

9.7.3 Grinding a General-Purpose Lathe Toolbit

High-speed-steel toolbits are best ground on an ordinary pedestal, or bench-mounted, grinding machine equipped with aluminum oxide wheels. Generally, the grinder should have a coarse grit wheel for "roughing out" the toolbit and a finer grit wheel for finish grinding. The face of each wheel must be dressed properly.

The general-purpose toolbit is an example of proper toolbit grinding procedures. It is a right-cut tool generally used for facing, straight turning, and taper turning operations. It can be used for roughing as well as finishing operations by changing the nose radius and oilstoning the tool (Fig. 9.50):

1. Hold the tool firmly while resting the hands on the grinder toolrest.
2. Do not apply excessive pressure against the grinding wheel. Too much pressure could overheat and burn the tool and fingers, causing the toolbit to be ripped from your grip and possibly injuring you. Cool the tool in water often while grinding high-speed-steel tools to prevent overheating and burning.

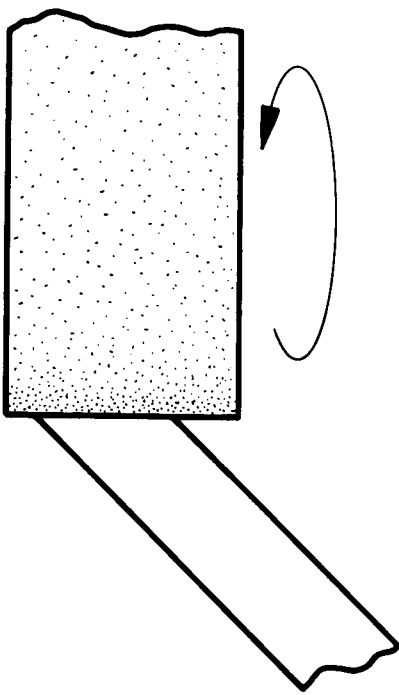


FIGURE 9.50 Grinding the end relief and end-cutting edge angles.

3. While grinding, move the toolbit back and forth across the face of the wheel without changing its position.
4. The first angles ground are the end relief and end-cutting edge angles. Hold the toolbit against the rotating wheel and tilt the bottom inward 26° (only 10° is required with straight toolholders described in Sec. 9.5.3) for the end relief angle and to the right 30° for the end-cutting edge angle. [Note: Beginners should use a suitable gage or protractor to measure each angle during grinding (Fig. 9.51). Laying out the angles of the toolbit on a piece of cold-rolled steel and practicing grinding may help the beginner.]
5. Grind the side relief and side-cutting edge angles. Tilt the bottom of the side inward approximately 6° for the relief angle and to the right 15° for the side-cutting edge angle (Fig. 9.52). When ground, these two angles form the cutting edge. The cutting edge should be the same length as the size of the toolbit; that is, a $3/8$ -in. square toolbit has a $3/8$ -in. cutting edge.
6. The last angle ground is the side rake angle. To grind the side rake, hold the toolbit shank approximately 45° downward to the axis of the wheel and the bottom inward 14° (Fig. 9.53). When grinding the side rake, be sure that the top of the cut-

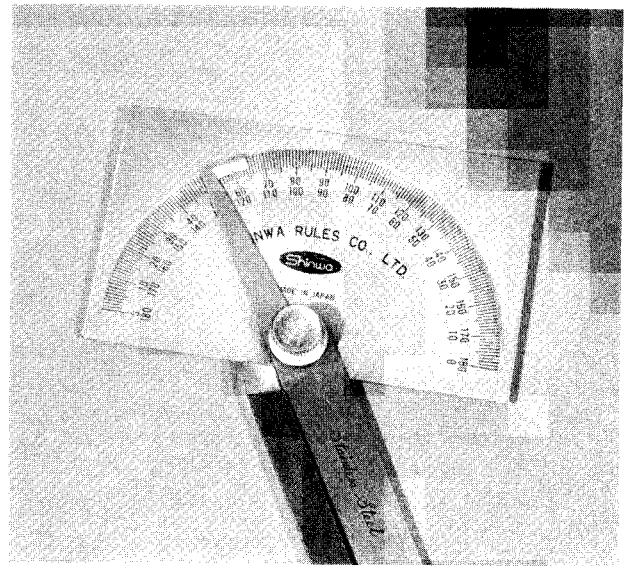


FIGURE 9.51 Measuring the end-cutting angle with a protractor.

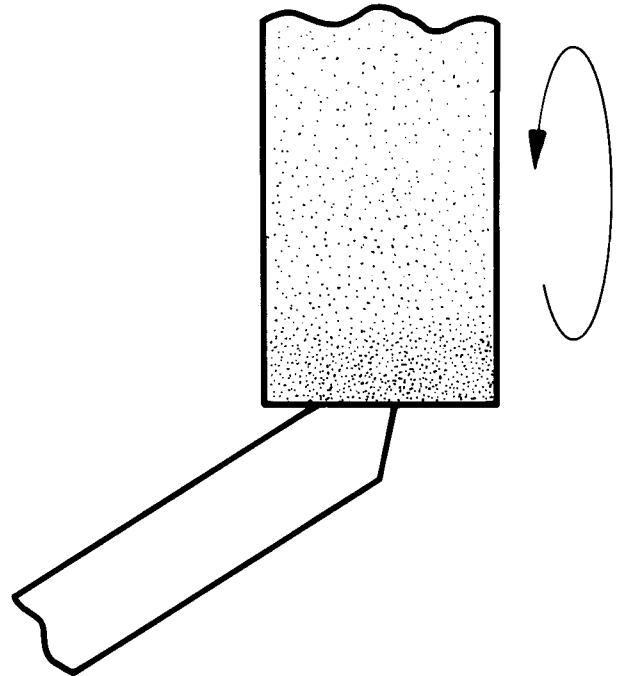


FIGURE 9.52 Grinding the side-cutting edge and side relief angles.

ting edge is not ground below the top of the toolbit. Doing so reduces the efficiency of the tool and wastes expensive material.

7. Grind a small nose radius of a $1/64$ - to $1/32$ -in. point on the toolbit. The nose radius should extend from the tip of the cutting edge to the base of the toolbit. When grinding the nose radius, only a slight amount of pressure is needed—too much causes a larger radius than desired. (Note:

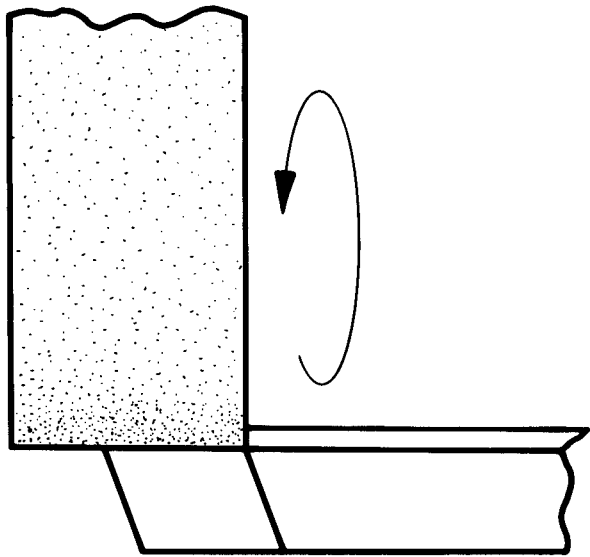


FIGURE 9.53 Grinding the side-rake angle.

Some machinists prefer to *hone* the radius with an oilstone.)

8. Hone the cutting edge slightly with a whetstone or oilstone to prolong the life of the toolbit and improve surface finish. Be sure and hold the toolbit firmly against the stone to avoid changing the angles or inadvertently rounding the cutting edge (Fig. 9.54).

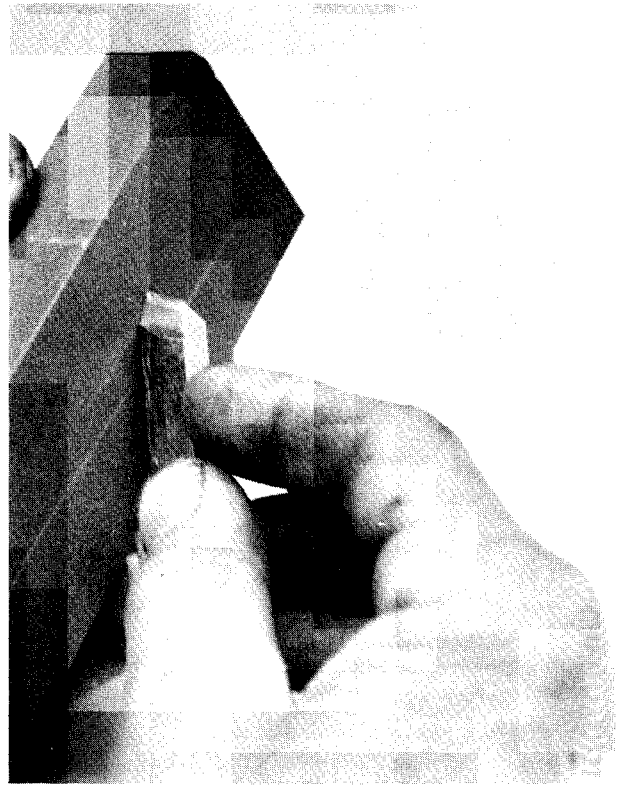


FIGURE 9.54 When honing the toolbit, hold it firmly against the oilstone.