

Notes from the Shopsmith Woodworking Academy

Clean Cuts — PART 4 – Using Oriental Waterstones

As we continue our series of columns on sharpening tools and techniques for the home shop, we're sticking to the basics – and leading off once again with this simple fact - ***The tools you use for any project are only as good as they are SHARP !***

And although this may seem to be glaringly obvious to an experienced woodworker, we continue to receive a lot of letters from new woodworkers, complaining that their lathe chisels, bench chisels, plane irons, jointer knives and machine cutters simply aren't producing the results they've expected. In most cases, this is not a matter of using the wrong technique (although it's often *part* of their problem), but rather, a matter of simply forgetting that no matter how expensive a tool may be, it must be *sharp* to produce optimum results.

In our first *Clean Cuts* column (July/August, 2003), we discussed *Benchstone Basics*... emphasizing that a good set of benchstones forms the real *foundation* of your workshop sharpening system. Yes, motorized sharpening equipment can be a great time-saver...but power equipment should come *after* you've purchased and learned how to properly use a good set of benchstones.

Oil or water?

We've already talked about *oilstones* such as silicon-carbide, India, aluminum oxide and Arkansas. However, we have yet to discuss one category of stone that's been gaining steadily in popularity for a number of years, now. That category is the Oriental Water Stone. They may do the same job as an *oilstone*, but the way in which you use them – and the way in which they finally produce the razor-sharp edges they're noted for – is a bit different.

For example, *oilstones* are typically used in a group of three grits: Coarse, Medium & Fine. Up until about 15 years ago, they were the first choice of most American woodworkers for generations. With *oilstones*, oil is used as a lubricant to float away the tiny bits of steel that come off the edge of the tool you're sharpening. This keeps the abrasive cutting particles on the surface of the stones from loading-up with *swarf* (those flakes of steel), glazing over and becoming virtually useless for putting anything beyond a "butter-knife edge" on your cutting tools.

Man-made *waterstones* have been available for a long time...even in the USA. However, until the late 1970's, they were never widely marketed. In reality, *waterstones* are deeply rooted in the ancient culture of the Orient, where they have been used to sharpen steel for many, many centuries. In fact, there's a little *romance* in their history, as well, since the glorious Samurai Warriors used the natural versions of these stones to put a razor-like edge on their swords, centuries ago.

Waterstones – the basic three

Like a set of *oilstones*, you should use *waterstones* in a set of three. Start with a coarse (250 to 800 grit) stone to begin the sharpening



process...move to a medium stone (1000 to 1200 grit) for the primary sharpening stage...then finish off by polishing your edge to a mirror-smooth finish using a fine (4000 to 8000 grit) stone.

Unlike *oilstones*, however, *waterstones* use water as a lubricant to keep the stone surfaces from glazing over – and they use a lot more of it than the amount of oil typically used with an *oilstone*. Fortunately, water is a lot less costly than oil.

Among the woodworkers who have used *oilstones* and *waterstones*, some don't like *waterstones* at all...some think they're as good as *oilstones*, and some swear they'll never use anything but *waterstones*!

This last group of true believers got our curiosity up. What makes these stones so different? Are they really better than the *oilstones* we've been using for years? We did a little research, then tried them out in our own shop. Make no mistake about it, *waterstones* are not just another variation of the tried-and-true *oilstone*. They're a completely different breed of sharpening stone in the way they're made – how they'll fit into the routine of your shop – and how you'll use them

What goes into a *waterstone*?

The basic set of three man-made *waterstones* includes a coarse grit stone, a medium grit stone and a super-fine grit stone for final polishing. They're made by fusing hard abrasive particles together with a tough bonding agent inside an electric furnace (see Fig. 1). It's the same basic process whether it's an *oilstone* or a *waterstone*. However, *waterstones* have larger *pores* between their hard, steel-cutting abrasive particles.

According to one expert, most 800-grit, 1000-grit and 1200-grit *waterstones* are probably made with Aluminum Oxide...the same abrasive material that goes into what we often call *India stones*. The finer (4000-grit through 8000-grit) stones are usually made with *Rare-Earth Compounds*...exactly *which* compound isn't popularly known. It seems like the manufacturers of these *waterstones* shy away from revealing what they call their *trade secrets*. Some woodworkers have guessed that the super-fine polishing stones are made of *cerium-oxide*, the very same polishing agent used to polish telescope lenses. However, the makers have clearly stated that this isn't the case.

The bonding agent used to cement the *waterstone's* abrasive particles together is different from that used for an *oilstone*. It's a special adhesive that actually loosens with the application of water and friction, allowing the abrasive particles to move around as you pass your tool over the stone's wet surface. During use, the very top layer of abrasive constantly wears off, exposing a fresh layer of abrasive underneath. This is a lot different than the action of an *oilstone*...in which the abrasive particles are designed to be locked fast in a tight holding bonding agent matrix. When using an *oilstone*, the abrasive particles are worn completely away – but not moved around.

So, although *waterstones* are more porous than *oilstones*, glazing-up with *swarf* is less of a problem. Many users claim that a *waterstone* is practically impossible to glaze-over in the same way as an *oilstone*.

Routine differences

With *waterstones*, you need water to store them in...water to make them work...and even more water to clean them with when you're finished. This is an advantage in at least one way over *oilstones*: If you're in a hurry to use a newly honed chisel and fail to take the time to clean your hands after honing, you won't have to worry about bringing oily fingers to your wood project. However, it is important to remember that water is also an alien in the workshop environment. It rusts tools and

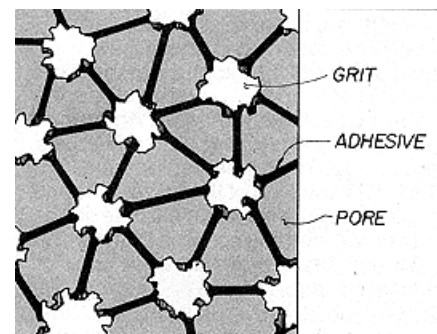


Fig. 1: *Waterstones* generally have larger “pores” than *oilstones*...and use different adhesives to hold the abrasive particles together.

stains raw wood. For that reason, you should keep a more-generous-than-normal supply of soft, absorbent rags close by when using *waterstones*. Fortunately, from a safety standpoint, storing water-soaked rags in the shop creates little risk, compared to the dangers of spontaneous combustion posed by storing oil-soaked rags.

When using *waterstones*, remember to avoid splashing water onto nearby items that don't like water. It's a good idea to build a splash tray for *waterstones*, like the example shown in Fig. 2. It's made from a laminated kitchen sink countertop cutout, available inexpensively from your nearby home center, lumberyard or countertop fabricator.

When you're finished using *waterstones*, be sure to dry your sharpened tools immediately to prevent rust and the leaching of moisture into your toolbox. For storage, it's a good idea to keep them wet...even when you're not using them...by totally immersing them in a sealed plastic container or bucket. This way, when you're ready to use them, you can just remove them from storage and go immediately to work, knowing that they're both clean and properly soaked. Failure to do so means that you'll have to anticipate each use, then soak them until the bubbling stops (about three or four minutes) before getting started.

It's important to note that leaving your *waterstones* continually wet will not harm the stone or its wooden base (attached permanently to many finishing stones) – although in some cases, the water can get pretty raunchy, pretty fast. You might want to add just a few drops of chlorine bleach for each gallon of water to retard bacterial growth. Remember, too, that if your shop isn't heated, never let a wet stone get so cold that it freezes. If this happens, the water will expand during freezing and cause the stone to crumble.

Using them well

You'll soon notice that cutting steel with these softer, more porous *waterstones* feels a lot different than cutting steel with an *oilstone*. In fact, using a *waterstone* is a lot like dragging a huge chunk of chalk across a good, dry chalkboard. There's a pleasant resistance...a feeling of control. As you push your tool's edge across the surface of the stone, it will tell you that the steel is being cut. This is in contrast to the feeling you get when using a well-oiled Hard Arkansas *oilstone*, for instance, where your tool seems to float frictionless across the stone's surface...with little or no feeling of resistance.

There's also a difference in the sound when using these stones. Some claim the sound of using a coarse *waterstone* starts out low and a little dull...then, as the edge gets sharper, begins to increase in pitch. At the point of the highest pitch, they judge the tool's edge to be sharp. For many, it's this combination of increased "feel" and "sound" that gives them a clearer mental image of what's actually happening...than what they get when using *oilstones*.

So, how fast do they really cut steel? Our tests indicate that a coarse silicon-carbide *oilstone* cuts faster than an 800-grit (coarse) *waterstone*...which, in turn, cuts a lot like a medium *India oilstone*.

A caution: Since *waterstones* are more porous and thus, "softer" than *oilstones*, you must be careful not to gouge or dent them with your tools. Narrow-edged and round-edged tools should be honed on the stone's edge to avoid damaging its surfaces.

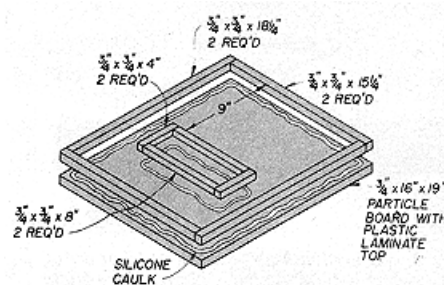


Fig. 2: A splash tray can be made from a sink cutout. The area on the right side is for flattening stones.



First step for use: FLATTENING

How *soft* are *waterstones*? The stone-flattening process that should ideally occur before *each* use of the stone will answer this for you. *Waterstones*...just like *oilstones*...must be flat to produce a true edge. An irregular stone will only transfer its irregularities to the edge of the tool you're sharpening (see Fig. 3).

To flatten the surface of a *waterstone*, start by using a sheet of 220-grit, wet/dry silicon-carbide sandpaper or the sanding screens used by drywallers. Place either type of sheet on a solid, **flat** surface such as a sheet of glass or a scrap piece of laminated countertop. Use one hand (as shown in Fig. 4), positioned in the middle of the stone to rub it flat, keeping your sandpaper or sanding screen thoroughly wet throughout the process.

You'll know the stone's flat when all the surface marks from previous honings are removed. It also helps to dry the stone with a rag, then check it by holding a straightedge across the surface as you hold it up to the light. If light shines through where the straightedge meets the stone's surface, you're not finished. All in all, it's a quick, easy process that's a *lot* faster than flattening an *oilstone*. After flattening, it's a good idea to create a small, 1/32" to 1/16" wide bevel on each edge of a *waterstone* to make it less susceptible to chipping and gouging. Just a few strokes of light pressure is all that's needed.

The sharpening begins

Don't make haste – make "paste"

Once your tones are properly flattened, you'll want to begin the process with a Coarse (250 to 800-grit) stone. When using a *waterstone*, it's important that you **not** wash off the paste that forms on the surface during use. Start with lots of water – just slosh it on with your hand or use a spray bottle – to begin the sharpening process. If you like, you can use a *Nagura Stone* to quickly create the initial paste to get you started. Otherwise, just start your sharpening process and, as the paste begins to gather into a thicker consistency, it will actually start to polish the edge, preparing it for the next step up to a finer grit stone.

Elbow grease replaces "the old grind"

Working with the Coarse stone – and a bit of *elbow grease* – can totally eliminate the need to power grind the nicks off the edge of a tool. Power grinding can be a very risky proposition for all but the most skilled sharpeners. Why? Because one little slip is all it takes to gouge an edge or remove its temper. The *waterstone*, on the other hand, does the job quite nicely and without fear of damage...although it takes a bit longer.

It helps to use a Honing Guide to maintain the exact bevel you want during the honing process (see Fig. 5). These Guides have a bearing roller on the underside, which rolls over the stone's surface during sharpening. The chisel or plane iron is then clamped between the adjustable side

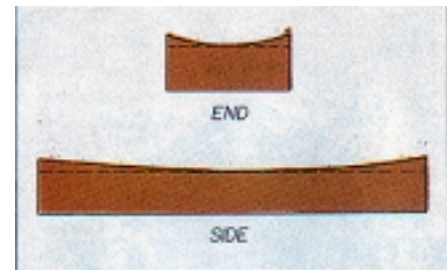


Fig. 3: All benchstones – whether oil or water lubricated – MUST be FLAT ! Check this prior to each use.

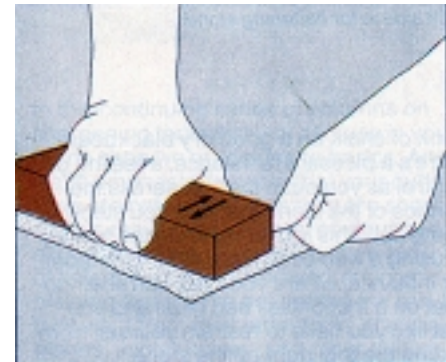


Fig. 4: Flattening a waterstone. Keep one hand positioned in the middle of the stone.

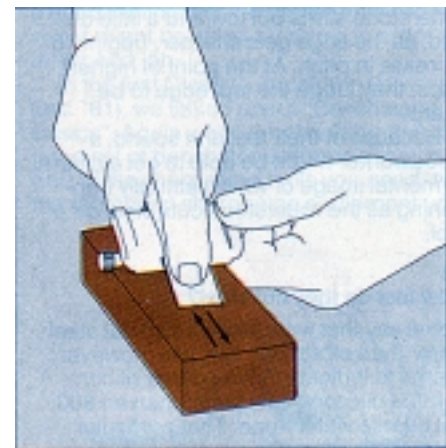
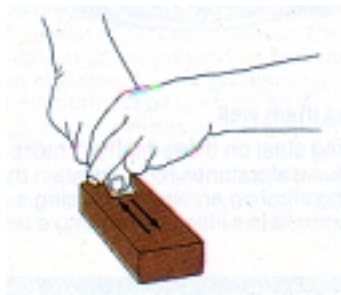


Fig. 5: A bevel-holding sharpening aid works well when removing large amounts of steel.

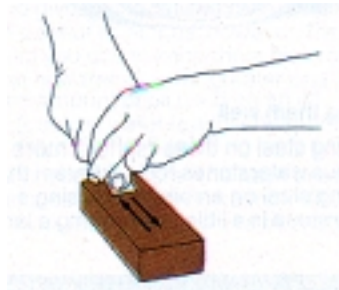
pieces, holding the edge at the proper angle to the stone's surface. Take long strokes, using as much of the full length of the stone as possible. If you're not using a Honing Guide, be sure to stop at the end of each stroke and "feel" for the exact same bevel angle before taking another stroke. Once you get the bevel to the angle you want...you can check this with a special Bevel Gauge...you may find that you no longer need the Honing Guide.

Oriental woodworkers squat or kneel on the floor when sharpening their tools. For many, this allows for greater leverage and better control. However, you can achieve excellent results with the stones at benchtop height, as well. The secret is to keep your body centered over the stone and your arms and elbows extended equally, applying equal pressure across the tool's edge.

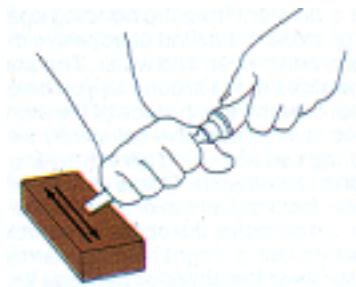
Hold the tool's cutting edge perpendicular to the stone's long edge...



or with the edge at a slight skew...



or with its edge *parallel* to the stone's long edge...



This last method is tricky. If you're not careful, you'll roll the tool's edge over into a less desirable, half-moon shape.

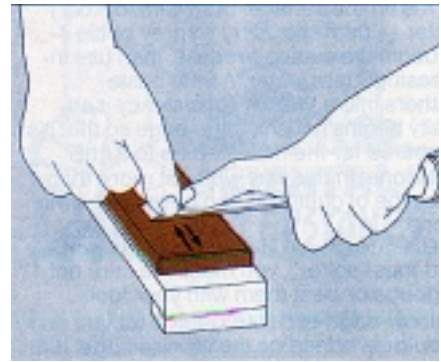


Fig 6: Remove the wire burr. Note position of fingers...keeping entire backside of tool firmly in contact with the stone at all times.

...and continues.

Wipe off your tool before moving to the 1200-grit stone. Use it in the same manner as the coarser stones, producing the best edge possible before moving on to the final polishing stone. This will take fewer strokes...*if* you have used the first stone correctly.

The final step is honing on the 6000 or 8000-grit stone to remove the *wire edge* or burr that the first two stones turned-up on the tool's backside. Just turn your tool over to remove it, maintaining good control by using downward pressure on your index finger to keep the tool's back in firm contact with the stone's surface while the fingers on your other hand grasp and guide the tool (see Fig. 6).

The final polishing stones will put a spectacular, mirror-like finish on the tool's bevel – the more brilliant the reflection, the sharper the tool. No final leather stropping is necessary after using these super-fine stones.

So, which should you own?

If you're just getting started and you need a set of benchstones, you can't go wrong with *waterstones*. If you already own a set of *oilstones*, the *waterstones* will increase your sharpening speed and capabilities.

In closing, *waterstones* wear a bit faster than *oilstones*...and you can't get *waterstones* in special shapes such as rounds, tapers, points and triangular shapes. However, many woodworkers believe that they're easier to use than *oilstones*...and once you learn to use them properly and to their fullest capability, a good set of *waterstones* will prove to be a fine investment, indeed!

Coming up in the March/April issue — PART FIVE – *Sharpening Jointer, Molder & Shaper Knives*