks or cracks in the blade.
- B. New blades may be ordered from the Warehouse Catalogue.

##### Mechanical Axe

- A. This shall be checked weekly for integrity of the blades. Also check for any oil or other foreign substance on the halyard or handles as this could conduct electricity and cause a hazard.
- B. New blades or halyards may be ordered from the Warehouse Catalogue.

**APPENDIX II**  
**EXTINGUISHERS**

**Extinguishers**

A. Dry Powder

1. Dry powder type extinguishers shall be inspected weekly, turned upside down and shaken vigorously to prevent caking and packing.
2. Dry powder type extinguishers shall be recharged after every use. The extinguishers agent is chemically treated bicarbonate of soda.
3. If the extinguisher has not been used during the last one-year period they shall be sent to the Mechanical Shops for testing. Refer to the extinguisher tag for the last service date.

B. Carbon Dioxide

1. Carbon dioxide extinguishers shall be recharged after every use, or whenever the weight of the cylinder indicates that the extinguisher is not fully charged. The full weight of the cylinder can be found by looking at the stamped weight rating on the valve body of the unit. Minimum weight is usually entered on a plate attached to the side of the extinguisher.
2. Extinguishers requiring recharging are sent to the Mechanical Shop. They shall be carefully tagged to show engine company number and district.
3. These extinguishers shall be carefully inspected weekly for weak hose or other evidence of wear.

C. Other Extinguishers

Other extinguishers in use by the Department shall be maintained in accordance with manufacturers' directions which, in general, appear on a plate affixed to each type of extinguisher.

## **APPENDIX III**

### **SAFETY BELTS AND LIFE BELTS**

#### **I. INTRODUCTION**

- A. Purpose: To provide personnel with the requirements for the use of approved departmental safety equipment.
- B. Scope: This instruction applies to all personnel.
- C. Author: The Deputy Fire Chief of the Administrative Bureau, through the Training Section, shall be responsible for the content, revision and annual review of this instruction.
- D. Authority: General Industrial Safety Orders, Section 5144 and Article 10.1.

#### **II. RESPONSIBILITY**

- A. All Personnel shall strictly adhere to all Federal, State, and County of Los Angeles safety policies.
- B. All Supervisors shall enforce all Federal, State, and County of Los Angeles safety policies.

#### **III. POLICY**

- A. Safety Belts or Life Belts shall:
  - 1. Be provided for each employee required to work in an elevated position where protection is not otherwise provided by some other means or safeguard.
  - 2. Be used by all members when:
    - a. Operating ladder pipes
    - b. In the basket of aerial platforms
    - c. When working on station hose tower
    - d. Engaged in work projects requiring safety belts

- B. Other Safety Devices or Safeguards shall:
1. Be provided or installed and utilized by all personnel for exceptional or special situations as appropriate for the hazard encountered.
  2. Be maintained in place and in good repair at all times.

#### **APPENDIX IV**

#### **WET WATER PROPORTIONER**

##### Wet Water Proportioner

1. This unit shall be checked weekly for any damage or worn parts.
2. If repair is needed, send to Pacoima Warehouse, Small Engine Repair, secure a tag to the unit, stating the engine company number, battalion, and explanation of the problem. A Form 47 must also accompany the unit explaining the problem.

#### **APPENDIX V**

#### **OPERATING VICTOR CUTTING TORCH COMMERCIAL TYPE OR BACK PACK UNITS**

##### DEFINITION OF FLAM CUTTING

Flame cutting of ferrous metals is primarily a chemical process based on the remarkable chemical affinity of oxygen for ferrous metals above kindling temperatures. It is a process of preheating the materials to be cut, to their kindling or ignition temperature, and then rapidly oxidizing it by means of a stream of oxygen issuing from a cutting tip. This jet forms a narrow slot or kerf in the metal.

In addition to the chemical reaction, there is a very helpful mechanical eroding effect produced by the energy of the cutting oxygen stream which washes away approximately 30 percent of the metal in molten, unconsumed metallic form.

## OPERATING CUTTING TORCH

The operations and techniques for both of these units are basically the same. There are a few differences which will be mentioned when they arise during the instructions.

Place the oxygen and acetylene cylinders together where they are to be used. These cylinders are always used in a standing position, chained or anchored securely to keep them from falling. The valve protection caps should always be on the cylinders, except when the regulators are in place.

Acetylene cylinders are never laid on their side. They must be kept upright at all times due to the fact that acetylene cylinders are filled with diatomaceous earth and acetone. Acetone has a great affinity for acetylene gas and a greater amount of the gas can thus be stored in a smaller cylinder. If the cylinder is placed on its side, the acetone will run out. This is also the reason that the acetylene gas is not used below a certain working pressure which will be discussed later in the lesson.

### Preparing for Use

- A. Remove protector caps from the cylinders and examine the threads. Cylinders with damaged threads should not be used, but returned to the vendors.
  - 1. Wipe the threads a clean cloth. No trace of oil or grease should be on the cloth because oxygen reacts violently with any petroleum product, causing an explosion.
  
- B. Slightly open both the oxygen and acetylene valves and reclose. (Called "cracking")
  - 1. Blows dirt out of valves
  - 2. Oxygen cylinders have wheel valves
  - 3. Acetylene cylinders have a valve which requires the use of a wrench provided with the cylinder. Use only this wrench to open and close the cylinder and leave the wrench in place on the valve when in use.
  
- C. Examine the inlets to the regulators before installing on the cylinders
  - 1. Wipe threads with clean cloth
  - 2. Use the four-way wrench provided to make all connections

- a. Some acetylene cylinders have left-hand threads. A split or grooved nut is an indicator of left-hand threads.
  3. Do not use excessive force to tighten the regulators; just firm.
  4. Be sure the regulator screws are in the “out” position. The adjustment screw is turned counter-clockwise to release the tension.
- D. Connect hoses to the regulators
1. The hoses have a long separation at one end and a short separation at the other. The end with the long separation connects to the regulators.
  2. The green hose is the oxygen and it connects to the oxygen regulator. It has a right-hand thread.
  3. The red hose is the acetylene and it connects to the acetylene regulator. Acetylene hoses have left-hand threads as indicated by the grooved or split nut.
  4. Make all connections secure with the four-way wrench, but not excessively tight.
- E. Open the Oxygen Cylinder Valve slowly
1. Do not stand in front or behind the regulators when opening cylinder valves.
  2. Stand to the side and place your hand between you and the regulator.
  3. Open the oxygen cylinder valve fully but do not use excessive force.
  4. If valve leaks, shut off immediately and replace with new cylinder.
- F. Open Acetylene Cylinder Valve slowly
1. Acetylene valve should be opened a maximum of  $\frac{1}{2}$  turn only.
  2. Use the same precautions when opening as were used with the oxygen cylinders.
- G. Purge oxygen and acetylene hoses
1. Oxygen hose first

2. Hold open end of hoses in one hand
  3. Do not direct toward open flame, other persons or the cylinders
  4. Turn the adjustment screw on the oxygen regulator in, or clockwise, until the regulator reads a minimum of five pounds
  5. Turn screw back out to stop flow
  6. Repeat the same procedure with the acetylene
    - a. Just obtain a good flow, then back the regulator screw out
- H. Connect the hoses to the torch
1. Green the hoses to the torch
    - a. Oxygen connection at torch has either CO or OXY marked.
    - b. Right-hand threads.
  2. Red hose to the acetylene inlet
    - a. Acetylene connection marked by ACT
    - b. Left-hand threads, indicated by grooved or split nut
  3. Tighten connections with four-way wrench
  4. Check that the torch valves are closed.

### Lighting the Torch

- A. Set the regulator pressures
1. The settings used are those recommended for use with a #2 tip
    - a. Back pack units #2 tips
  2. Set oxygen regulator first
    - a. Turn the regulator screw in, or clockwise, until the gauge reads 35 pounds.
  3. Set acetylene regulator next

- a. Turn the regulator screw in, or clockwise, until the gauge reads 6 pounds.
    - b. At no time is the acetylene pressure to exceed 15 pounds due to the possibility of an explosion.
  4. Regulators on back pack unit are preset at the factory at 35 pounds oxygen and 5 pounds acetylene.
    - a. No adjustments are necessary
- B. Put on safety equipment provided
  1. Gloves (use only those provided with the equipment)
  2. Safety goggles
    - a. Never cut without goggles
  3. Spark Lighter
    - a. Use only the one provided with the unit. Never use any other type of lighter such as matches or cigarette lighter.
- C. Open the acetylene valve on the torch and, using spark lighter light the acetylene
  1. Always light the acetylene first
  2. Open torch valve  $\frac{1}{2}$  turn
  3. After acetylene ignites, continue opening valve slowly until flame leaves the tip.
- D. Open the oxygen valve on torch
  1. Open valve slowly
  2. Open valve until a neutral flame is reached
    - a. Sharp inner cones
    - b. This is a preheat flame
- E. Adjust flame for cutting
  1. Depress the oxygen cutting lever

- a. Note the change in the preheat flame. This is a carbonizing flame with a feather.
- b. With the level still depressed, readjust the flame by turning the oxygen until the flames again returns to neutral.

## Cutting Metals

- A. Always provide a charged hose line or a fire extinguisher where they are readily available.
  1. When cutting operations are for removal of victims, a turnout or salvage cover should be out over victim.
- B. Check where sparks will fall
  1. Keep hoses out of sparks
  2. Gasoline or oil on ground or in area
- C. Never direct torch toward cylinders
- D. Direct preheat flame at spot to cut
  1. Flame should just clear the surface
  2. Tip should point in the direction of cut
- E. When metal is cherry red
  1. lowly depress cutting level. Depressing too quickly will chill the area
- F. Move in the direction of cut slowly
  1. Too fast, and you will lose the cut
  2. Too slow, and the cute will fuse back together
- G. Always keep the tip out of the molten metal
- H. Never hammer or tap with the tip
- I. Light metals, such as car bodies, can be cut quickly; heavy metals take more time
- J. Cast Iron Cutting
  1. Move tip of torch from side to side. Cast iron produces more slag, so a wider cut is necessary.

## Shutting Off Torch

- A. Shut Off Torch just the opposite of lighting
  - 1. Oxygen valve turned off first
  - 2. Acetylene valve turned off second. If not done in this sequence, a pop may occur. This throws carbon back into the tip. The carbon can accumulate and cause a backfire.
- B. Back pack units are shut down in the same manner
- C. Reverse of all setting up procedures are used to disassemble unit
  - 1. Main cylinder valves are closed
  - 2. Regulator valves are turned off
  - 3. Lines are purged by opening control valves on torch

## Replacement of Oxygen and Acetylene Cylinders

- A. Commercial oxygen cylinders are replaced when operating pressure drops to 35 pounds.
- B. Commercial acetylene cylinders are replaced when pressure drops to 50 pounds
  - 1. Lower than 50 pounds and the acetone may start coming out of hose
- C. Check back pack units after use
  - 1. If the oxygen pressure falls below 500 pounds, replace unit. Send used unit to the Fire Shops for refill.
  - 2. Will last approximately 20 minutes under normal use.

## Backfires and Flashbacks

- A. Backfire
  - 1. A loud noise with a momentary extinguishment and reignition of flame.
  - 2. Causes:
    - a. The shutting off of acetylene first
    - b. Touching work with tip

- c. Acetylene pressure too low
  - d. Loose tip
  - e. Dirt on seats or tip or head
  - f. Overheating tip
3. If torch goes out:
- b. Shut off torch valves
  - c. Relight, using proper lighting procedures

**B. Flashback**

- 1. Usually accompanied by a shrill hissing or squealing
- 2. The flame flashed back into the mixing tube
- 3. Causes:
  - a. Overheating of torch and tip mixer tube
  - b. Working in confined space
- 4. Torch must be shut down completely. Use proper shut-down procedures.
- 5. Relight when fire in tube is out and torch is cooled, using proper lighting procedures.

**Rules and Precautions**

- A. Never use oil, grease, graphite, or any hydrocarbon derivatives around or on any part of unit. Check all rags used.
- B. Never cut without gloves and goggles.
- C. Additional protective clothing
  - 1. Turnouts
  - 2. Helmets
- D. Always have charged hose line and/or extinguisher readily available
- E. Use a torch only as a last resort around flammable liquids

- F. Check tanks for contents before doing any cutting on them
- G. Do not cut against concrete – causes spalling
  - 1. Moisture in concrete expands and explodes causing chips to fly
- H. Do not allow gas to escape in confined spaces
- I. Do not attempt to adjust or repair units – send them in for adjustments and repairs.
- J. Check hoses periodically for cracks or breaks. Immerse in water under normal pressure to check for leaks.
- K. Never hammer with torch
- L. Avoid breathing fumes
  - 1. Fumes from lead paints, non-ferrous metals, and galvanized or plated metals are toxic and can cause illness or death.