FIGURE 10.1 A typical shop compressor. It is usually placed out of the way, yet accessible to provide for maintenance in the unit.

FIGURE 10.2 Always use an air nozzle that is OSHA approved. The openings in the sides are used to allow air to escape if the nozzle tip were to become clogged.
FIGURE 10.3 A typical 1/2 in. drive impact wrench.

FIGURE 10.4 This impact wrench features a variable torque setting using a rotary knob. The direction of rotation can be changed by pressing the button at the bottom.

FIGURE 10.5 A typical battery-powered 3/8 in. drive impact wrench.
FIGURE 10.6 An impact socket. Always use impact-type sockets whenever using an impact wrench to avoid the possibility of shattering the socket, which can cause personal injury.

FIGURE 10.7 An air ratchet is a very useful tool that allows fast removal and installation of fasteners, especially in areas that are difficult to reach or do not have room enough to move a hand ratchet wrench.

FIGURE 10.8 This typical die-grinder surface preparation kit includes an air-operated die grinder, as well as a variety of grinding discs for smoothing surfaces or removing rust.
FIGURE 10.9 A fluorescent trouble light operates cooler and is safer to use in the shop because it is protected against accidental breakage where gasoline or other flammable liquids would happen to come in contact with the light.

FIGURE 10.10 A typical pedestal grinder with a wire wheel on the left side and a stone wheel on the right side. Even though the machine is equipped with guards, safety glasses or a face shield should always be worn when using a grinder or wire wheels.

FIGURE 10.11 A typical vise mounted to a workbench.
A hydraulic press is usually used to press bearings on and off rear axles and transmissions.

A typical portable crane used to lift and move heavy assemblies, such as engines and transmissions.

Two engines on engine stands. The plastic bags help keep dirt from getting onto the engines.
**FIGURE 10.15** An engine stand that attaches to the engine from the sides, rather than the end.

**UNFIGURE 10.1** Inspect the cart and make sure the tanks are chained properly before moving it to the work location.

**UNFIGURE 10.2** Start by attaching the appropriate work tip to the torch handle. The fitting shouldonly be tightened hand tight. Make sure the valves on the torch handle are closed at this time.
UNFIGURE 10.3 Each tank has a regulator assembly with two gauges. The high pressure gauge reads tank pressure, and the low pressure gauge indicates working pressure.

UNFIGURE 10.4 Open the oxygen tank valve fully open, and open the acetylene tank valve 1/2 turn.

UNFIGURE 10.5 Open the oxygen valve on the torch handle 1/4 turn in preparation for adjusting oxygen gas pressure.
UNFIGURE 10.6 Turn the oxygen regulator valve clockwise and adjust oxygen gas pressure to 20 PSI. Close the oxygen valve on the torch handle.

UNFIGURE 10.7 Open the acetylene valve on the torch handle 1/4 turn and adjust acetylene gas pressure to 7 PSI. Close the acetylene valve on the torch handle.

UNFIGURE 10.8 Open the oxygen valve on the torch handle 1/4 turn and use an appropriate size tip cleaner to clean the tip orifice. Finish by closing the oxygen valve.
UNFIGURE 10.9 Put on leather gloves and open the acetylene valve on the torch handle 1/4 turn. Use a flint striker to ignite the acetylene gas exiting the torch tip.

UNFIGURE 10.10 Adjust the acetylene valve until the base of the flame just touches the torch tip. Slowly open the oxygen valve on the torch handle and adjust for a neutral flame (blue cone is well-defined).

UNFIGURE 10.11 Once work is complete, extinguish the flame by quickly closing the acetylene valve on the torch handle. Be prepared to hear a loud "pop" when the flame goes out. Close the oxygen valve on the torch handle.
Close the valves on both tanks and turn the regulator handles CCW until they no longer contact the internal springs. Open the gas valves briefly on the torch handle to release gas pressure from the hoses. Close the gas valves on the torch handle and put away the torch assembly.

Heating attachments include ordinary heating tips, middle and right angle, and a "rosebud" tip. Ordinary heating tips work fine for most purposes, but occasionally the rosebud is utilized when a great deal of heat is needed.

Note that while acetylene tank pressures are relatively low, the oxygen tank can be filled to over 2,000 PSI. This can represent a serious hazard if precautions are not taken. Be absolutely certain that the hoses are chained properly to the cart before attempting to move it!
Any time heating or cutting operations are being performed, be sure that any flammables have been removed from the immediate area. A fire blanket may be placed over floor drains or other objects to prevent fires. A fire extinguisher should be on hand in case of an emergency.

Be sure to wear appropriate personal protective equipment during heating and cutting operations.

Note that heating operations should be performed over steel or firebrick. Never heat or cut steel close to concrete, as it could cause the concrete to crack.
UNFIGURE 10.18 When heating steel, move the torch in a circular pattern to prevent melting of the metal. Do not hold the torch too close to the work as this will cause a "snapping" or "backfire" that can extinguish the flame.

UNFIGURE 10.19 Affix the cutting attachment to the torch handle. Note that the cutting attachment has a cutting handle and a separate oxygen valve.

UNFIGURE 10.20 Fully open the oxygen valve on the torch handle. Oxygen flow will now be controlled with the valve on the cutting attachment.
Oxygen gas pressure should be adjusted to 30 PSI whenever using the cutting attachment. Acetylene pressure is kept at 7 PSI.

Open the acetylene valve on the torch handle 1/4 turn and light the torch. Adjust the flame until it has a cone of blue color. Slowly open the oxygen valve on the cutting attachment and adjust the flame until the blue cone is well defined.

Direct the flame onto a thin spot or sharp edge of the metal to be cut. This will build the heat quicker to get the cut started.
When the metal glows red, depress the cutting handle and move the torch to advance the cut. You will need to move the torch faster when cutting thinner panels of steel. On thicker pieces, point the cutting tip into the direction of the cut.