

# WOOD

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# Sharpening Showdown

We tested more than a dozen products—in four categories—sandpaper, water stones, ceramic stones, and diamond stones—to find the best at imparting a super-sharp edge in the least amount of time.

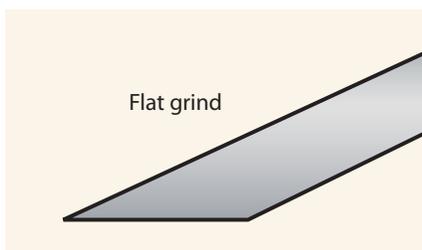
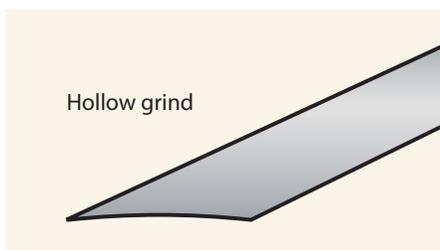
Sharpening chisels and plane irons is like working out at the gym: You know you should do it, but getting started can seem daunting. Like working out, the more you sharpen your tools, the better you get at it. And pretty soon you actually begin to enjoy it. To get to that point, you must first settle on the tools and methods that suit your needs. Before we get around to comparing the

four best sharpening media, though, let's cover the basic procedures that apply to all of them.

## First comes shaping

Before honing a razor edge onto a tool, first establish its primary bevel angle, a process known as shaping. (Most chisels and plane irons have either a 25° or 30° primary bevel angle.) During shaping,

## TWO TYPES OF SHAPING



Shaping a bevel on a bench grinder's round stone wheel forms a hollow grind (left), while a sharpening stone or sandpaper forms a flat grind (right).

## BENCH GRINDER: MAKING BEVELS FAST



**A** Grind a primary bevel angle onto chisels and plane irons with cool-cutting aluminum oxide wheels and a tool rest to maintain a consistent angle.

## Use a honing guide for repeatable results

To consistently and accurately flat-grind an edge or hone a microbevel, start with a honing guide (such as the Veritas Mk.II, shown in **Photo B** and listed in **Sources**) that holds your tool securely at a precise angle. We like this model because it holds chisels and plane irons from 1/4" to 2 7/8" wide, at bevel angles from 15° to 54°—more than adequate for the vast majority of chisels and plane irons. And its 2"-wide roller fits nicely onto all the stones we tried.

To use a honing guide, secure a tool following the product's instructions to ensure a beveled cutting edge that's square to the sides. With the tool bevel and honing-guide roller resting on the stone or sandpaper, rub the guide/blade assembly back and forth until the bevel looks uniform and a slight burr develops on the back of the bevel. Start with a coarse grit for shaping (100–325), and then hone with successively finer-grit stones (three or four from 600 to 8,000 grit, roughly doubling the grit rating with each step up) without changing the tool's position in the guide. If you're honing a microbevel, stop when it measures about 1/16" wide.



**B** The key to using a honing guide is to keep the roller and the tool's beveled edge in constant contact with the sharpening medium.

you create a fresh beveled surface that's square to the sides and free of nicks or scratches.

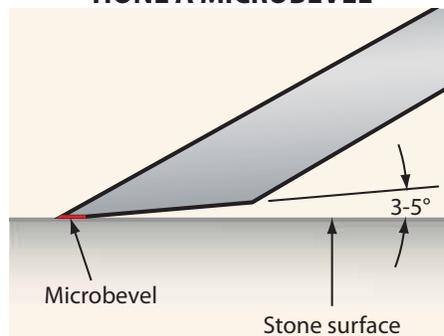
A bench grinder [**Photo A**] shapes the tool fastest—especially if your chisel or plane iron has been damaged and needs a lot of material removed. A bench grinder makes a hollow grind on your tool; see the “Two Types of Shaping” drawings on the *previous page*. For best results, use a slow-speed grinder (less than 2,000 rpm) with a 100- or 120-grit aluminum oxide wheel. (The coarse silicone carbide wheels that come with most grinders cut too roughly for wood-working tools.) To avoid overheating the tool and turning it blue (which weakens the steel), dip it frequently in a water-filled quench cup.

If you don't have a grinder, shape your tools using a honing guide to hold the tool—see the sidebar *above*—and a coarse stone or sandpaper (approximately 100 to 325 grit). This creates a flat grind, as shown on the *previous page*. Upon finishing the sharpening process, a flat grind ultimately yields a cutting edge as sharp as a hollow grind, but the process takes longer because you're removing more metal and at a slower rate than a grinder.

## Now hone the edge

Regardless of how you shape the tool's edge, you now need to hone it to razor sharpness. For this step, raise the tool angle 3–5° in your honing guide and hone a microbevel, as shown in the drawing *above center*, using a series of stones or sandpaper from about 600–1,000 grit up to the 5,000- to 8,000-grit range. Because the tool will cut using only the tip of the bevel, you don't need to hone the entire primary bevel. This

### HONE A MICROBEVEL



After shaping the primary bevel angle, create a microbevel by raising the tool from its primary bevel to hone only a short section near the tip.

saves you time and effort and extends the life of your sharpening media.

## Know when to stop

With each finer grit of sandpaper or stone you run a tool across, you'll remove metal and further refine the edge. Successively finer grits not only remove scratches left behind from the previous grit, but also further hone that

edge to a crisp point that will slice through wood with ease. Stop too soon and your tool may remove wood, but probably with some tear-out, greater effort on your part, and a short edge-life expectancy. The sharper you get a tool, the longer that edge will stay sharp. Read ahead to find the targeted stopping point for each sharpening medium.

While cutting wood with the sharpened tool, the edge will wear away; how quickly that happens will depend on the wood and the tasks you're doing. When it dulls—you'll notice it not cutting as easily or cleanly as when freshly sharpened [**Photos C and D**—simply hone the edge again at that same microbevel angle to resharpen. Start back at a midpoint honing grit (1,000–4,000) and continue through the polishing stages (5,000–8,000). After rehonoring three or four times, the microbevel will begin to catch up to the primary bevel. Before you get to that point, it will be quicker to simply reshape the primary bevel and then hone a new microbevel.

### SHARP TOOLS SLICE—PARTIALLY SHARP TOOLS MAKE CRUMBS



**C** This plane's iron, sharpened to a mirror polish with an 8,000-grit stone, yields shaved ribbons when cutting end-grain pine.



**D** Sharpened only to 1,000 grit, this plane leaves crumb-like shavings and torn-out grain in its wake. Two more grits would improve this cut.

# 4 Effective hand-honing media

## 1. Sandpaper

**What you'll need:** If you plan to shape your tools with a hollow grind at the bench grinder, you'll need sandpaper in 220, 320, 600, and 1,200 grit, as well as an ultrafine abrasive (between 2,000 and 4,000) for final polishing. (Stopping short of the ultrafine grits will produce an edge that cuts wood, but dulls quicker.) For flat-grind shaping, add 120 grit. You can use self-adhesive sandpaper rolls, but few rolls come in grits higher than 400, and your brand choices dwindle past that point.

You'll need a flat surface on which to adhere the sandpaper. You can use glass or granite, but we find 3/4"-thick MDF flat enough for everyday sharpening. Adhere the sandpaper to 3x8" blocks of MDF, as shown at *right*. (Use spray adhesive to mount regular sandpaper.) Once the abrasive wears out, simply toss the block and make another.

**How it works:** Use a rubber nonslip mat to keep your sharpening substrate from scooting during use. Using the same grits listed above, flatten and polish the back of the tool—but only the 1/2" or so nearest the cutting edge—after shaping the bevel and before honing the cutting edge. (Watch a video on sharpening with sandpaper and a honing guide at [woodmagazine.com/sharpeningvid](http://woodmagazine.com/sharpeningvid).)

### PROS:

▶ This system has the lowest buy-in cost: The sandpaper should cost you less than \$50, and a sheet of MDF \$30 or so. If you get the glass, expect to pay less than \$20 for a 10" square.

▶ You can find quality sandpaper (600 grit and under) almost anywhere. (See **Sources** on page 65 for where to buy ultrafine papers.)

▶ You don't need a messy lubricant; just sharpen dry and get great results.

### CONS:

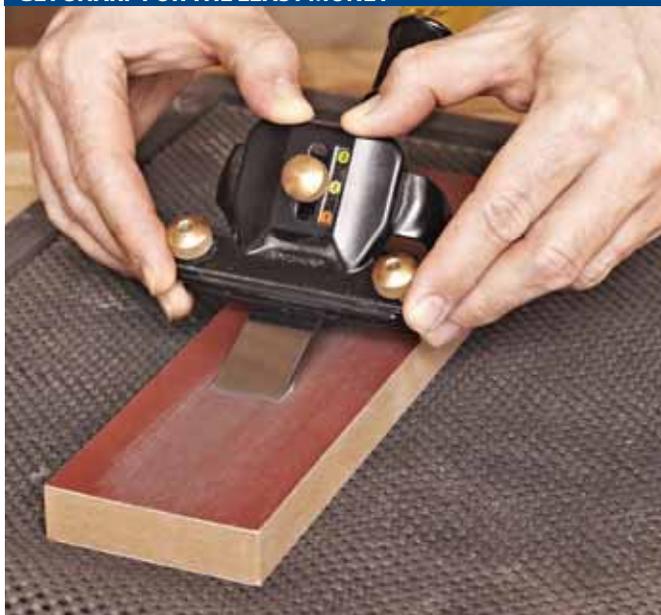
▶ The abrasive in sandpaper wears out quickly when sharpening tools, especially the harder A2 steel. Each of the four sandpaper brands we tested lost its fast-cutting ability within the first 30 seconds. (See the chart *below*.) Then you're left with a slow-cutting abrasive that's completely spent in 5–7 minutes.

▶ Costs add up if you're sharpening more than the occasional tool. Because

you'll need to replace sandpaper so often, the low initial buy-in can become a regular money drop. And the ultrafine sheets—essential to honing the final edge—cost \$2–\$4 *per sheet*.

**BOTTOM LINE:** If you only sharpen a few tools two or three times a year, and you want to minimize your investment, look no further than sandpaper.

### GET SHARP FOR THE LEAST MONEY



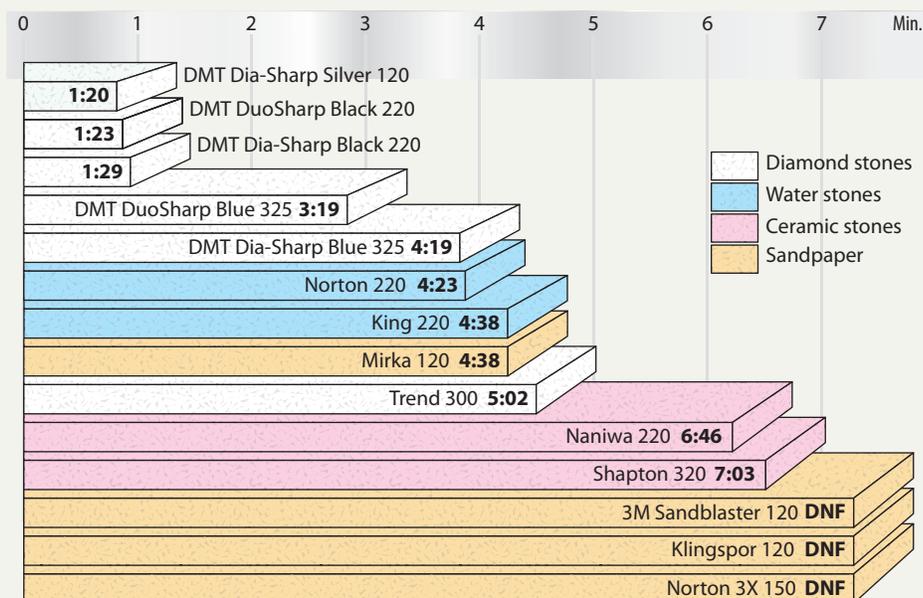
By using sandpaper on MDF blocks, you toss everything when the abrasive wears out, saving you a lot of hassle versus having to clean worn abrasives from float glass or granite.

## SHAPING OR HONING, DIAMOND STONES CUT STEEL

We all want our tool-sharpening time kept to a minimum so we can get back to working wood. So to find which of the sharpening media (sandpaper, water stones, ceramic stones, and diamond stones) get the job done quickest, we put more than a dozen products to the test in the *WOOD*® magazine shop.

There's no beating a bench grinder for fast shaping, but if you prefer to do your shaping on a flat stone or sandpaper, look for something in the 120- to 325-grit range. As you can see from our test results, the coarsest diamond stones did the job in less than a minute and a half. Even diamond stones around 300 grit performed better than or as well as the rest of the field. The bottom line: For the fastest flat grinds, get a diamond stone.

### SHAPING: DO IT WITH DIAMONDS; SKIP THE SANDPAPER



Time required to shape a 25° primary bevel on identical plane irons, average of three tests. DNF—did not finish the test because the abrasive wore out.

## 2. Water stones

**What you'll need:** Three stones, in 1,000, 4,000, and 8,000 grit (about \$130 to \$175 combined), will handle all your honing needs. You can get a 220-grit stone for shaping, but as shown in the chart on the *previous page*, a diamond stone does the job much quicker. A good option to save money: Buy combination stones with a different grit on each side for about 20–30 percent less cost than single-grit stones.

**How it works:** Use a honing guide as described earlier, but only after a bath—for the stones, that is. Essentially bricks made of aluminum oxide particles pressed tightly together with a binder, water stones must be submerged in water at least 15 minutes prior to use. And then during use, you'll need to splash water on the top surface occasionally to aid the cutting action and clear away metal filings. After you've established a hollow grind or flat grind, hone the tool starting with 1,000 grit and finish with 4,000 and 8,000.

### PROS:

- ▶ A set of three water stones costs about 30–50 percent less than a similar set of ceramic or diamond stones.
- ▶ You can store water stones 4,000 grit and coarser in the water bath so they're

### SOAK 'EM, THEN STROKE 'EM



Water stones must soak 15 minutes before use. We store them on maple strips in an \$8 plastic cake carrier.

always ready to use; finer stones, though, might break apart if stored in the water.

### CONS:

- ▶ Water stones gouge easily from the tool's sharp bevel and dish out quickly, and consequently must be flattened using a special flattening stone, sandpaper, or coarse-grit diamond stone. How often this needs done will depend on your choice of brand; just to be sure, flatten at the beginning of each sharpening session.
- ▶ Some water stones hone so slowly, especially on third and fourth efforts, we found it faster to reshape the primary

bevel after the second round of honing and then hone a new microbevel. With the Norton water stones, you can rehone a microbevel three times on a fine stone without it being a chore.

- ▶ The water and messy, grayish swarf could stain your workbench or cast-iron tool surfaces if spilled.
- ▶ Stones soaked in water or still wet from use will freeze and crack if stored below 32°F.

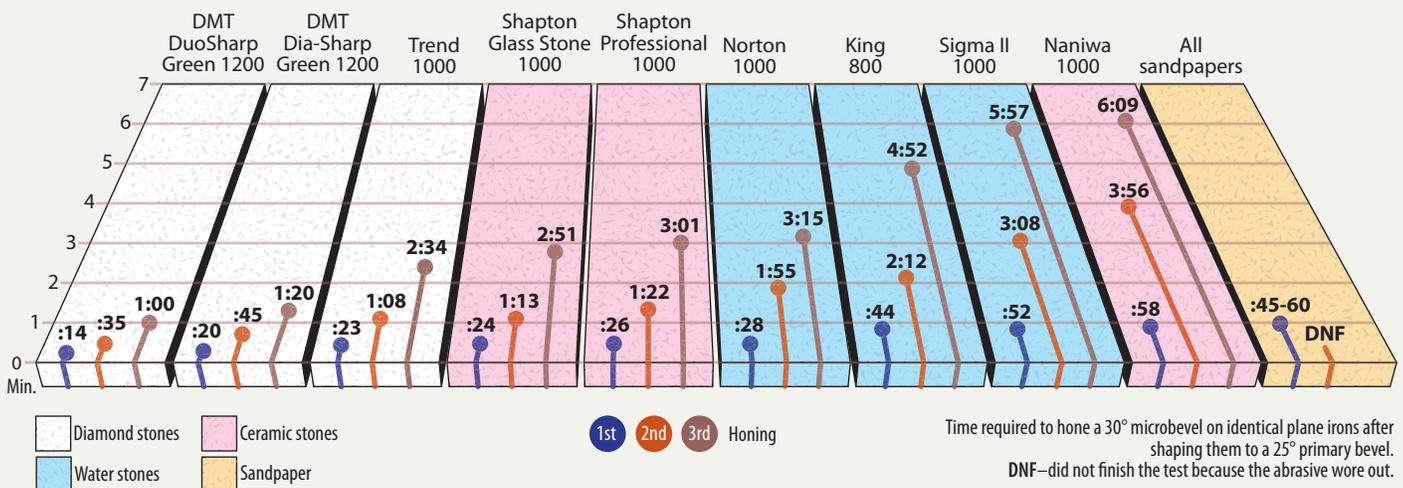
**BOTTOM LINE:** Water stones give you a nice combination of reasonable price and good overall performance with no learning curve.

## FASTER THAN STONES OR SANDPAPER

Refining an edge to a crisp, sharp point comes after shaping the primary bevel, and it's done on finer-grit stones or sandpaper. To test comparable products in the 800- to 1,200-grit range, we honed the tools' edges, recorded the times, dulled the tools equally, and repeated the process

two more times. (Each successive honing takes longer because you're removing more steel each time.) As with shaping, diamond stones proved quickest at honing. All the sandpaper brands we used could produce just one effective honing, so toss the sheet after each use.

### HONING: AGAIN, DIAMONDS ARE YOUR BEST FRIEND



## 3. Ceramic Stones

**What you'll need:** Get a 1,000-; either a 4,000- or 5,000-; and an 8,000-grit stone. Don't bother with the 220 or 320 coarse shaping stones—they cut slower and cost more than a similar-grit diamond stone.

**How it works:** Ceramics work almost identically to water stones, except you don't soak them. (They'll actually break apart if soaked.) Instead, just spritz a little water on the surface to lubricate and clear the swarf.

### PROS:

► The Shapton professional stones and Shapton glass stones honed tools faster than water stones and left a fine, polished edge second to none. In fact, to save some money you could skip the 8,000-grit stone and just stop at the 5,000 without noticing a dramatic difference.

► Shapton glass ceramic stones are half as thick and mounted on glass, but sharpen just as well as the full-thickness

Shaptons. They also sell for 30–40 percent less.

► Most ceramic stones are harder and denser than water stones and wear about twice as long, so they stay flat and retain their abrasiveness longer.

► Clean up with ceramics is a snap: Just rinse with water and wipe dry.

### CONS:

► The three ceramic stones we recommend for honing will cost you about \$200 to \$350—a big payout.

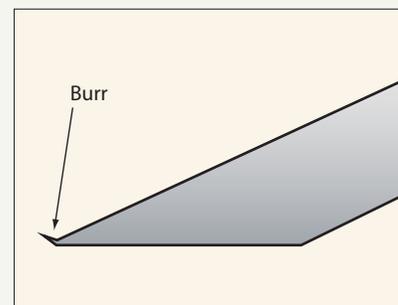
► Naniwa ceramics cut slowly, load up fast with metal filings, gouge easily, and need flattening more often than other ceramics we tested.

**BOTTOM LINE:** For the most part, ceramics sharpen cleaner and faster than water stones and sandpaper, and leave supersharp, polished edges. Ceramics are a big investment, but you'll likely use them for 20 years or more. But you'll still need a shaping source.

## MYTH BUSTER

### Don't shave the burr

Conventional wisdom says, with each grit stone or sandpaper you use in your sharpening process, to flip the tool over after honing the bevel and rub away the inevitable burr. But that's not necessary if you've flattened the tool's back. As you continue sharpening the tool at the same angle on successively finer grits, the burr will eventually fall away on its own as the sharp edge comes to a crisp point.

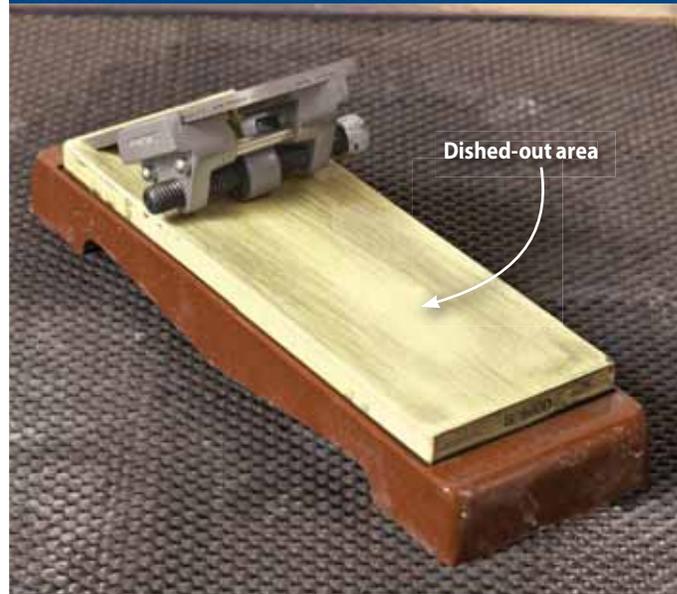


### WITH CERAMICS YOU JUST SPRAY, THEN SHARPEN



Even if they're fully dry, you need only give ceramic stones a quick spritz of water before sharpening tools.

### WATCH FOR UNEVEN WEAR ON SOFT STONES



The Naniwa fine-grit ceramic stones dished out so rapidly we had to stop and flatten them often. Not doing so would produce rounded tool edges.

### Don't bother with oil stones

These standbys have been around a long time, but oil stones just aren't practical any longer—for three good reasons:

- **Costly.** These natural stones have become more scarce and expensive.
- **Ineffective.** They don't cut the newer tool steels and alloys, such as the A2 steel now used in a lot of plane irons. Instead, the filings just clog the stone's surface.
- **Messy.** Which would you rather clean up: water or oil? Thought so. And some modern sharpening media require no lubrication at all.



## 4. Diamond Stones

**What you'll need:** Nothing's harder than diamonds, and these diamond-particle-coated steel plates cut quickly and evenly every type of tool steel we threw at them. But we just couldn't get tools sharp enough using diamond stones alone, so plan to pair them with another type of media for final honing and polishing.

We recommend getting a two-sided 8"-long diamond stone because it gives you two grits to speed through the shaping/early honing process. Get a 120- to 325-grit stone for shaping a flat grind, and a 1,000 or 1,200 for the next step. Or, for following up a hollow grind, get a 600/1,200 stone.

**How it works:** You stroke the tool on a diamond stone just as you do with other media. Diamond stones need lubrication to prevent metal filings from building up and clogging the abrasive, but it's not as messy as with water stones.

DMT's DuoSharp stones, *below left*, feature an abrasive-coated plate with a pattern of dotted recesses throughout, providing a place for the swarf to pool. That helps them cut quicker than DMT's Dia-Sharp stones, which have more densely packed diamonds that give them the appearance of diamond sandpaper. Spritz both of these with water as needed during use.

Trend's Classic Pro stone has a diamond-shaped pattern with recessed flutes for drainage, but the oil that comes with the stone dissipated quickly and was more difficult to clean up than with water. The oil costs \$15–\$50 to replace, depending on size, so skip the oil in favor of water. (Trend recommends oil to prevent rusting of the steel plate. We dried ours after use to prevent rust.)

### PROS:

- ▶ DMT stones cut at least four times faster than the other media we tested.
- ▶ Two-sided stones provide value. The DuoSharp (\$80–\$110 each) comes in

four combinations of different grits. The Trend Classic Pro (\$135) stone comes only in 300/1,000, although Trend offers a 220-grit single-sided stone for \$155. Dia-Sharp single-sided stones cost \$65–\$100 and come in six grits.

### CONS:

- ▶ Trend's diamond stone shaped and honed slower than the DMT models, but it's still about as fast or faster than water stones, ceramics, and sandpaper.
- ▶ Because coarse diamond stones (120 to 325 grit) cut so aggressively, you'll need to follow up with a finer diamond stone (600 to 1,200) and a water or ceramic polishing stone (5,000 to 8,000) or sandpaper (2,000 to 4,000) to remove the shaping scratches.

**BOTTOM LINE:** This is a good place to begin your sharpening-stone system because a diamond stone cuts fast, needs no maintenance other than an occasional rinsing, and can be used to flatten water and ceramic stones.

### DIAMOND CUTS FAST, STAYS FLAT



Diamond stones vary in surface appearance. Recessed dots and flutes (left and right) help clear swarf from the abrasive. Some stones (center) lack this feature.

## Here's where you should spend your money

After buying a bench grinder (\$125 for the grinder, \$30 for a 120-grit wheel) and a quality honing guide, we recommend you invest in two stones: a two-sided DMT DuoSharp in coarse (325) and extra-fine (1,200) grit, and a 6,000-grit Shapton glass ceramic stone. With this setup (\$175 for the two stones) you'll make a hollow grind at the grinder, hone the microbevel with the coarse side of the diamond stone, refine it with the extra-fine side, and then polish it with the ceramic stone. The last three steps will flatten tool backs. The quick-cutting media will have you spending less time sharpening and more time using your sharp tools. 🌱

Produced by **Bob Hunter** with **John Olson**

### Sources

- Mk.II honing guide:** part #05M09.01, \$64.50, Lee Valley, 800-871-8158, leevalley.com.
- Norton water stones, Sigma II water stones, ultrafine sandpaper:** Lee Valley.
- King water stones:** Traditional Woodworker, 800-509-0081, traditionalwoodworker.com.
- Shapton ceramic stones, ultrafine sandpaper:** The Japan Woodworker, 800-537-7820, japanwoodworker.com.
- Naniwa ceramic stones, ultrafine sandpaper:** Tools For Working Wood, 800-426-4613, toolsforworkingwood.com.
- DMT diamond stones:** DMT Manufacturing, 800-666-4368, dmtsharp.com.
- Trend diamond stones:** Trend Routing Technology, 877-918-7363, trend-usa.com.
- Shapton glass ceramic stones:** Woodcraft Supply, 800-225-1153, woodcraft.com.