



Source, Select, Use & Manipulate Saw Files to Maximize Your Saw's Performance

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By

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Have you ever snuck an eBay package into your workshop late at night containing a box of saw sharpening taper files, glad you were able to snap them up new? You cut them out of the plastic bag, and unwrap them fresh out of the vapor corrosion inhibitor paper where they have been carefully interleave-wrapped one by one, and lay them out on your workbench, marveling at their crisp teeth and uniform taper. You then gird your loins, resolved to sharpen your own saw for the first time, attach a handle to one of them, and thus armed, joint a row of flats on your 26" Disston No. 12 Handsaw with a fresh mill file. Aligning your light and donning safety goggles, you then take an initial stroke of many that will follow, intent on bringing that toothline back into perfect symmetry.



And another stroke, followed by another. You squint through your goggles impatiently, wondering if you're actually abrading metal or just going through the motions. It seems you're having to really make that file bite into your toothline to get it going. And then halfway down the toothline you realize the bitter truth: the name on the box may denote a time-honored company, but the reality is you've worn out the file before you could even finish the first pass. Holding your file up to the light, you see that the corner edge looks shiny and slick, and now you're mad. Really mad! Spent \$80 bucks for a box of files that are only good for the recycling bin. Disgusted, you resolve to ship your saw to one of the saw docs servicing the hand tool industry for a restoration job you really wanted to do on your own.

Welcome to my world. It didn't take long to figure out that the only truly decent files around made by Simonds, Johnson, Nicholson and Oberg are the ones you see on eBay with the raggedy, tattered boxes on the outside. In other words—you want the files made before companies began farming the work out to China in recent years with no quality control in place. It's not so much they're made in China—it's failure of the producer to effect quality control for



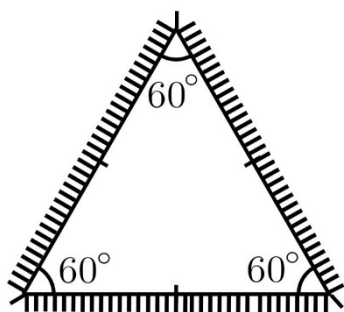
the guy at the switch. Those beat-up old boxes may look ugly on the outside, but there's

actually gold on the inside--because those new old stock files made in the US *before* NAFTA are hardened and tempered significantly better than much of the trash manufactured offshore today.

I've been sharpening saws at Bad Axe and SawSharp for almost 20 years now, and new old stock files were our lifeblood at Bad since Day 1. The rule of thumb was, '*the rattier the box, the better the file.*' So ever since I began making Bad Axe saws in 2009, I snapped up every new old stock file I encountered and grimaced when supplies dwindled on eBay and flea markets, and prices escalated.

But availability is always finite when something is no longer made or manufactured to the quality desired. First to go were the 4" xx-slim files, the default dovetail saw file of choice. You just don't see new old stock for this category anymore on eBay, period. Then the 5 xx-slim file, great for carcase saw work, dried up. You can still find 6 xx-slim for your tenon and miter saws, but even that size is noticeably dwindling.

There are reputable European file makers still around from whom one may source files: [Friederich Dick from Germany](#) (distributed in the US by Bad Axe and in Europe by Dictum), [Corradi Files](#) from Italy, Vallorbe from Switzerland (distributed in North America by Lee Valley Tools), and Bahco—a Swedish firm making files in Portugal also distributed in North America by Lee Valley Tools. Corradi and Friedrich Dick are my personal favorites, and they have yet to let me down.



What many people may not realize is the impact having a needle file in your arsenal can have on your finer-toothed saws in the 14-pitch and finer ppi counts. Friedrich Dick, Corradi and Vallorbe make them in three-square format. Needle files are nearly three times as expensive as a regular saw file, but they'll give you a

deeper gullet and longer cutting edge, and last twice as long for dovetail and carcase saw work. I can use a needle file for up to six separate sharpenings before the file wears out.

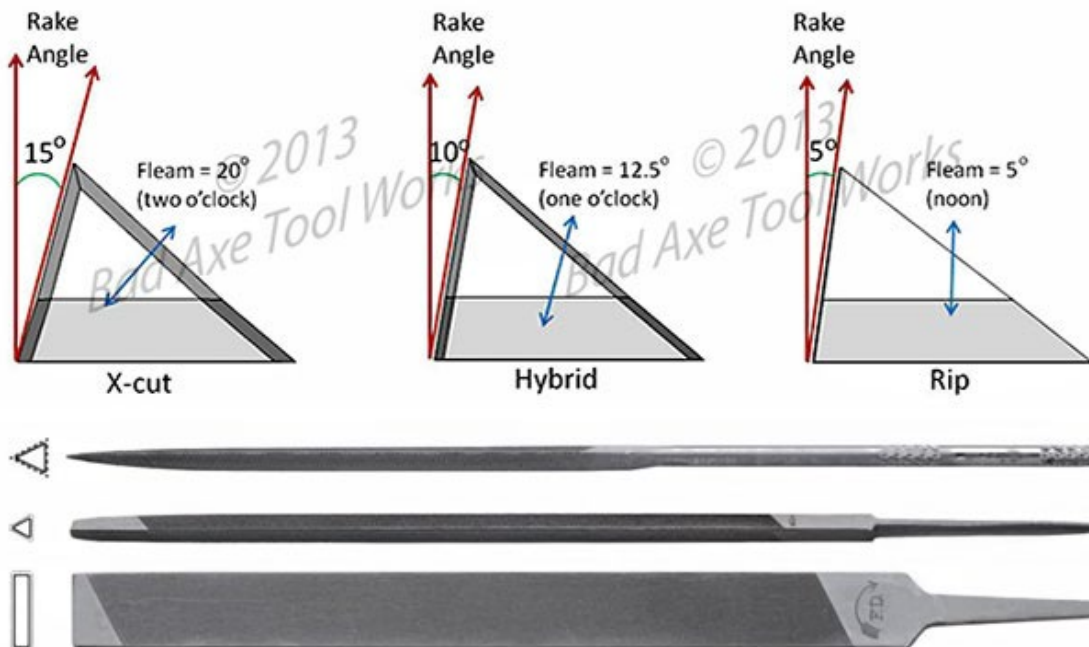
Which brings us now to the file size table you see at the right of this page, which identifies a file type and size per ppi.

Traditional saw filers have long held to the convention that 4 xx-slim is ideal for filing 14 ppi and finer, due to its diminutive cross-section for a diminutive tooth size. And it still applies.

What follows is how I integrate needle files with standard saw taper file sizes to get the kind of result that works best for how I sharpen all saws.

PPI	Size File
16 - 17	140mm needle
15	160mm needle
14	200mm needle
13	4" xx-slim
12	5" xx-slim
10 - 11	6" xx-slim
9	6" x-slim
7 - 8	8" x-slim
5 1/2 - 6	8" slim
4 - 5	8" reg
Jointing	10" Mill File
Deburring	Chainsaw File

A word first about sawtooth terminology and saw sharpening taper file sizing



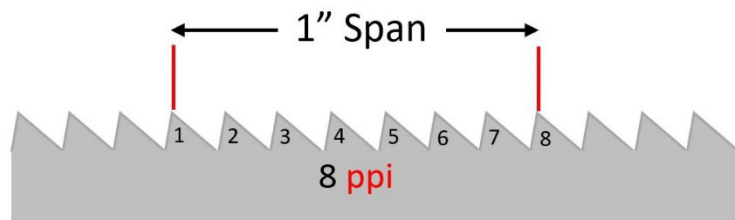
conventions: Generally speaking, you want to present a little more than twice the face of a file in comparison to the size of a given tooth. This lets you use the file a minimum of three times

for three saw filings without wearing the file out by overlapping a given sharpening into an area along the face already used. This is really the bottom line when it comes to file selection. Do disabuse yourself of the notion that all saw file manufacturers follow a sizing standard. They just don't.

That said, there exists nonetheless a degree of flexibility as long as you don't reduce a tooth into little nubbins by using too large of a file's cross section. Let's address terminology first:

Terminology:

- PPI vs. TPI: Points per inch (ppi) is measured by how many points are bracketed by inch-long increments of

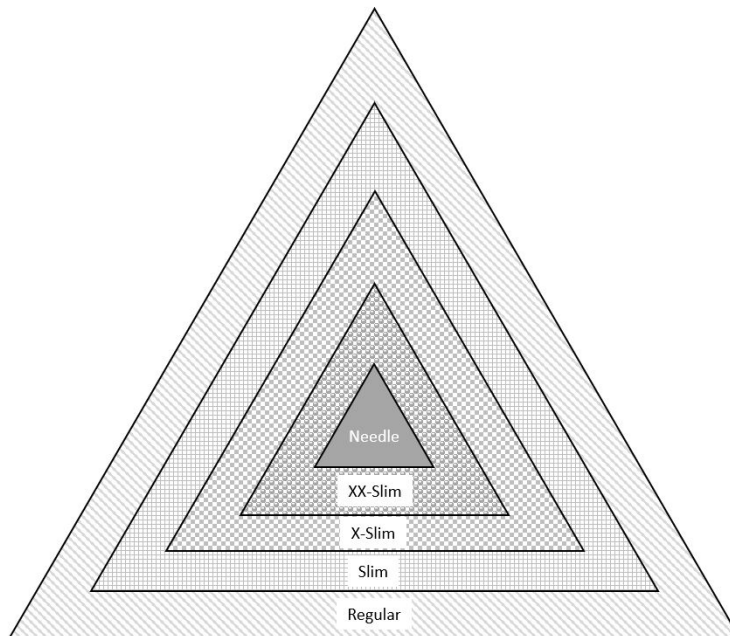


a ruler, beginning with the first point at the increment, and concluding with the last point of the next increment. Teeth per inch (tpi), is counted one less point, with the count beginning at the second point as 'one,' then moving forward till the last point hits the next increment. For instance, an 8 ppi handsaw is considered 7 tpi. Sawmakers prefer to use the ppi method when denoting pitch.

- Pitch: aka for points per inch, or ppi.
- Cross-section: The cross section of a file is a 60-degree equilateral triangle, just like a saw tooth.

- **Taper:** A saw sharpening file is referred to as a taper file; that is, it tapers from the tip to the tang, broadening in cross section along the way. This enables the sharpener to hit

two adjacent tooth edges per gullet.



Sizing Conventions:

- All saw taper files are designated by length and cross-section. Length is generally graduated in inch-long increments, starting at 4" files, then graduating to 5", 6", 7" and 8". Cross section sizing begins at double-extra slim—xx-slim for short—then goes to x-slim (broader in cross-section), slim (broader still), and regular for the coarsest teeth.
- For example, one of the smallest files you can use for dovetail and carcass work is a 4" double-extra slim, or 4" xx-slim for short. This means it's a diminutive file for 13-15 ppi toothline (although I prefer to use needle files for that purpose), and has a small cross-section.
- Personal Preference: Though I could use a 4" -slim with a correspondingly broader cross-section for 12 ppi, I prefer to use 5" xx-slim, since the extra length gives us the broader cross-section I seek. I also prefer using the xx-slim cross-section for a 6" file, which hits the 10-11 ppi range quite effectively, followed by a 6" x-slim for 9 ppi and so on.

Recommended file sizes by type and utility: With that in mind, I use needle files for all—ALL—dovetail and carcass saw work, ranging from 14 ppi. Three different sizes of needle file apply: 140mm for 16-17 ppi saws, 160mm for 15-16 ppi, and 200mm for our 14-15 ppi toothlines. Alternatively, I could use a 4" xx-slim file for all of these saws, and it will work, but I find that the needle file simply gives me a longer cutting edge where the thin plates of these saws truly excel for furniture-grade cuts in quality hardwoods.

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16 - 17	140mm needle
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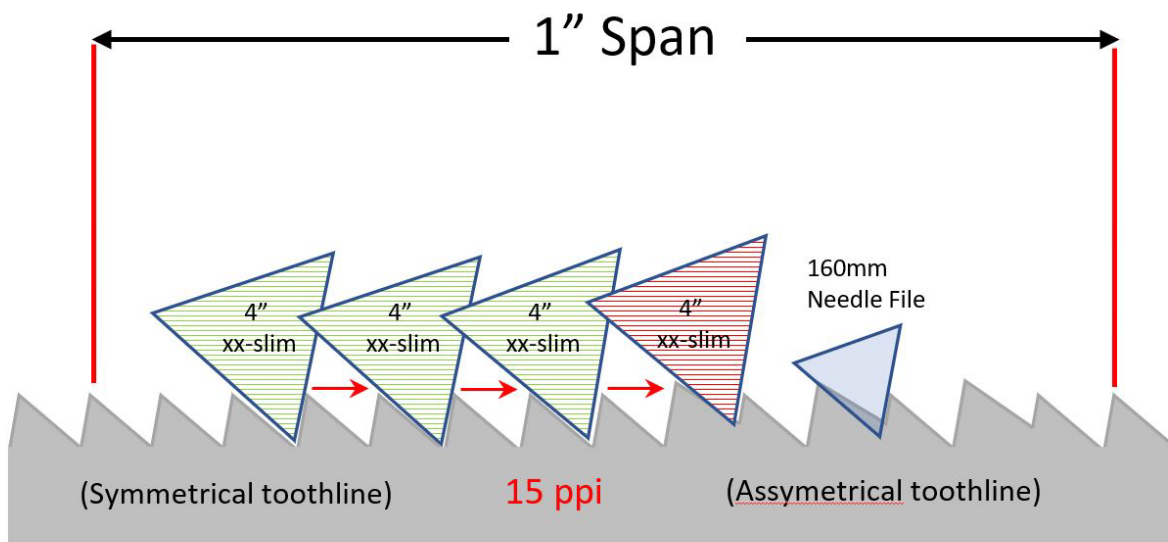
Let's now move into the more conventional saw taper files for coarser-toothed carcass saws and tenon saws, such as what you see with our 14", 16" and 18" tenon saws and our 20" miter saw. 4" xx-slim is not too fine to handle 13 ppi—again giving one a deeper gullet with longer cutting edge. 5 xx-slim works great for 12 ppi, where I file the majority of tenon saws. 6 xx-slim works fine for larger 18" tenon saws and vintage miter saws & panel saws frequently filed at 10 – 11 ppi.

As we progress into the world of panel saws, a 6" x-slim or 7" xx-slim works out perfectly for pitches at 9 ppi. Graduating to 8" x-slim fines a good fit for handsaws filed 8 ppi, and 8" slim for 7 ppi kerfing planes and rip filings at that pitch. 8" slim completes the hand and panel saw realm for 5 ½ ppi and 6 ppi. The largest file I use at 8" regular addresses 4 and 5 ppi, pitches best reserved for coarse ripping handsaws and frame saws.

Exceptions to the 'rules:' Notice again that I prefer to use a 200mm needle file for 14 ppi filings, a 160mm file for 15 ppi filings, and 140mm for 17 ppi and finer filings. That is my preference. One can just as easily use a 5" xx-slim file for 14 ppi and 4" xx-slim for 15 ppi and finer. Your teeth will be a little nubbier, but perfectly serviceable. I simply prefer using the needle file

approach for the finer pitches, because it gives me a deeper gullet and longer cutting edge for our dovetail and carcass saws with correspondingly thinner plates. That said, needle files are almost twice more expensive than traditional saw taper files, and so that is why 4 xx-slim and 5 xx-slim remain a viable and less expensive solution for dovetail and carcass saws.

Likewise, one can 'size-up' or 'size-down' for reasonable results. For instance, let's say you have a 10 ppi tenon saw. While a 6" xx-slim is a tad small in cross-section for this pitch, you may find yourself (living in a shotgun shack) wanting to size down to deepen the gullets of a vintage saw where the last sawfiler has clumsily filed a big-tooth/little-tooth pattern, and the gullets are very asymmetrical; you now seek to deepen the gullets as much as possible. Even though the 'correct' file size for this pitch is 6" x-slim, the 6" xx-slim is a better file to use given your asymmetrical gullets dilemma. The tradeoff is you'll wear it out faster than the 6" x-slim. Conversely, you may have a scenario where your toothline is completely overset, a common scenario when picking up saws off eBay. Say you have a 6 ppi handsaw where a 8" slim file will optimize the toothline, but because the teeth are overset, you want to hog off more metal so



A needle file will carve a deeper gullet without overwhelming the adjacent tooth when encountering 'big-tooth, little-tooth' patterns. One can use the same principle by switching file size by switching file size for coarser tooth patterns as well.

you can reduce that set. In this scenario, I'd use an 8" regular file to knock the teeth down, then

re-file it with an 8" slim file, re-set the teeth appropriately, then brush it up once more with the 8" slim file. See how that works?

These deliberate file choice considerations stepping up or stepping down have a direct correlation to how much set you want to keep or reduce given the scenario with the saw you have purchased or inherited.

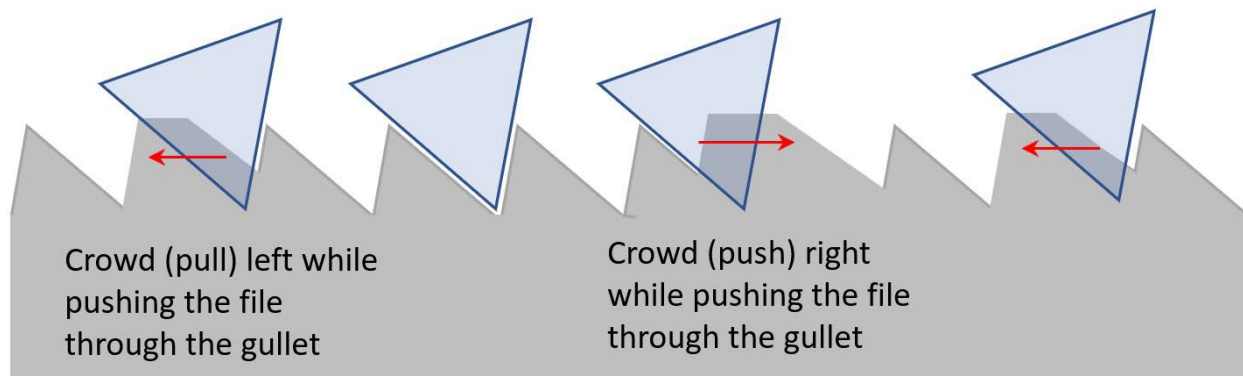
Jointing & Deburring: Bad Axe offers Friedrich Dick's 10" mill file, and excellent choice for jointing sharpening flats along the toothline before sharpening the saw. Think of the jointing file



as a long jointing plane--the long plane of the file establishes one's visual queue for sharpening by creating a flat on the tooth. Once you've sharpened off the flat (and no more!), then your tooth will be in jointing alignment with all other teeth, such that all teeth cut in unison. A chainsaw file is useful for deburring a sharp edge along the non-toothline perimeter of one's saw by drawing it backwards against the burr. This is common when one shears metal when shortening a saw due to a severe kink at the toe, or for widening an offset fastener through-hole in the plate when transplanting a handle.

Crowding your Teeth: Oftentimes, a smaller file is useful when 'crowding teeth;' that is to say shaving away more metal on a larger tooth with a broader sharpening flat adjacent to a tooth with little to no jointing flat. This phenomenon is commonly experienced deep into the sharpening process when you have sharpened 90% of a toothline to joint yet have a remaining—and sometimes large—flat on a tooth next to another tooth sharpened to a point already. The solution? One pushes (or pulls) the sharpening file narrower in cross section laterally toward the larger tooth while pushing the file through the gullet both teeth share as the graphic illustrates below:

Crowding the Toothline



Carve away more material from the larger teeth by deliberately selecting a smaller file and pushing (or pulling) the file in a lateral fashion while pushing it through the gullet--this is known as 'crowding.'

As you can see, the file size you'd normally use for a given pitch with this issue will overwhelm the tooth already sharpened, so size your file down. Observe the illustration above depicting a toothline at 10 points per inch, which you'd normally use a 6" slim file. For crowding the larger teeth, use a 6" xx-slim file, and don't hesitate to reach for your 5" xx-slim file to deepen and even out the gullet depths.

Safety Considerations:



Always remember that sawfiling kicks up a lot of dust, and we're not talking about your garden-variety wood dust, which can send you into sneezing fits. No, we're talking metal dust here, and that's some nasty stuff. Think about it: metal dust is actually metal shrapnel under the magnifying glass, and though it may seem innocuous while floating in

the air, it's not. Just consider what it can do deep in the alveoli of your lungs if you're wearing a dust mask, or how it would interact with your corneas when you wake up in the morning unshowered after a sawfiling session and you're knuckling the sleep out of your eyes.

So be safe. Wear a dust mask and eye protection when you're sawfiling. I like keeping a cordless vacuum handy to suck up all the metal dust particulate before, during and after a sawfiling session. Metal filing dust is dangerous stuff, and you'll definitely want to keep it out of your eyes, nose and mouth.

Safety when mounting handles: Saw files are brittle and pointy. Don't get in a rush and mindlessly push a handle on to a file's tang by leaning into it—you might well stab your hand, or your hip, depending on your body English!





You are far better served safety-wise by securing your file handle up in a vise, then tapping the handle onto the tang with a light mallet.

If you're screwing on a Skrooz-On handle (has hardened threads to cut into the file's tang onto the tang of a file, you're still best served by securing it upside down in a vise so you can bear

down on the tang with the handle without putting yourself in jeopardy.

Think about it: if you're bracing the tip of the file against an immovable object and pushing the handle into the tang, what would happen if you get too gung-ho and the file snaps? Where does that sharp metal go? Into your hand, right? Of, depending on how you're leaning your body into the tang, somewhere you don't want that file to be. Exercise good sense here too.



One final note about handling a file: sometimes a handle has just a smidge too large of a bore to securely fasten the tang of your file. A couple of wraps with masking tape around the tang

will make up the difference and get your handle on securely.



In closing, don't hesitate to reach for a smaller file to accomplish a deeper gullet, finesse a deeper gullet, or to crowd a larger tooth into symmetry with adjacent teeth. If a toothline is overset, don't hesitate to reach for a larger file to

hog off more material, then switch to a narrower file more appropriate to the pitch. Conversely, if all you're doing is brush-sharpening a toothline that is already symmetrical, then apply a very light touch with the file appropriate to the pitch. Remember always the proper mindset for sharpening a saw is not the same as sharpening a plane iron; in other words, don't be an unthinking robot grinding away. Each pair of teeth your file affects has its own issues. Knowing how to switch back and forth between file sizes as the situation dictates is a deliberate choice that can and should be implemented as the situation dictates.

