

Tip #19 Sharpening

Sharpening (grinding and honing) woodworking tools is very personal and can be accomplished in many ways—you will sharpen tools the way that works best for you. Tools are ground on machines and then honed on several types of stones. Grinding eliminates defects in the cutting edge by removing metal from the tool. Honing puts a razor sharp edge on the ground cutting edge of the tool.

This tip will cover the different ways of grinding and honing many of the basic cutting tools used for woodworking. Because of the diverse nature of woodworking and the thousands of tools available we can not possibly cover everything in just one chapter. For additional sharpening information consult the tool manufacturer or your local library.

GRINDING MACHINES AND ACCESSORIES

The Shopsmith machines and accessories that we will be using to show the different grinding techniques are the Disc Sander, Belt Sander, Strip Sander, Grinding Wheel, Sharpening Guide, plus specialty grinding stones (Figure 24-1).

The abrasives generally used to perform grinding tasks are: aluminum oxide and silicon carbide for belts and discs used on power sanders, and silicon carbide for wheels used in power grinders.

SHARPENING SAFETY

As with other power tool operations, sharpening safety is Paramount! Know the machine that you are about to use. To protect yourself and others from personal injury take the time to review these important safety considerations:

- Read, understand, and follow ALL the safety and other information in the Owners Manual that applies to the machine, machines or accessories you plan to use.
- Always wear proper eye and face protection.
- Always support the tool that you are grinding.
- Always operate the machine at the recommended speed.

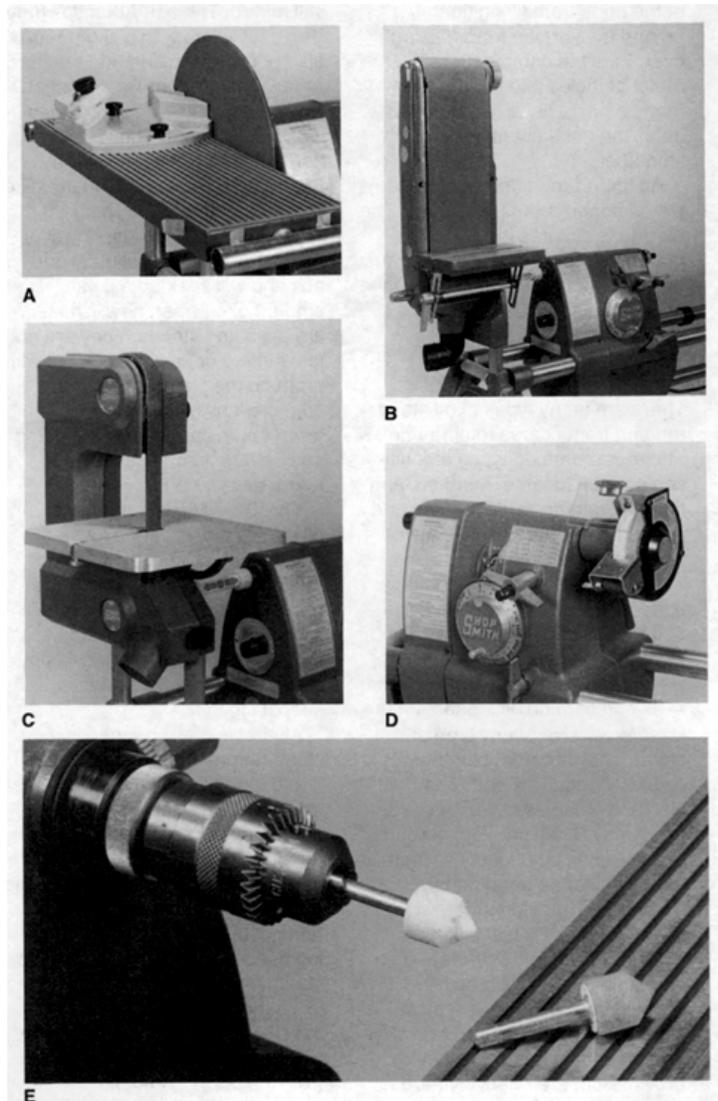


Figure 24-1. The machines and accessories used for grinding are: (A) disc sander, (B) belt sander, (C) strip sander, (D) grinding wheel, (E) specialty grinding stones, and the sharpening guide. The sharpening guide which is used with the disc sander, belt sander and strip sander is shown with the disc sander.

- Never turn on the machine with the tool or cutter already against the abrasive.
- Never connect a dust collection system to the grinding machine or accessory during grinding operations. Sparks and/ or hot pieces of metal could ignite the sawdust or debris in the collection bag.
- Never perform any grinding operations without the appropriate shields and guards in place and properly positioned.
- Always inspect the abrasive surface of the disc, belt, or wheel for any wrinkles, tears or cracks. Replace any defective abrasive materials IMMEDIATELY. Always grind with the tool's cutting edge pointing AWAY from the direction of rotation of the disc, belt or rubber bonded abrasive wheel.
- Never mount the Velcro® Sanding System on the disc sander for grinding operations. The cutting edge of the tool or cutter will dig into the soft-backed sandpaper and throw the tool or cutter from your hands possibly causing injury and certainly damaging the tool and the sanding system.

GRINDING LATHE CHISELS

Lathe chisels can be ground on several Shopsmith machines. However using the Shopsmith Sharpening Guide with the disc sander, the belt sander or the strip sander is probably the easiest. Chisels can also be ground on the grinding wheel accessory but there is less apparatus to guide the chisels so accuracy is more difficult.

Lathe chisels are held three different ways for scraping, cutting, and shearing. Therefore, they must be ground properly for the way they are going to be used. Some chisels can be ground and held to cut in more than one way while others are designed to cut stock one way only.

The skew and the gouge are generally ground for shearing with a long bevel and then honed to a razor sharp edge. They are intended to shear or cut (depending on how they are held) and are used to make spindle turnings. They can, however, also be ground and used as scraping tools.

The parting tool is ground for either cutting or scraping and is honed razor sharp only when it is intended for cutting.

The roundnose chisel is generally ground with a short bevel and the burr is left on the cutting edge. This chisel is seldom honed and is intended to scrape. It is used to make both spindle and faceplate turnings. Shearing chisels can be used to scrape and scraping chisels can be used to shear if this works best for you, but there are a few things to remember.

Warning: When any chisel ground to a shearing angle is used to remove stock with a scraping technique, especially with alternating grain direction, the sharp cutting edge will dig into the stock, stalling the machine or throwing the chisel and or the stock. This will leave a deep gouge in the stock and possibly throw the tool from your hands causing injury and certainly damaging the tool.

Round bottom gouges, even when ground for scraping, will roll when the upper corners come in contact with the rotating stock causing them to dig into the stock. This will throw the tool from your hands possibly causing injury and certainly damaging the tool and the workpiece.

The double beveled chisels, skew and parting tool, are measured across both bevels. This is known as an included angle. (This angle includes both bevel angles.)

The longer the bevel or the smaller the angle ground on the chisel, means a sharper tool that will leave a smoother cut. However, the tool will be more difficult to control.

As you grind away metal, the chisel will become short and the handle ferrules will hit the sharpening guide, especially at the shearing settings. By then you will have ground past the heat treated end. For this reason, the chisel dulls quickly and needs to be replaced.

When you're using the disc sander or the belt sander mounted on the Mark V, always grind at "Slow" speed. For grinding on the strip sander, follow the recommended speeds for the different grits in the Owners Manual.

Because grinding removes metal with a moving abrasive working against a stationary metal tool, a great deal of frictional heat is created. To keep this heat from building up and destroying the factory heat treating and hardening of the tool (temper), hold the tool against the abrasive momentarily then slide it away. Repeat this procedure until the tool has been sufficiently ground. *Caution: Have a container of water nearby to cool (quench) the tool if it becomes too hot to touch. If you notice that the tool is discoloring and turning blue, you are either holding the tool against the abrasive too long or too hard, the abrasive is dull or the speed setting is too fast.*

When you're using the disc sander, the dust chute is used to contain the abrasive particles and protect the way tubes from grit. An alternative to using the dust chute is to place an 8" to 12" wide piece of scrap lumber on the way tubes under the sanding disc. *Caution: When you're finished grinding, always slide the power plant away from the grinding position and wipe the way tubes clean.*

Grinding Lathe Chisels using the Sharpening Guide

The Shopsmith Sharpening Guide mounts on the disc sander, belt sander and the strip sander and is used to grind skews, gouges, parting tools and roundnose chisels. Set up the machine you will be using and grind the chisels according to the applicable instructions below. To determine the sharpening guide angle settings, refer to Table 24-1.

Table 24-1: Sharpening Guide Angle Settings

	Left Setting (Shearing)					Right Setting (Scraping)			
	20°	15°	10°	5°	0°	5°	10°	15°	20°
Skew	25°	30°	35°	40°	45°	50°	55°	60°	65°
Gouge	25°	30°	35°	40°	45°	50°	55°	60°	65°
Parting Tool	40°	45°	50°	55°	60°	65°	70°	75°	80°

Disc Sander Setup—Mount the sharpening guide on the Mark V extension table (Figure 24-6).

Warning: To sharpen lathe chisels, mount the sharpening guide to the extension table only. Mounting the guide to the worktable may cause the cutting edge of the chisel to dig into the abrasive and the tool to be thrown from your hands.

Adjust the sharpening guide to the desired angle setting. Slide the sanding disc to within 1/16" of the sharpening guide then secure the power plant lock. **Warning:** Never use the Velcro® Sanding System to grind tools.

Belt Sander Setup—Position the belt sander vertically and set the table to the "0" setting. Position the parting tool station of the sharpening guide in front of the belt sander backup plate. Adjust the guide to the desired angle setting. **Warning:** Position the sharpening guide to within 1/16" of the belt and secure the table locking setscrews (Figure 24-7).

Strip Sander Setup—Set the strip sander worktable to 900 and adjust the sharpening guide to the desired angle setting. Because there are no table slots or mounting holes in the strip sander table, the sharpening guide must be clamped to the table top. An index line is used to align the guide. Draw this line 3-5/8" from, and parallel to the platen (Figure 24-8).

When setting the angle, position the hole in the rear of the sharpening guide and the angle setting

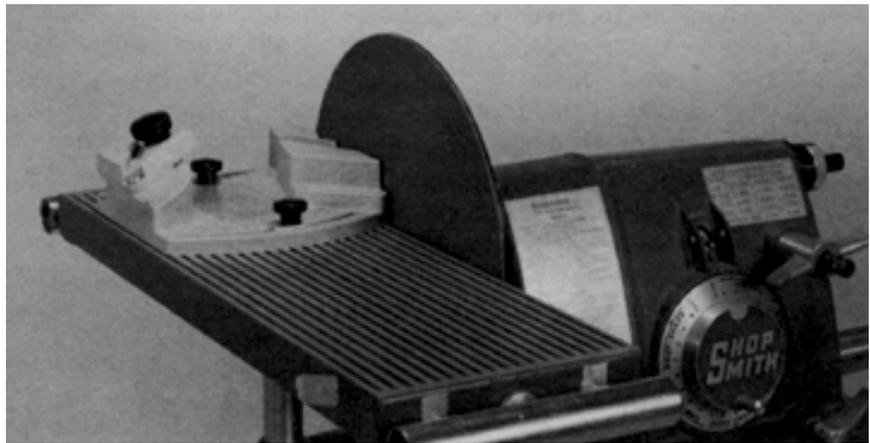


Figure 24-6. To sharpen lathe chisels, mount the sharpening guide on the extension table only.

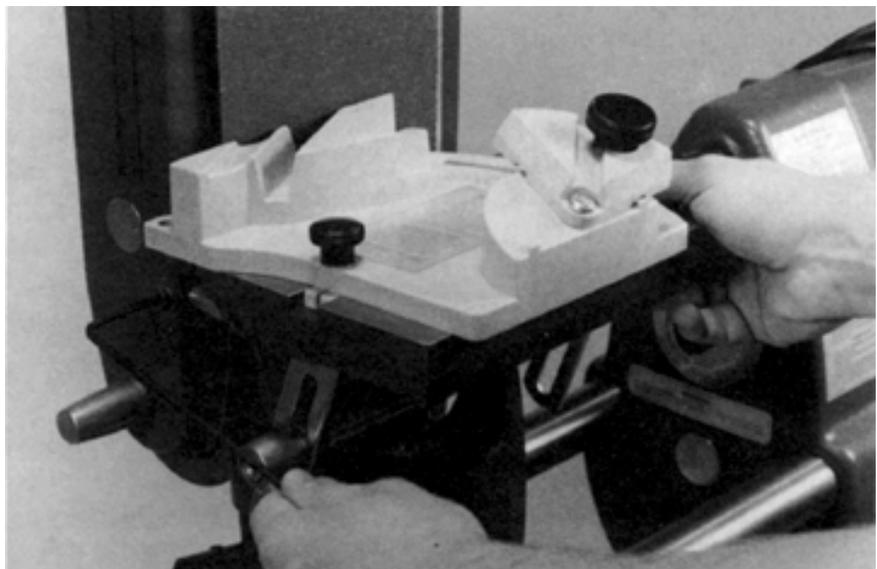


Figure 24-7. Position the guide to within 1/16" of the belt.

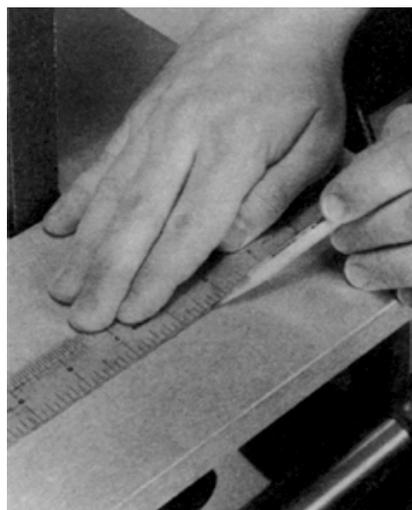


Figure 24-8. Draw an index line 3-5/8" from, and parallel to the platen.

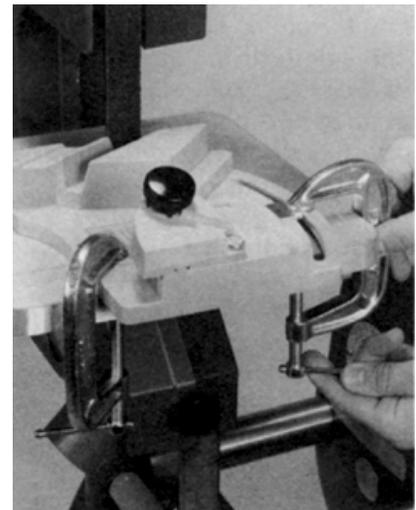


Figure 24-9. Clamp the sharpening guide to within 1/16" of the belt.

indicator directly over the index line. Slide the sharpening guide along the line until the desired station is in front of the belt. Make sure the sharpening guide is within 1/16" of the belt, then clamp the guide securely to the table (Figure 24-9).

Grinding the Skew—The skew chisel has a bevel ground on both sides at an angle not perpendicular to either the side faces or the top and bottom edges. To grind this compound angle the skew must be held at an angle to the abrasive and leaned to the left and to the right. These angles are controlled by the sharpening guide.

Position the tip of the skew **down** and the side against the **left** wall of the second station of the sharpening guide (Figure 24-10). Be sure the skew **is not** touching the abrasive and the speed dial is set to "Slow" (if you are using the Mark V), then turn on the machine.

Gently slide the skew against the wall of the skew grinding station and into the moving abrasive. Hold the chisel there momentarily then back it away. Repeat this several times.

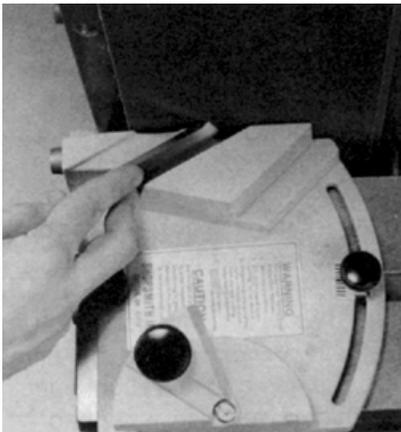


Figure 24-10. Position the tip of the skew down and the side against the left wall of the second station.

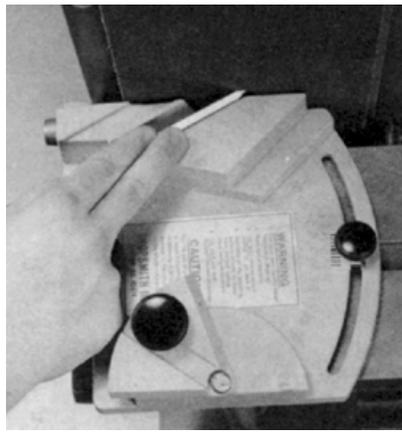


Figure 24-11. Position the tip of the skew up and the side against the right wall of the second station.

Turn the skew over and position the tip of the skew up and lay the side of the skew against the right wall of the second station (Figure 24-11).

Gently slide the skew against the station and into the moving abrasive. Hold it there momentarily then back it away. Repeat this several times.

Grind away only enough metal to remove any damage to the cutting edge and create a slight burr. If the skew is being ground for scraping, then it is ready to use (the burr is sharp and scrapes very well). If the skew is being ground for shearing or cutting, it will need to be honed to a razor sharp edge.

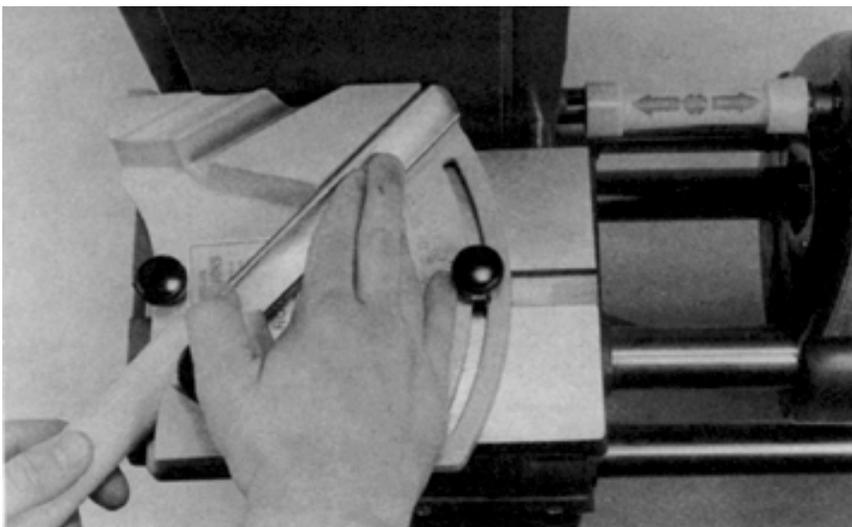


Figure 24-12. Set the gouge in the third station and lay its side against the left wall.

Grinding the Gouge—The gouge chisel has a bevel ground on the convex side (bottom) at an angle measured from the concave side (top). This bevel is curved to form a rounded cutting edge. To grind this complex curved bevel, the gouge must be held at the proper angle, fed into the abrasive and rotated. The angle is controlled by the sharpening guide.