

# User's Guide to Block Planes

Five common tasks  
for the handiest  
plane in the shop

BY CHRIS GOCHNOUR

One of the tools I reach for most often is a block plane. With its compact size and comfortable palm grip, it is an extension of my hand. I almost always have a block plane within reach as I navigate through the diverse tasks of custom-furniture building.

A finely tuned block plane is a pleasure to use. Quiet, efficient and precise, it can slice tissue-thin shavings off end grain, leaving a crisp, clean surface that no method can rival. I use a block plane for many tasks, such as eliminating mill marks from board edges and ends, shaping a radius or a chamfer on a board's edge, and fine-tuning and cleaning up joinery. Over the years, I've refined the way I tune and use this plane, based on the tool's unique geometry and features.

Typically made of metal and varying in length from 4 in. to 7 in., block planes are ideal for planing small parts and reaching into tight areas. They can be used one- or two-handed, either pushed or pulled. The blade is bedded at a low angle—between 12° and 20°—but the bevel faces upward, creating an actual cutting angle of 37° to 45° (if the blade is sharpened at 25°). The low blade angle allows for a palm-and-finger grasp and a low center of gravity, creating a more sensitive feel and greater stability. It also puts the blade in more di-



## Low-angle vs. standard block plane

Years ago, when I first tried my hand at planing, I used a low-angle block plane to level the front edges of a figured mahogany dresser. I was puzzled by the torn grain that resulted, because I knew my plane was well tuned and razor sharp. After further experimentation, it became clear that I had not chosen the right plane for the situation.

Understanding cutting angles will help you select and tune a block plane that will handle the task at hand effectively. The cutting angle is the angle formed by the workpiece and the top of the blade. A low cutting angle requires less energy, reduces friction (enabling the blade to stay sharp longer) and minimizes blade deflection and chatter, allowing the blade to slice through long grain or end grain with less effort. However, a low-angle blade has more trouble on figured or changing grain because the low angle produces a knifelike cut that tends to lift and pry, tearing the grain.

Conversely, a standard block plane with a steeper cutting angle requires more energy to use, generates more friction and dulls more rapidly. It also is more susceptible to chatter. However, these qualities make a standard block plane more valuable on long grain, where its wedgelike cut will not lift, pry and tear the grain.

# 1 REMOVING MILL MARKS

With its low center of gravity, the block plane excels at slicing machine marks off the edges and ends of boards.



**Edge vs. end grain.** To plane edge grain (left), check the grain direction and use a standard-angle plane. For end grain, use a low-angle plane, if possible, and chamfer the far edge (above) beforehand to avoid splintering. Skew the plane to create a shearing action (right), and wet the wood with paint thinner or water if you encounter stiff resistance.



rect alignment with the thrust of the cut, reducing blade deflection and chatter.

Another nice feature of a block plane is that the upward-facing bevel is supported by the bed all the way to its cutting edge. This further stabilizes the blade, so it gives rock-solid performance even in harsh end-grain planing. A final attribute of many block planes is an adjustable throat. This enables

you to fine-tune the plane's throat from a wide opening that accommodates a free flow of coarse shavings to a narrow slit that's capable of supporting the finest cut, leaving a smooth, tearout-free surface.

With a sharp, well-seated blade in your plane (for more on tuning up a block plane, see the story on p. 72), you are ready to tackle many tasks. There are five

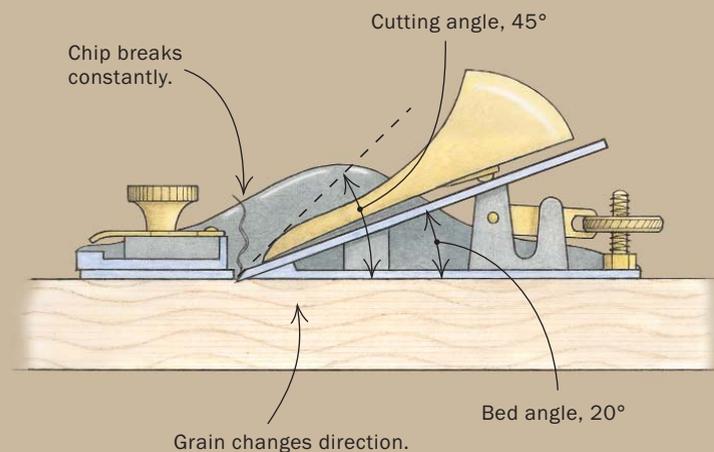
crucial woodworking operations that a block plane handles easily. A standard-angle plane works better for some of these tasks; for others, a low-angle plane is preferable (below).

## Clean up saw and mill marks

Due to their compact size and stable footing, block planes are ideal tools for elimi-

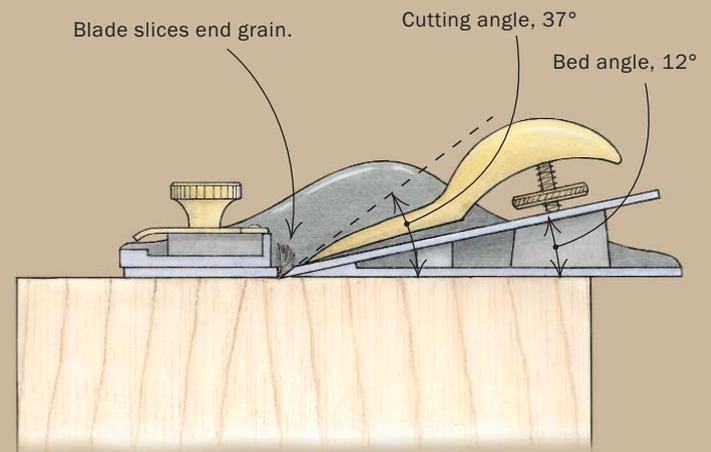
### STANDARD ANGLE FOR LONG GRAIN

A 45° cutting angle is harder to push through the wood and causes the blade to dull more quickly, but it breaks the chip aggressively for a cleaner cut in long grain.



### LOW ANGLE FOR END GRAIN

A low cutting angle requires less force to slice through tough end grain, and the blade doesn't dull as quickly.



## 2 CHAMFERING AND ROUNDING EDGES

The block plane excels at working the edges of a workpiece, from roundovers to wide bevels to just lightly breaking an edge.



**Chamfers and roundovers.** Draw reference lines on the edges and ends of the workpiece. For roundovers (above), stop short of the lines with the first bevel and then bevel the new corners. Finish with fine sandpaper.



**Large bevels can start on a machine.** The wide bevels on this drawer bottom were roughed out on the tablesaw, but they were finished and fitted to the drawer with a few passes of a block plane.

nating mill marks from edge and end grain (see the top photos on p. 69). Secure the board and use a light cut. Generally, you should push the plane, but if the grain direction changes, it's easy to turn around the plane and pull it toward you.

It is important to keep the edge square. If your machinery is set up squarely, you can use the mill marks as a reference, planing until the marks disappear evenly. Pencil marks across the board edge also will

serve as a reference. In time you will develop a feel for the job, enabling you to maintain a square cut without using any reference marks.

Removing mill marks from the ends of a board can be a bit more challenging because of the tough nature of end grain and its tendency to splinter at the unsupported edge of the cut. For this job, a low-angle plane is better than a standard block plane. Set the plane for a very light cut and make

sure the blade is sharp. I have found that skewing the plane is a very effective technique here, producing a shearing action that contributes to a smoother, cleaner cut on end grain. Skewing the blade also lowers the effective cutting angle. For example, if the plane has a 37° cutting angle and is skewed 45°, the effective cutting angle becomes a low 28°.

Generally, I plane board ends with one continuous stroke from edge to edge. To

## 3 CLEANING UP JOINERY

For perfect-fitting joinery, make joints proud and then plane them flush with a block plane.



**Plane dovetails in two directions.** First remove the bulk of the excess stock by planing along the row of pins or tails (left) with the nose skewed inward to avoid splintering the end grain. Then work inward from the edge (above) for the last few passes.

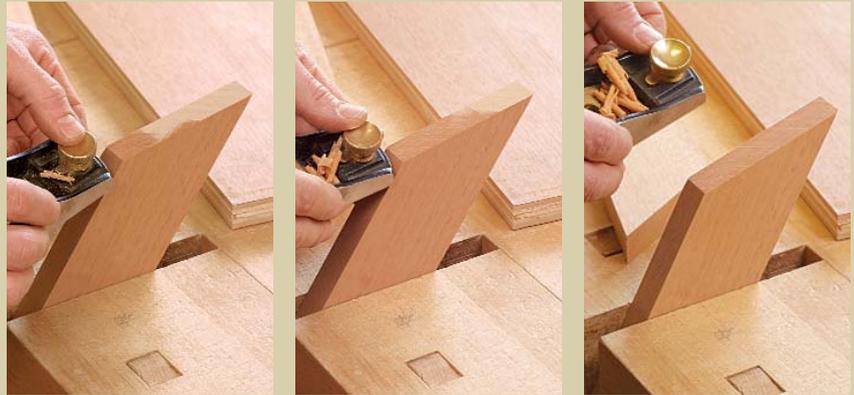


**Plane pegs flush.** Plane in a tight circular motion to work toward the center of the peg.



## 4 FINE-TUNING MITER JOINTS

Angled cuts from a machine tool aren't always perfect, but a block plane can adjust the fit of miters quickly.



**Closing the gap.** This solid-wood edging for a plywood panel has loose-fitting miter joints (left). A series of cuts makes the adjustment. The first cut (above left) changes the miter angle, and successive cuts carry that new angle across the entire joint.

prevent a chipped edge at the far end of the cut, there are a few things you can try: Plane a small bevel on the far edge to reinforce the fibers, or clamp a piece of scrap to the back edge to support it. Also, you can plane toward the center of the board from both edges.

Certain woods have harsh end grain that will dull the blade of a block plane rapidly. Unless you enjoy sharpening, dampen the end grain with water or paint thinner to

make the wood more supple, preserving the blade's edge.

### Round and chamfer edges

Block planes excel at lightly softening a hard edge, milling a crisp chamfer or fully rounding an edge.

To chamfer an edge, make several light passes, rolling the plane slightly with each pass. To make roundovers from 1/2-in. radius to 1/4-in. radius, just keep rolling the

plane with each pass. After planing, slight facets will remain, but these can be smoothed quickly with fine sandpaper.

To make a rounded edge, lay out the profile on the board edge and end. Because the shaping is freehand, a diverse range of contours can be shaped simply by working to your layout lines. Begin the radius with a few bevel cuts. Then bevel the bevels, gradually shaping the intended profile. Finish with a very light cut and multiple passes,



## 5 FITTING A DOOR

After installing the hinges, use a block plane to adjust the fit of a door. Start by putting a back bevel on the door stile.



**A back bevel (left) will make the next step easier.** It leaves good clearance for closing and only a small amount of wood to be removed during final fitting. Next, install the door and fine-tune the fit (above left). Check your progress frequently, creeping up on a fine, even gap (right).

rolling the plane continuously. Final touch-ups can be made with a contoured card scraper or sandpaper.

To chamfer or bevel an edge, begin by laying out the cut with pencil lines on the board's edge and ends. Then plane to the layout lines, making sure the cut stays in the center of the two lines. If you stray off course, make corrections now rather than waiting until you've reached the pencil lines.

When chamfering end grain, skew the plane's nose off the edge of the board so

that the blade is cutting the grain downward. This will give a smoother finish.

### Clean up joinery

I frequently use a block plane to clean up joinery after gluing. I'll trim tenon pegs flush, moving the plane in a tight swirl and working until the blade skims the surface surrounding the peg. Through-tenons, dovetails and bridle joints also can be trimmed flush with a block plane.

When making a dovetail joint, for exam-

ple, leave the pins and tails a bit long. After the glue dries, remove most of the extra material by planing in line with the edge, skewing the plane nose inward, which supports the cut and prevents chipped edges. When the joint is nearly flush, start planing in from the end, cutting lightly until the joint is flush and clean.

### Fine-tune miters

Frequently, miter joints require slight adjustments after being cut. A block plane is



## Tune up the plane for best results

Whether you choose a low-angle or standard plane, an initial tune-up makes all the difference. Each time I tune up a plane, I follow a sensible order of refinements, beginning with the sole of the plane and then progressing to the bed, the lever cap and finally the blade.

### 1. FLATTEN THE SOLE

A convex or concave sole will leave the cut unsupported, causing unpredictable results, so I always check to see whether the sole



**Lap the sole.** Attach coarse- and medium-grit sandpaper to a flat substrate and flatten the bottom of the plane until the sandpaper hits the entire sole. The area around the blade is the most critical to get flat. The scratch pattern will tell you how much more steel to remove.

is flat. Before lapping the sole flat, I also check that the adjustable throat seats well in the plane body. Remove the throat plate and check for any burrs or debris and then use a file to eliminate any trouble spots. Reassemble the plane, making certain the throat plate seats properly and moves freely.

I flatten planes by putting abrasive paper on a flat surface (plate glass, a slab of granite or a jointer bed) and lapping the bottom of the plane. I always keep the blade in the tool, properly tensioned but raised above the sole. Begin with 80 grit and then follow with 150 and 220. You can stop there and let actual use further polish the sole, or go one step further to 320 grit.

Watch it on the web

For more on tuning up a block plane, go to [www.finewoodworking.com](http://www.finewoodworking.com).

the perfect tool to accomplish this task. For example, if I'm mitering a solid-wood border around a center panel, and a corner has a slight bird's mouth, I first assess where the material needs trimming. Then, using a series of overlapping cuts followed by one continuous pass, I make the adjustment with a block plane and check the fit.

Even if the joint has been cut accurately, one light cut on each miter will quickly eliminate any irregularities that sawblade

deflection may cause, ensuring an invisible glueline.

### Fine-tune gaps on doors and drawers

Nothing works better for evening out the gaps on cabinet doors and drawers than a block plane. I appreciate how its compact size allows a one-handed grip, freeing the other hand to steady the work. Depending on the location of the door or drawer being fit, sometimes I push the plane; other times I pull.

To ensure that a door stile has enough clearance and doesn't hit when opened or closed, I recommend a slight bevel from the door's front to back. This bevel is shaped easily with a block plane, even with the door in place. Another reason for this back bevel is that only a small amount of wood needs to be removed during the subsequent final fitting. □

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## 2. TUNE THE LEVER CAP AND BED

The blade must have a snug fit with the lever cap and the bed of the plane. First remove any rough burrs or sizable drips of japaning (black paint) that prevent a stable fit between the cap and blade. Then check that the bed of the plane is free from rust, paint globs, grime or coarse machining. The blade must have a solid footing to remain still under pressure.

Eliminate any imperfections with careful filing, being cautious not to make matters worse by being reckless with the file.



**Tune the lever cap.** While protecting the back of the cap assembly with a piece of paper, sand the paint off the front edge for a snug fit with the blade.

**Level the bed.** Insert a small wood block into the back of the plane body as shown (right), to raise the file to the blade angle. Don't over-file.



## 3. LUBRICATE THE PARTS AND HONE THE BLADE

The plane's vertical adjuster and adjustable throat will work more smoothly with a light drop of machine oil on each part. A little paste wax on the sole of the plane will keep it gliding freely and prevent rust.

Sharpen the blade as you would any other, remembering that the sharpening angle of a block plane impacts performance. Because a block plane has its bevel up, its cutting angle is the sum of the bed and the sharpening angle. I sharpen my standard (20° bed) and low-angle (12° bed) planes with a 25° bevel, producing 45° and 37° cutting angles, respectively.

I use a honing guide because it helps maintain the desired bevel angle. There are two sides to a sharp edge: the bevel and the blade's back. I take both surfaces to 6,000 grit on my waterstones.



**Adjust the throat.** A small gap in front of the blade supports the finest cuts; a larger gap is required for heavier cuts.



**Wax the sole.** This protects the plane from rust and makes for smooth sliding action.