A SHARP IDEA

Diamond honing stones meet a clever jig, and presto. British tool maker M.Power thinks about sharpening so you don’t have to.

BY JOHN ENGLISH

A COUPLE OF YEARS AGO, a small British manufacturing company, M.Power Tools Ltd., decided to take advantage of the fact that diamond stones don’t change their shape during use. The founder, Toby Cardew, is a furniture builder and cabinetmaker, and he understood how intimidating the sharpening process could be, especially for new woodworkers. His idea was to make a very simple jig that held a blade in a fixed position while a diamond-coated sharpening stone was rubbed back and forth across it to create a bevel. Traditional stones would quickly wear away in such a setup, but diamond stones don’t. The resulting PSS1 (Precision Sharpening System 1) creates two bevels, a 25° primary and a 30° secondary.

A primary bevel is the large, main bevel on a tool that is usually formed on a grindstone. A secondary bevel is a small, thin bevel along the cutting edge that is normally formed by working it on a bench stone, using a jig to hold the tool at a specific angle. It’s a lot easier to sharpen a tool when only the secondary bevel needs a touch-up.

There are limits to the PSSI. It can only grind and hone flat blades (essentially, bench chisels and plane irons). And it only sharpens at two preset angles, so it’s difficult to use in
advanced applications such as adding a back bevel or changing a bevel to handle mortise work (perhaps up to 35°) or cut figured grain (down to 20° or so). However, it’s extraordinarily easy to use, very quick, doesn’t create a mess on the workbench, and meets most of the sharpening needs of the average woodworker. Plus, the whole system only costs about as much as a decent bench stone.

The stones
Among the handful of manufacturers offering diamonds in the woodshop, DMT (Diamond Machining Technology, Inc.) has been a leader for more than 30 years. Each PSS1 unit comes with two DMT-made monocrystalline diamond plates. These are a 220-grit prep stone and a finishing stone at 450 grit. These aren’t really stones in the normal sense. They are nickel plates with a coating of monocrystalline diamonds, housed in a plastic frame.

According to DMT, monocrystals are strong, single crystals, while polycrystalline diamonds are fragmented compounds that break apart and wear away easily with use. Sharpeners made with polycrystalline diamond, they say, will wear out and need replacement.

In addition to the two stones included with the PSS1, M.Power offers three other DMT stones as options, including a roughing stone (120 grit), a fine finishing stone (600 grit), and a super-fine finishing stone (1200 grit). For quick touch-ups on bench chisels and plane irons, the two included stones are ideal. If you’re looking for a mirror finish, the fine and super-fine stones, used in sequence, seem to deliver an edge that’s pretty close to the one I can achieve on my 6000-grit waterstones. (The grit numbers can be a bit confusing, as Japanese waterstones are measured on a different scale than American oilstones.)

In a shop test, the coarse 120-grit stone worked well to grind a new edge on a damaged chisel, although it took awhile. For a minute there, I was tempted to cheat and use the bench grinder, but then the angle wouldn’t have matched up properly when I moved on to the rest of the stones in the PSS1.

Instructions
M.Power’s included instructions are simple, sequential and very easy to follow. If the tool is dull or has lost its edge, insert the coarsest stone in the sled, place the tool to be sharpened on the bed and steady it against the fence. Then glide the carriage (sled) back and forth until the cutting edge has a bright line across the total width of the blade edge. Move up to the next grit and repeat the process.

The original PSS1 came with a diamond-impregnated plate that the tool or blade would sit on. The idea was that this plate would automatically remove the burr as the tool was removed from the jig. Feedback from woodworkers encouraged the company to remove this feature. It was apparently scratching the back of the tool. Now, M.Power suggests stropping the newly beveled edge to remove the burr.

If you’re new to sharpening, a burr is a minute raised area on the back of a freshly ground or honed blade. It can be felt with a finger. To remove it, touch the tool gently against a leather strop or a cotton buffing wheel that has been charged with a fine grinding compound. Be careful not to overdo the stropping, as you can quickly dull a newly sharpened edge. When a burr forms across the
entire width of the back or underside of a tool, it means that you are ready to move on to a finer stone.

**A detailed look**

Two of the greatest advantages of the PSS1 are setup and safety. To get ready to sharpen, one only has to slip the right stone into the jig (where it’s held in place with magnets), and select the desired angle of 25° or 30°. With no motor or spinning grindstone, the jig is extremely safe to use, which makes it an ideal choice for shop class in middle and high schools.

The grind is flat. That is to say, it’s not a hollow grind as is delivered by a bench grinder. There is no arc to it. For some chisels (Japanese), this may be a disadvantage, but for most situations it is inconsequential. The jig handles square-edge chisels and plane irons from ¼” (3mm) to 2½” (64mm) wide, although with very wide chisels I found it a little difficult to guide the sled as it emerged quite a distance from each end of the base.

The PSS1 is machined from a solid block of aluminum and wears an anodized coat. The sled runs on Nylon 66 slip rails that deliver very smooth action. Nylon 66 Polymer is a DuPont invention from the 1930s. According to DuPont, it’s “a polyamide made from adipic acid and hexa-methylene-diamine by polycondensation,” and I’m certainly not going to argue that. The resulting polymer was the first of the “miracle” yarns made entirely from chemical ingredients through the process of polymerization. Long-wearing and self-lubricating, it’s an ideal choice for this application.

The nature of the jig is a rather large advantage. While almost every other application on the market moves the tool across a stationary or revolving stone, the PSS1 holds the tool in one position. That means that the beveled edge is always ground at a precise 90° to the long sides of the cutter, which is a very desirable feature when one is chopping hinge mortises, cleaning out
corners in joinery and so on. Another nice feature is repeatability. A tool being brought back to the PSS1 is placed in the jig at exactly the same location as it was previously. Because diamond doesn't wear, the new bevel will be a replica of the previous one. The advantage here is that, after the initial sharpening, all subsequent ones only take a few seconds as the established bevel is just being touched up.

**Final notes**

Despite its apparent simplicity, I discovered that it takes a little practice to get the hang of the PSS1. There is a small amount of intentional play designed into the action, and one's stance and handhold both have a lot to do with minimizing the effect of this slight sloppiness. After the second or third chisel, it doesn't seem to be an issue anymore. The body learns quickly how to adapt. The instructions say: “There is a small amount of float between the Carriage and Base. Take up this float by moving the Carriage away from the tool.” What that means is that one should push the sled away from the handle of the chisel as it slides across the base.

On very narrow chisels (under \( \frac{1}{2} \)"), it can be difficult to hold the tool firmly against the fence, especially with large fingers. The sled wants to catch it every now and then and move it a hair. I found that a small block of wood can help. On very wide blades, a bench grinder isn't out of the question as a first step to save some time on an initial sharpening. If you go that route, set the bevel for about 23° or 24°, and that will leave less to remove on the jig. After the first sharpening, even wide chisels are honed in a few strokes.

I would highly recommend using a plate glass lapping plate with wet/dry paper attached to it with a spray adhesive to flatten the backs of all tools and knives before using the PSS1 to address the fronts. If the back isn't flat, the cutting edge will never be truly uniform. A cutting edge is actually the intersection of two planes, and if one of them is pitted or damaged, fixing the other won't help a lot.

The company recommends using a light oil as a lubricant for the sled, and they also say to use the diamond stones dry. However, I found that a few drops of water work wonders on the diamond plates, to flush debris aside, so the crystals can do their job. Cleaning up after each use with a soft, damp cloth is a good idea, too. It's actually quite startling to look through a magnifying glass at the amount of metal removed, especially with the more aggressive stones. Residue on the plates can be removed with a pencil eraser after the tool is completely dry.

The DMT-M.Power Precision Sharpening System retails for around $80 and it is available from a number of online retailers, including Woodcraft Supply (item #146411).

— John English is a contributing editor to Woodcraft Magazine.
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