As much as we might like to believe that our various woodworking machines can produce perfect joinery every time, we’d be kidding ourselves. The truth is that accurate joinery often depends on precision to within several thousandths of an inch—a challenge under the best circumstances. That’s one of the reasons planes and other hand tools are still around; they can fine-tune machine-cut joinery for a perfect fit.

When it comes to correcting ill-fitting tenons, rabbets, dadoes, and other flat-faced joints, it’s hard to beat a well-tuned shoulder plane. This open-sided tool, with its full-width blade, is named after its ability to trim tenon shoulders and make rabbets. (See “What’s in a Name?” at right). Despite the moniker, shoulder planes are handy for a whole host of high-precision tasks, which I’ll share with you in this article.

There are plenty of new and used shoulder planes available in various widths, lengths, and configurations. A good starter choice is a ¾”-wide plane, which will probably handle most of your needs. But regardless of the size plane you get, once you start using it, you’ll find yourself reaching for it a lot during the course of building projects.
Built to trim into corners

A shoulder plane is basically a narrow plane with a blade that is the full width of the body. Because the sides of the plane are open, the blade can reach into corners, allowing the trimming of tenon shoulders and cheeks, as well as the edges of rabbets and dadoes. In fact, it can fully create rabbets, dadoes, and grooves from scratch.

The blade on a typical factory-made shoulder plane is designed to work in a bevel-up configuration, with the body of the blade bedded at a 15° to 20° angle. This bedding angle, coupled with a 25° blade bevel, adds up to a 40°-45° cutting angle. Models with lower cutting angles are ideal for end-grain planing, although they usually handle face-grain trimming with equal aplomb.

Many shoulder planes include a removable toe (the section of the body in front of the blade) that enables them to pull double-duty as a chisel plane, allowing the blade to reach all the way into a corner. Removing the toe on some shoulder planes can be a hassle, but it’s a good option if you don’t own a dedicated chisel plane.

Tuning and sharpening

Shoulder planes are highly specialized tools and must be precisely machined and properly tuned in order to work accurately. As with any hand plane, the sole should be dead flat, but with a shoulder plane, it’s also important that both sides are parallel to each other and perfectly perpendicular to the sole. When shopping for a new or used shoulder plane, make sure to check the body with a machinist’s square. If it’s out of square by more than a couple thousandths of an inch, keep looking. (This is reason enough to return a new tool to the manufacturer.)

An error of less than about .002” can often be corrected by sanding the sole. Attach sandpaper (I usually start with 100 grit) to a granite surface plate, and clamp a square, straight wooden fence to the plate. Hold the plane against

Tip Alert

An automotive feeler gauge and a dial caliper will allow you to take precise measurements when gauging joints and tuning planes.

When “Tiny” Matters

You might think that working to thousandths of an inch is the purview of a machinist, not a woodworker. But when creating joints (and tuning hand planes), it can matter a lot. See for yourself: create a perfectly fitting mortise-and-tenon joint that slips together with moderate hand pressure. Then cut away about .004” (the thickness of a dollar bill) and refit the joint. You’ll find that it’s now sloppy, and you’ve just compromised its strength, even when glued up.
the fence with the blade retracted, and rub it on the sandpaper. If the plane is fairly close to square, it shouldn’t take long to bring it up to snuff, working through successively finer grits to 220 grit.

**Tip Alert**

When truing the sole of a plane against sandpaper, first draw felt-tip marker lines across the sole to help you gauge your sanding progress.

An Eclipse-style honing guide works well to ensure that the cutting edge remains square to the sides of the blade when sharpening.

The next item of concern is the blade. Most importantly, its beveled end needs to be dead square to the sides of the plane body. Check it by placing a small machinist’s square against the sides of the blade, first making sure that the sides of the blade are parallel. If the end of the blade is out of square, it can be corrected during the sharpening process. Although thicker blades can safely be ground, and then honed, some vintage plane blades are so thin they’ll overheat quickly at a grinder, drawing their temper. I usually sharpen thin blades simply by honing them with waterstones through 8000 grit.

I typically use an “Eclipse” style honing jig (Woodcraft #03A21), clamping the narrow shank of the blade in the way that chisels are normally held, (Photo A).

**Adjusting the blade and mouth**

To cut properly, a shoulder plane blade must project the right amount from the side of the body as well as from the bottom of the sole. While common sense might indicate that the side of the blade should be set flush to the side of the plane body, cutting geometry dictates otherwise. As shown in **Figure 2**, a blade that’s set flush with the body will create a tapered cut, especially when making deep rabbets and dadoes from scratch. In order to cut a square-sided shoulder, the side of the blade must project by about .004 inches. Therefore, if both sides of a shoulder plane are to be used without readjustment, the blade should be about .008” wider than the body, as is the case with many vintage planes.

Unfortunately, the blades on many older planes have been ground down to match the body width. And, surprisingly, the...
blades on many new planes come the same way. This shortcoming can be corrected by adjusting the blade to project from whichever side is being used as a reference for a particular job. To make the adjustment, lay the plane on its side spanning a couple pieces of paper on a flat surface. Then push the blade down with your fingernail, and tighten the blade clamping mechanism (Photo B). The downside of this approach is that the blade must be shifted to the other side when you need to use the opposite side of the plane as a reference.

To set the blade projection from the sole, use the blade depth adjustment screw. For most joint-trimming purposes, you’ll want a cut of no more than .002”-.003” (test it on scrap). When hogging out a rabbet or dado, you can set it for as heavy a cut as possible without suffering clogging or blade chatter.

The mouth opening, which is locked in place by the toe-locking screw, should be adjusted to suit the depth of cut. As with a smoothing plane, close the mouth as much as possible to minimize tear-out without clogging the opening. Keep in mind that some shoulder planes just have a tendency to clog, especially when cutting across the grain. This isn’t a defect; it’s just the nature of the beast. Simply clear the throat manually when the occasion arises.

**Shaving tenons**

Before the advent of power tools, tenons were hand-sawn, and their shoulders almost always required some cleanup to achieve a tight-fitting joint. Although there’s a good chance you’re making your tenons on a tablesaw or router, misalignment can still creep into your setup. That’s where the shoulder plane comes into play.

When laying out tenons, I use a marking knife to lay out the shoulders. I then cut them on the tablesaw a hair shy of the knife line. After sawing the cheeks, I place my workpiece on a bench hook, butting the tenon shoulder against the bench hook fence to prevent tear-out at the end of the cut. A couple light passes with the shoulder plane is all it takes to shave perfectly to the knife line as shown in Photo C.

Fat tenon cheeks can also be trimmed with a shoulder plane, although it’s a bit trickier. Because there is little frame of reference, you have to take care to cut parallel to the tenon cheek to prevent tapering it. With your plane adjusted for a very light pass, start the cut with the toe...
Firmly register on the tenon surface (Photo D). Then carefully push it forward while keeping it level with the surface. If the tenon is longer than the width of the plane, start at the shoulder and take overlapping passes until you reach the end of the tenon. When trimming cheeks, always take very light passes, frequently checking the fit of the tenon in the mortise to avoid removing too much material.

While at the bench hook with plane in hand, I like to put a small chamfer on the tenon ends, as shown in Photo E. The chamfer eases assembly and helps to prevent pushing all the glue to the bottom of the mortise during glue-up.

**Fine-tuning rabbets and dados**

Another ideal use for a shoulder plane is fine-tuning machine-made rabbets, dadoses, and grooves. It’s often quicker and easier to widen or deepen a joint with a couple of planing passes than it is to reconfigure your machine setup. To widen a joint (or create a new one), you need a way to guide the plane to your cutline. Although shoulder planes don’t include an integral fence, it’s easy to set up a wooden straightedge on your workpiece.

To cut a rabbet, I first lay out the joint lines with a knife or marking gauge. (A knifed shoulder line helps prevent cross-grain tear-out.) I then clamp a stout straightedge flush to the scribed shoulder line, and plane to my depth line, as shown in Photo F. To prevent exit tear-out, clamp a piece of scrap to the workpiece at the trailing end of the cut.

You can also correct mismatched rabbets with a shoulder plane by removing the toe and employing the tool as a chisel plane. After flushing up the corner (Photo G), the toe can be reinstalled and the rabbet faired, using the plane in the conventional fashion.

To widen or deepen a dado, or to simply clean up a ragged joint bottom, a shoulder plane can be pressed into service, providing it’s narrow enough to fit within the joint. To ensure an even depth of cut, scribe depth lines on both sides of the board and check the depth frequently while planing to prevent overcutting or undercutting. To avoid tear-out at the ends of the cut, start from each end of the joint, working your way to the center.

**Tweaking tongue-and-groove joints**

Most of my cabinets are fitted with tongue-and-groove backboards. If you’ve ever machined a batch of T&G joints and found the fit a little too
snug, it’s a simple matter to tweak the joints with a shoulder plane. If the tongues and their mating grooves are perfectly centered on your boards, clamp the boards on a bench and take a thin, continuous shaving from one side of a tongue, as shown in Photo H. Then flip the board end for end and take a second cut from the other side. Test the fit in a groove, and repeat if necessary.

**Flushing up moldings**

Despite care when aligning applied moldings on cabinets, it’s not unusual for a piece to shift while gluing or nailing it into place. If the misalignment is small, a shoulder plane can help acceptably refine the joint. Since the blade will nestle into a corner, the case side can be used to support the plane while removing small amounts of material from the top edge of a molding strip (Photo I). Complex moldings may require some additional gouge or chisel work to bring curved surfaces into alignment, but the shoulder plane will handle all the flat edges and faces.

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**About Our Author**

Craig Bentzley has been restoring antiques and building furniture for nearly 40 years. In addition to writing, Craig also teaches at guilds, woodworking shows, and at Woodcraft stores.

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**A Model Plane Kit**

The only thing sweeter than picking up a good commercial tool and putting it to work is making your own. Ron Hock offers a wooden shoulder plane kit (Woodcraft #151095) that promises to make this dream a reality. To satisfy my curiosity and inner craftsman, I ordered one and went to work. The provided instructions were easy to follow, and Ron’s Web site (www.hocktools.com) has a short video that clearly shows how simple it is to make one of these planes. It took me about two hours from start to finish. The most difficult part of the process was coming up with an attractive, comfortable design that was uniquely my own.

Unlike metal-bodied planes, this plane is a bevel-down configuration with a bedding angle of 37°. As with all wooden planes, setup is a bit tricky, but the plane performs well, and it’s a nice addition to my burgeoning collection. Depending on the type of work you do, it may be the only shoulder plane you’ll ever need.
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