

Grinding and Shaping Molding Plane Irons

By Bill Anderson



For shaping and blocking out profiles on molding plane irons, I use both grinding wheels and files. The grinding wheels work well with irons that have been hardened and tempered. The files are not quite as efficient with tempered irons, the metal being just almost too hard to file, but work very well with annealed (soft) irons. Once the profile is shaped by one of these manners, I will hone using slipstones.

Grinders

I have both 8" slow speed (1725 rpm) and 6" regular speed (3450 rpm) grinders. The surface feet/minute for these two configurations is about the same. I often take wheels from the 8" grinder and transfer them to the 6" grinder when they have been worn down far enough.

I have two 8" speed grinders. One is reserved for 1" wide stones and I use this for flat, straight grinding of irons and for outside curves. The other grinder has a metal cut-off wheel on one side and a ½" ruby wheel on the other side. Both of these wheels are shaped with a diamond shaping stone to have a rounded profile. I use these wheels for shaping inside curves.

I have one 6" grinder which is fitted with a 1" wide wheel (originally of my 8" grinder) and a ¼" wide wheel. The narrow wheel is profiled round, and the other is left flat.

All of my grinders are fitted with Veritas tool rests (www.leevalley.com, product number 05M23.01). I have fitted each of these rests with an auxiliary wooden platform which wraps around the wheel so that I can work the sides of irons as well as the cutting edges.

The stones that I use are fairly coarse, generally 46-60 grit. Finer wheels are counterproductive in that the risk of overheating the tool is too high. Look for wheels with hardness J or K, as these are generally considered best for woodworking tools. The narrower wheels need shims for both the arbor holes and for spacing along the grinder shaft. The arbor hole shims are readily available and usually a set comes with any wheel you may purchase. Spacing shims for the narrower wheels can sometimes be assembled from metal washers, but I often drill wooden shims to the correct arbor diameter, and then turn them to a reasonable diameter. Sometimes I need to have several shims on each side of the stone for the very narrow stones.

The stones that I most often use are the following:

1. Norton 3X, 8 X1 X 1, 46 grit, K hardness, blue ceramic alumina (SG) (www.nortonabrasives.com). Woodcraft sells these in their stores.
2. Norton 6 X ¼ X ½, 46 grit, aluminum oxide (www.toolsforworkingwood.com)
3. Grinding Wheel Warehouse, 8 X ½ X1 ¼, 46 grit, J/K hardness, aluminum oxide (ruby grain wheel), (www.grindingwheelwarehouse.com). You have to purchase a minimum of 5 wheels at a time.
4. Metal cutting abrasive wheels, 7-8" diameter, thicknesses: 0.045", 3/32", 1/8", 5/8-7/8" arbor. Available at most big box stores.

It is important to keep the grinding stones well dressed. I very frequently run a diamond dressing stone across the surface. This will markedly improve the cutting action of the stone.

The only time I actually lay the iron directly on the tool rest for shaping is when I am blocking out the profile. First I will paint the iron face with red machinist's fluid, mount the iron in the plane proud of the sole, and then scribe the profile onto the painted face using an awl. I set the tool rest square to the stone and grind the edge blunt and square to the face of the iron.

When rough shaping the bevel of the iron (prior to or after heat treating), I generally hold the iron equally with the thumbs and 3 fingers of both hands, using the little fingers to rest on the tool rest to give me a frame of reference. This allows me to tilt and roll the iron to shape the bevel organically. I frequently cool the iron as I develop the bevel to hear the cutting edge.

Files

There is any number of good sources for files: McMaster Carr (www.mcmastercarr.com), MSC Direct (www.mscdirect.com), Enco (www.use-enco.com) and Grainger Supply (www.grainger.com). Most files are made in Mexico or India these days and the quality of these files can be rough. For this reason, I often look for American made files listed on Ebay or other equivalent sites.

There are two types of file tooth patterns: single cut and double cut. The doublecut files have teeth shaped in two directions for a heavier stock removal. There are two general types of coarseness: American Pattern and Swiss Pattern. American files come in three grades of coarseness: bastard, second cut and smooth cut. Swiss pattern files come in 7 grades from 00 to 6 (finest). In general, the Swiss pattern files are finer and for more precise work. For the shaping of molding plane irons, 00 grade of coarseness is just right.

The files I use are generally of four types. The files all come in a range of lengths from 4" to 16" or so. I like to use tapered files so that I can choose the level of filing action as I go along.

1. Square tapered. I use these files to work fillets and other square corners. I generally grind one face free of teeth to generate a safe edge. Files about 8-10" long with a maximum cross section of 1/4" are most useful.
2. Round tapered. I have several diameters of these files, which I use to shape sharp inside curves such as beads.
3. Flat tapered. These files are very useful for outside curves. I generally use a 6" long file for this purpose. I also grind off the teeth from the long edges so that the file is safe on these edges.
4. Half round tapered. I use the Swiss Pattern style here which comes to a tapered point. The 00 coarseness is the most effective. I use these files for larger inside curves such as ogees.

When I am filing molding plane irons, I generally clamp the tang in the vise jaws, with the flag hooked over one end of the jaws. This gives about a 30 degree angle for filing. However, the flag is unsupported and the pressure from filing can bend the junction between the flag and the tang. I am now using a small right angle block of wood (30-60-90 degrees) with a rare earth magnet embedded in the base. This allows me to clamp the tang in the middle of the vise jaws, and slide the magnetic block under the flag for support. The block of wood needs to be narrower than the flag itself, thus I have made a variety of widths of these devices.

I find that filing a cutting edge is often easier than trying to grind it. When you grind, you are not looking at the surface you are working, but when you file, you are looking at what you are shaping. After an iron is tempered or the profile rough shaped, I will rough grind the bevel to close to what I want to remove most of the waste. I will then paint the blunt edge of the iron with red machinist's fluid and file the bevel down to just shy of the sharp edge using a skewed slicing action with the file.