



# Wood Planes Made Easy

Make a smoothing plane to rival the best metal ones on the market

BY DAVID FINCK

## ONE METHOD, MANY PLANES

Once you know the basics, you can make an arsenal of planes—for everything from chamfering small parts to jointing long edges. A small hammer is used to adjust the planes.

**M**ake a wood plane and it will reward you with flat, gleaming wood surfaces and an unmatched planing experience. Make it the way I describe here, and you'll be surprised how easy it is. Wood planes offer great value, too. They far exceed the quality and performance of less-expensive metal planes, and you can build several of them for the price of one high-end plane. Their thick blades make freehand honing easy, and the high-quality steel holds a great edge. Last, they are shaped to fit your hands, so the comfort factor alone is a good reason to explore them.

Often called a Krenov plane, this plane style is closely associated with cabinetmaker and author James Krenov, who adapted the design of commercially made European wooden planes. Gluing on cheeks eliminates the need to hollow a solid block.

Plane-making is not difficult, and it is a great way to learn many fundamentals of woodworking. This article should serve intermediate-level woodworkers well; for those seeking more guidance, my book, *Making and Mastering Wood Hand Planes*, (Sterling, 2005) starts at square one.

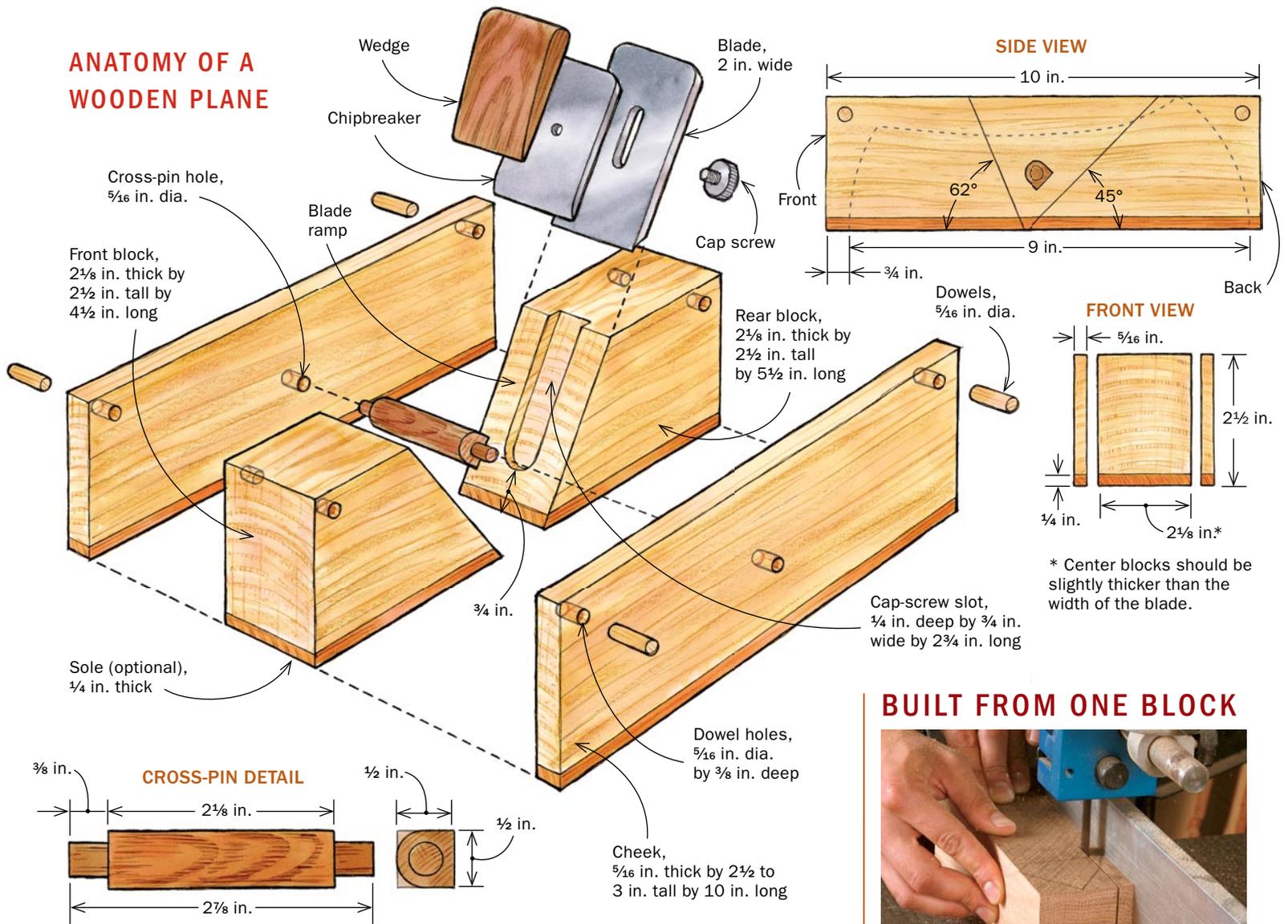
### Prepare the plane blank

Straight-grained stock will yield a stable body. Choose well-dried wood of good density and durability. Among domestics, oak, ash, hard maple, Osage orange, mulberry, and applewood are good choices.

To make a smoothing plane, square up a thick block (this can be glued up from thinner pieces)  $3\frac{1}{16}$  in. wide by 10 in. long



## ANATOMY OF A WOODEN PLANE



## BUILT FROM ONE BLOCK



**Saw off the cheeks.** After gluing on the sole and trimming everything square and flush, cut away the 3/8-in.-thick cheeks. This should leave the center block about 3/16 in. thicker than the blade width.



**Bandsaw the front and back blocks free-hand.** You can use a chopsaw or a tablesaw to make this cut more cleanly, but the bandsaw is safest and the cuts will need to be smoothed regardless. Set aside the triangular waste piece for later use.

### Sources of Supply

This Krenov-style plane is built to fit a 2-in.-wide plane iron. Plane-iron assemblies include a chipbreaker and a cap screw, and come in a range of widths: 1, 1 1/4, 1 1/2, 1 3/4, and 2 in.

#### PLANE-IRON ASSEMBLIES

David Finck, [www.davidfinck.com](http://www.davidfinck.com)  
A2 Steel, 2 in., \$58.

Hock Tools, [www.hocktools.com](http://www.hocktools.com)  
High-carbon steel, 2 in., \$52.



by 2 1/2 to 3 in. tall, with its two sides parallel and square to the bottom. The top can be left rough-sawn as it will be trimmed away when shaping the plane. Examine the side of the blank. If the grain slopes noticeably, choose the front of the plane so that the grain direction slopes downward from front to back. This helps the plane slide smoothly and prevents chipout on the bottom.

A plane will hold up fine without a separate sole (and the next step can be eliminated), but planes tend to wear most in the area in front of the throat opening, so a small square insert may be required after a lot of use to compensate for wear. If you will use the plane daily, apply a sole of especially hard-wearing wood, such as lignum vitae, jatoba, or ironbark, to the plane blank. Glue the sole (1/4 in. thick and 1/8 in. wider and longer than the blank) to the bottom of the plane blank, using a caul under the clamps to distribute pressure. Use



## TRUE THE BLADE RAMP



**Plane the ramp and check for square.** Light passes with a block plane clean up the ramp surface (left). An accurate square and a light source help to make sure the blade ramp is square to a side (above). Here, it's still a bit off.

a block plane to trim the overhanging sole flush to the sides of the plane blank.

### Cut the cheeks and center block

Cut the blank into three pieces: two cheeks and a center block. After cutting the pieces slightly thicker, mill the cheeks and the center block to finished thickness. The center block is slightly thicker than the 2-in. blade width to allow for lateral adjustments.

On the thick center block, lay out and cut a 45° angle (a good all-purpose cutting angle) for the blade ramp and a 62° angle (provides adequate clearance between it and the cross-pin for fingers to remove jammed shavings) for the front block.

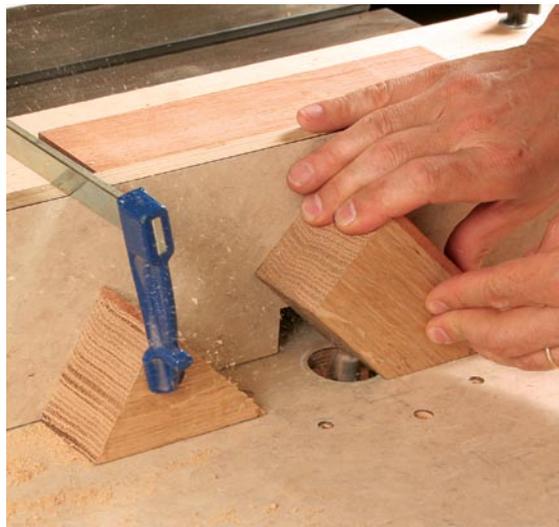
### Truing the back block is critical

The blade ramp must be trued to perfection: dead flat across the width and length and squared to one side with no trace of wind or twist. Any imperfections will allow the blade to pivot out of adjustment in use. Start with the front block for practice, because the only thing of importance here is to keep the ramp of the block square to a side. An experienced block-plane user will knock this off in 60 seconds. A novice may spend an hour, but taking the time here ensures the success of your plane.

Move on to the blade ramp. The blade ramp must be slotted to provide clearance for the cap screw. The cap screw should not bottom out in the slot before the blade extends beyond the sole.



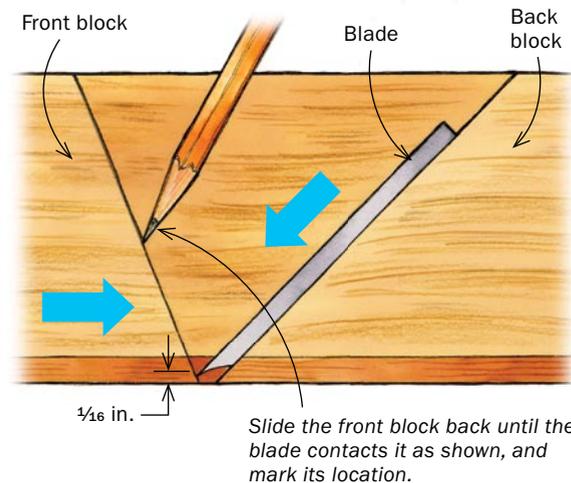
**Route the cap-screw slot.** This stopped slot is centered in the ramp and is 1/8 in. wider than the cap screw. Lay out its stopping point (above). On the router table, use triangular scrap as a stop (right).



## ALIGN THE PIECES PRECISELY



**Mark the position of the ramps.** Place the back block flush with the back and bottom edge of a cheek and mark its location. Set the blade in place and jockey the front block so that the blade contacts it 1/16 in. above the sole. Trace its location on the cheek.



Assembly is simple but precise. Space the front block and blade ramp so that after glue-up, the blade does not slide through the opening, but contacts the front block  $\frac{1}{16}$  in. from the bottom. Then true the bottom and file the front block for a minimal throat opening. Clamp everything and insert dowels to lock in the alignment.

The cross-pin sits between the cheeks and contacts the wedge, capturing the plane-iron assembly against the  $45^\circ$  ramp. Mill straight-grained hardwood  $\frac{1}{2}$  in. sq. by 12 in. long for cross-pin stock. Unclamp the plane and remove one cheek. Pivot the blocks out of the way and draw a horizontal line on the other cheek  $1\frac{1}{4}$  in. from the bottom (the height of the center of the cross-pin). Pivot the blade ramp into location. Place the blade on the ramp and the chipbreaker on the blade. Mark a line  $\frac{7}{16}$  in. from the chipbreaker (the thickness of the wedge plus half the cross-pin). Those marks meet at the center point of the cross-pin, where you drill the hole for the tenons.

The cross-pin has rounded tenons on each side and is inserted without glue. The tenons should turn easily but not wobble. Use a file to lightly round the edges of the cross-pin that contact the wedge, and give the other two edges a more pronounced rounding.

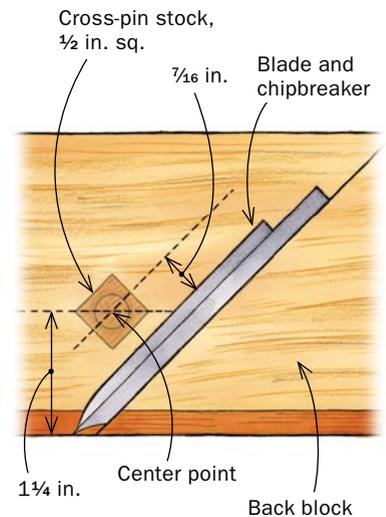
### Glue up the plane and true the bottom

Before the final glue-up, dry-fit the plane with the cross-pin installed, check all the

## POSITION THE CROSS-PIN



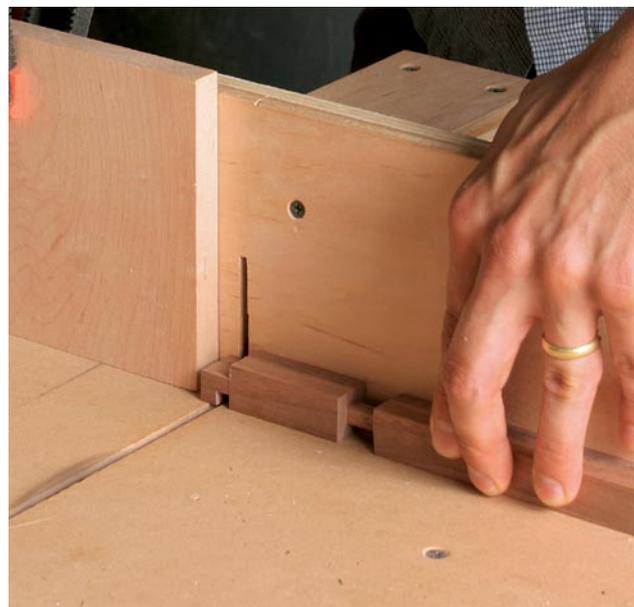
**Locate the position of the cross-pin.** Place the blade on the ramp and the chipbreaker on the blade. The cross-pin's center point meets at the point  $1\frac{1}{4}$  in. above the sole and  $\frac{7}{16}$  in. from the chipbreaker.



**Drill cross-pin holes.** For best results, use a brad-point bit and a backing board beneath the cheek. Drill the first hole through the inside face of one cheek while the other cheek is removed (left). After drilling the first hole, assemble the plane and position it with the drilled cheek up. Use the first hole as a guide for drilling the second (right).



**Dowel the cheeks in place.** Drill a  $\frac{1}{16}$ -in. hole in each upper corner, going through the cheek and about  $\frac{3}{8}$  in. into the blocks. Tap in  $\frac{1}{16}$ -in. dowels, then trim them off.



**Make the cross-pin.** Finck uses a tablesaw and sled to form square tenons (left). Then he rounds the tenons with files (above) and shapes the cross-pin to make sure the plane will rotate freely; if not, work on the fit.

## ASSEMBLE THE PLANE AND FLATTEN THE SOLE

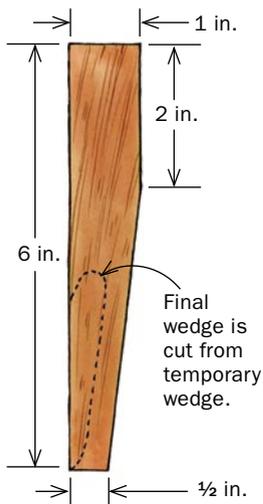


**Glue the plane together.** Keep the glue  $\frac{1}{4}$  in. away from the angled surfaces to minimize squeeze-out in the plane opening (left). Do not glue the cross-pin. Clamp an alignment stick to the bottom, and use cauls to distribute the pressure on the cheeks (right). After the clamps are set, remove the alignment stick so you can clean up any squeeze-out on the bottom and in the opening.



seams, and erase any pencil marks. Trim the ends of the cross-pin tenons and indexing dowels flush to the cheeks. After the plane has been glued up, a temporary wedge keeps the plane body tensioned (without the blade in the plane) so you can true the plane bottom with a jointer. Straight-grained, easy-working wood like walnut or cherry is a good choice for wedges. Set the wedge and clean up the bottom of the plane. Then try the blade in the plane (bevel side down). It should bump against the front block. Take passes on the jointer until the blade is within  $\frac{1}{32}$  in. of the bottom, but doesn't pass through the opening. Lightly sand away machine marks on a flat reference surface.

### TEMPORARY WEDGE



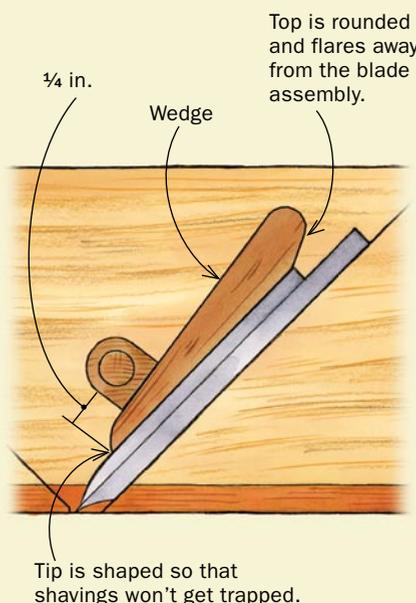
**Install a temporary wedge and flatten the sole.** Mill stock the same width as the plane iron. Bandsaw the wedge and smooth it with a few plane strokes. Tap the wedge lightly in place until the plane takes on a ringing tone, like a solid block of wood. Once the wedge is set, a light pass or two on the jointer will clean up the bottom of the plane (right).



### THE FINAL WEDGE



**Cut the final wedge.** Bandsaw the permanent wedge from the temporary one. The new wedge shares the flat bottom of the old one and should fit between the cross-pin (extending about  $\frac{1}{4}$  in. beyond) and the blade-chipbreaker assembly.



After a few small adjustments to the throat opening (see photos, facing page), convert the temporary wedge to a permanent one. Light finger pressure should snug up the wedge without skewing it to one side or the other. It should fit perfectly, without any bumps.

Cut the wedge a bit shorter than the end of the blade. Shape it so that the upper end can withstand hammer taps and flares away from the blade assembly. The tip is sharp, but the rounded top allows shavings to roll over it smoothly. Be sure that the end of the cap screw does not touch the wedge. If it does, either shorten the screw or cut a relief on the back of the wedge.

### Take the shaping personally

Shaping the plane is as personal as making furniture. I favor shapes that allow flexibility,

## TUNE THE MOUTH AND SHAPE THE PLANE



**Adjust the throat opening until the blade protrudes.** Properly filing the throat opening is critical to the success of the plane. Use a sharp mill bastard or smoothing file (left). The process is a matter of sighting the blade against the opening, filing, sighting again, and so on, until the blade slips evenly through the opening. The optimal opening is slightly thicker than a fine shaving (right).



**Bandsaw the shape.** Sketch the outline of the plane on a cheek and bandsaw it. It isn't necessary to shape the plane all at once. Shaping can be done in stages, after using the plane to get a sense of how it fits your hands.

for I sometimes pull the plane, sometimes push it, sometimes rock it from side to side, and sometimes hold it one-handed. Therefore, I like gentle curves that invite the hand without locking it into one grip.

Don't give in to the temptation to shape the plane all at once. Shape in stages, using the plane in between to get a sense of where to shape more.

Keep the leading lower edge of the plane crisp to help push stray shavings off the board. If it's too rounded, stray shavings will go under the plane and jam the opening. Lightly bevel the underside of the cheeks to within about  $\frac{1}{16}$  in. of the throat

opening to reduce friction and burnished stripes on the planed surface.

### First shavings

Use a small adjusting hammer to set and tap the blade and wedge into place, then set the blade depth and check for parallelism. The shavings should look lacy and feel cottony-soft. Hone the blade more heavily at the corners to yield a wide shaving that thins to nothing at the edges. This will create a surface with no gouges or digs. □

*David Finck designs furniture and lighting and makes acoustic guitars in North Carolina.*



**Shaping with hand tools.** You may leave the plane rough-sawn for a grip-textured surface or refine the shape and surfaces with spokeshaves, chisels, card scraper, files, rasps, and sandpaper. Finish is not necessary.

## Setting the blade



**Set the wedge.** Start with the blade bottomed out, then pull it up  $\frac{1}{16}$  in. and set the wedge with finger pressure (above). Sighting from the back, tap the blade until it barely breaks the surface (right). Then tap the wedge to set it.



**Tap the blade laterally.** With your thumb, feel the outer margins of the blade to see if they protrude equally. Adjust by tapping the blade laterally. If the blade is too far out, retract it by rapping the back of the plane. Secure the wedge with another light tap.

### Online Extra

To watch David Finck set the blade, use his plane, and offer troubleshooting tips, go to [FineWoodworking.com/extras](http://FineWoodworking.com/extras).