Standard Aircraft Handbook for Mechanics and Technicians

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CHAPTER 2

Tools and How to Use Them

Safety Considerations

Before commencing work on an aircraft, personal safety must become habit. Putting on safety glasses must be as much a part of the act of drilling a hole as picking up the drill motor.

The responsibility for this attitude lies with the mechanic, but this responsibility goes further. A mechanic's family needs him whole, with both eyes intact, both hands with all fingers intact, and above all, in good health.

Safety glasses or face shields must be worn during all of the following operations:

- Drilling
- Reaming
- Countersinking
- Driving rivets
- Bucking rivets
- Operating rivet squeezer
- Operating any power tool
- Near flying chips or around moving machinery

Ear plugs should be used as protection against the harsh noises of the rivet gun and general factory din. If higher noise levels than the rivet gun are experienced, a full-ear-coverage earmuff should be used because it is a highly sound-absorbent device.

For people with long hair, a snood-type cap that keeps the hair from entangling with turning drills should be worn. Shirt sleeves should be short and long sleeves should be rolled up at least to the elbow. Closed-toe, low-heel shoes should be worn. Open-toed shoes, sandals, ballet slippers, moccasins, and canvas-type shoes offer little

or no protection for feet and should not be worn in the shop or factory. Safety shoes are recommended.

Compressed air should not be used to clean clothes or equipment.

General-Purpose Hand Tools

Hammers

Hammers include ball-peen and soft hammers (Fig. 2-1). The ball-peen hammer is used with a punch, with a chisel, or as a peening (bending, indenting, or cutting) tool. Where there is danger of scratching or marring the work, a soft hammer (for example, brass, plastic, or rubber) is used. Most accidents with hammers occur when the hammerhead loosens. The hammer handle must fit the head tightly. A sweaty palm or an oily or greasy handle might let the hammer slip. Oil or grease on the hammer face might cause the head to slip off the work and cause a painful bruise. Striking a hardened steel surface sharply with a ball-peen hammer is a safety hazard. Small pieces of sharp, hardened steel might break from the hammer and also break from the hardened steel. The result might be an eye injury or damage to the work or the hammer. An appropriate soft hammer should be used to strike hardened steel. If a soft hammer is not available, a piece of copper, brass, fiber, or wood material should be placed on the hardened steel and struck with the hammer, not the hardened steel.

Screwdrivers

The screwdriver is a tool for driving or removing screws. Frequently used screwdrivers include the common, crosspoint, and offset. Also in use are various screwdriver bits that are designed to fit screws with special heads. These special screwdrivers are covered in Chap. 7.

A common screwdriver must fill at least 75 percent of the screw slot (Fig. 2-2). If the screwdriver is the wrong size, it will cut and burr the screw slot, making it worthless. A screwdriver with the wrong blade size might slip and damage adjacent parts of the structures. The common screwdriver is used only where slotted head screws or fasteners are used on aircraft.

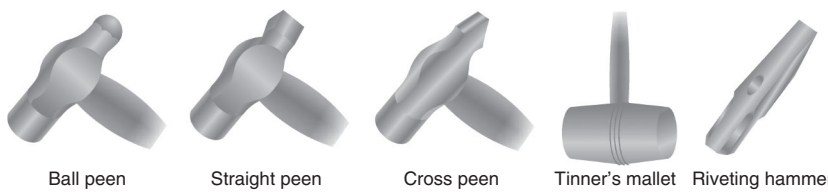

Figure 2-1 Types of hammers.

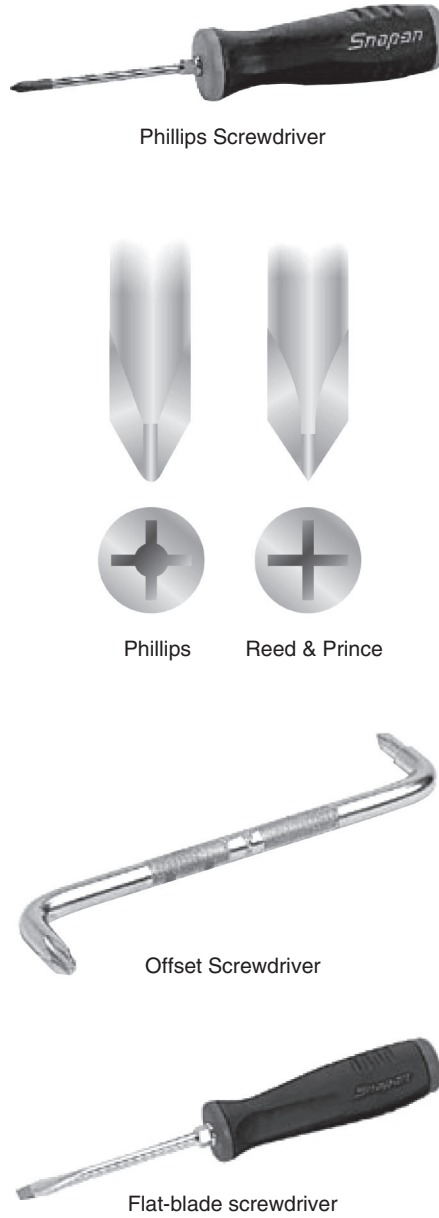

Figure 2-2 Types of screwdrivers.

The two common recessed head screws are the Phillips and the Reed and Prince. As shown in Fig. 2-2, the Reed and Prince recessed head forms a perfect cross. The screwdriver used with this screw is pointed on the end. Because the Phillips screw has a slightly larger center in the cross, the Phillips screwdriver is blunt on the end. The Phillips screwdriver is not interchangeable with the Reed and Prince.

The use of the wrong type of screwdriver results in mutilation of the screwdriver and the screwhead. A screwdriver should not be used for chiseling or prying.

Pliers

The most frequently used pliers in aircraft repair work include the needle nose, duckbill, slip joint, diagonal cutter, water-pump, and vise grip pliers as shown in Fig. 2-3. The size of pliers indicates their overall length, usually ranging from 5 to 12 inches. In repair work, 6-inch, slip-joint pliers are the preferred size. Needle nose and duckbill pliers are used to reach where the fingers alone cannot and to bend small pieces of metal. Slip-joint pliers are used to grip flat or round stock and to bend small pieces of metal to desired shapes. Diagonal-cutting pliers or diagonals or dikes are used to perform such work as cutting safety wire and removing cotter pins. Water-pump pliers, which have extra-long handles, are used to obtain a very powerful grip. Vise-grip pliers (sometimes referred to as a *vise-grip wrench*) have many uses. Examples are to hold small work as a portable vise, to remove broken studs, and to pull cotter pins.

Figure 2-3 Types of pliers (from left to right: needle-nose, duckbill, diagonal cutter, and water-pump pliers).

Pliers are not an all-purpose tool. They are not to be used as a wrench for tightening a nut, for example. Tightening a nut with pliers causes damage to both the nut and the plier jaw serrations. Also, pliers should not be used as a prybar or as a hammer.

Punches

Punches are used to start holes for drilling; to punch holes in sheet metal; to remove damaged rivets, pins, or bolts; and to align two or more parts for bolting together. A punch with a mushroomed head should never be used. Flying pieces might cause an injury. Typical punches used by the aircraft mechanic are shown in Fig. 2-4.

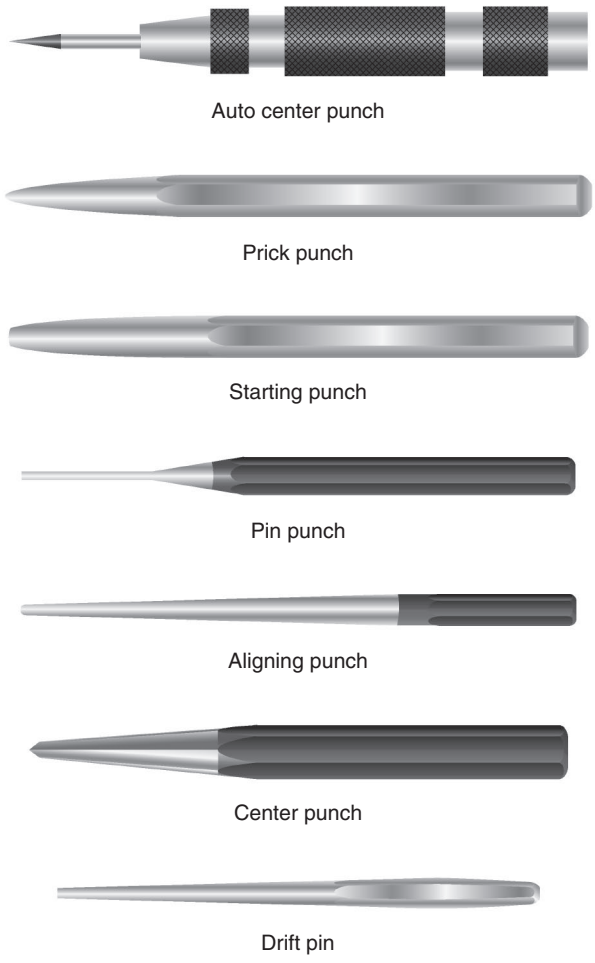

Figure 2-4 Typical punches.