Shop-made Hand Plane

Build an heirloom-quality tool using just scraps and an $11 plane iron.

There's a certain satisfaction that comes from using a tool you made yourself. And when it's as easy and inexpensive to make as this plane, you'll find yourself reaching for it (and smiling) again and again.

Find and prepare your iron

We used a plane iron from a Buck Bros. 6½" block plane (Model C2, about $11) purchased at The Home Depot. The iron measures 1⁹⁄₁₆" wide × 4⅛" long; any similar-size iron will work. Using a hacksaw, we cut the iron to 3" long, then ground the cut end smooth, rounding the top corners. Flatten the iron back and sharpen the iron on sharpening stones or by using sandpaper on a flat surface. (See **More Resources** for a free video to help with these steps.)

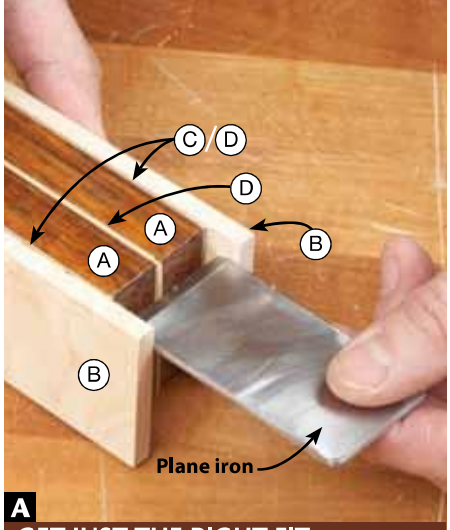
Laminate the body

We built this plane from solid cocobolo and maple, with walnut and maple veneers, but any dense, tight-grained wood is suitable for the core (A) and cheeks (B). Any species of veneer will work as accents.

1 Start by preparing the blanks for the body. Cut two core pieces (A), two contrasting cheeks (B), two pieces of dark veneer (C), and four pieces of light veneer (D) to 2¼×9".

2 Sandwich all the pieces (A–D) together and test the fit of the iron between the cheeks (B) [**Photo A**]. The iron should fit with about ¹⁄₆₄" of clearance. If needed, add or remove veneer, or lightly grind the edge of the iron.

3 Laminate the cores (A) and veneers (C, D). We used two layers of light veneer between the cores and alternated



A GET JUST THE RIGHT FIT

With the cores (A) and veneers (C, D) between the cheeks (B), check the fit of the iron. Add or subtract veneer to get a good fit.

B TWO MITER CUTS CREATE THE THROAT OPENING

Cut away the 1¾"-long rear of the core (A/C/D) first. Double-faced tape keeps the core in place during the cut.

C

With a fresh strip of double-faced tape holding the core to the fence, cut the front of the plane body from the core.

the remaining veneers on the outside of the cores [**Drawing 1**]. Clamp the core, using the cheeks (B) and scraps as clamping cauls to keep the edges flush.

Quick Tip! Keep the cauls from sticking. Place sheets of waxed paper between the core, the cheeks, and the cauls to prevent these pieces from being glued to the core.

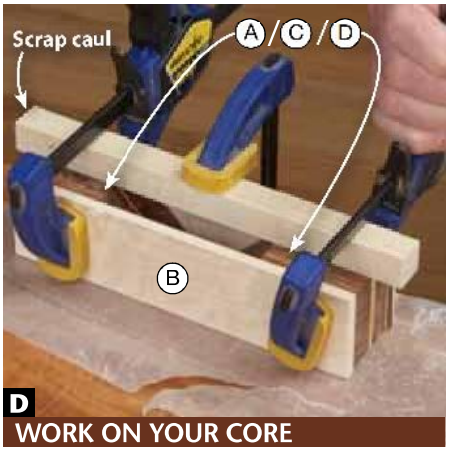
4 After the glue dries, joint the bottom of the core (A/C/D) smooth and square to the sides.

Quick Tip! "Joint" short pieces safely. Apply self-adhesive sandpaper to the cast-iron top of your tablesaw and place the rip fence next to the sandpaper. Sand the core with a side riding against the rip fence.

5 Lay out the throat opening [**Drawing 1**]. Attach an auxiliary fence to your miter gauge, pivot the head to 45°, and cut a kerf through the fence. Using a strip of double-faced tape, firmly stick the core (A/C/D) to the fence, aligning a layout line with the kerf. Cut the core into three pieces [**Photos B, C**]. Keep the triangular waste piece—the wedge (E) will be cut from it later.

6 Set the core (A/C/D) pieces on a sheet of waxed paper on your bench, with the mitered points touching. Glue and clamp the cheeks (B) to the core [**Photo D**] and clamp the core to the bench.

7 After the glue dries, joint the top of the plane body (A–D), then lightly crosscut each end to even them up. To open the mouth of the plane, set the rip fence to take a 1/32" or less cut, and then rip the bottom face [**Photo E**]. Make fine adjustments to the fence position as needed until the iron, sitting bevel down, fits through the opening with an additional 1/32" gap.



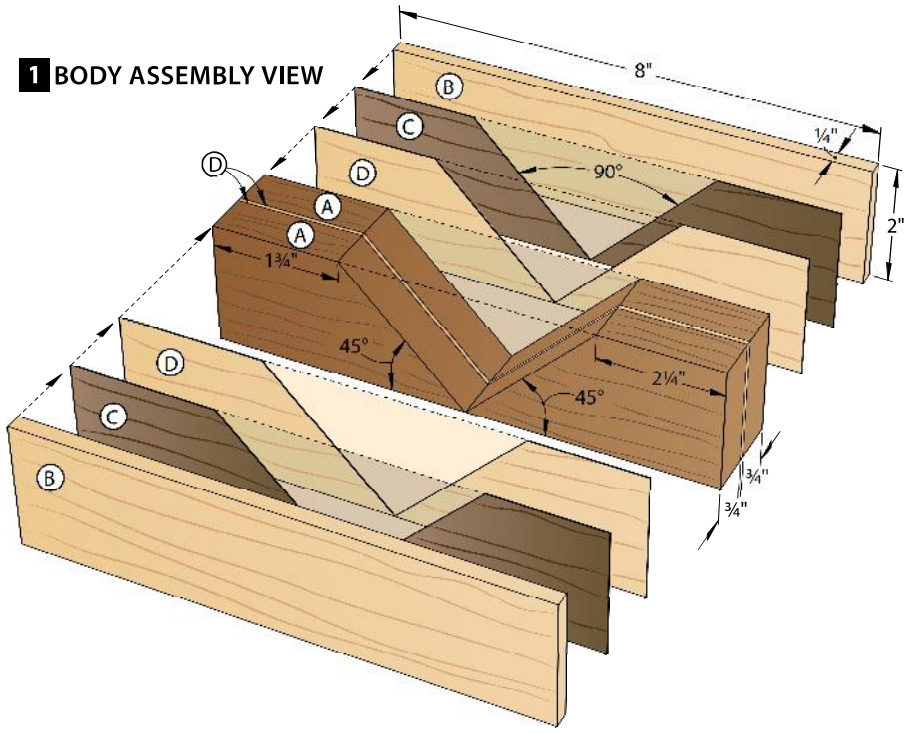
D WORK ON YOUR CORE

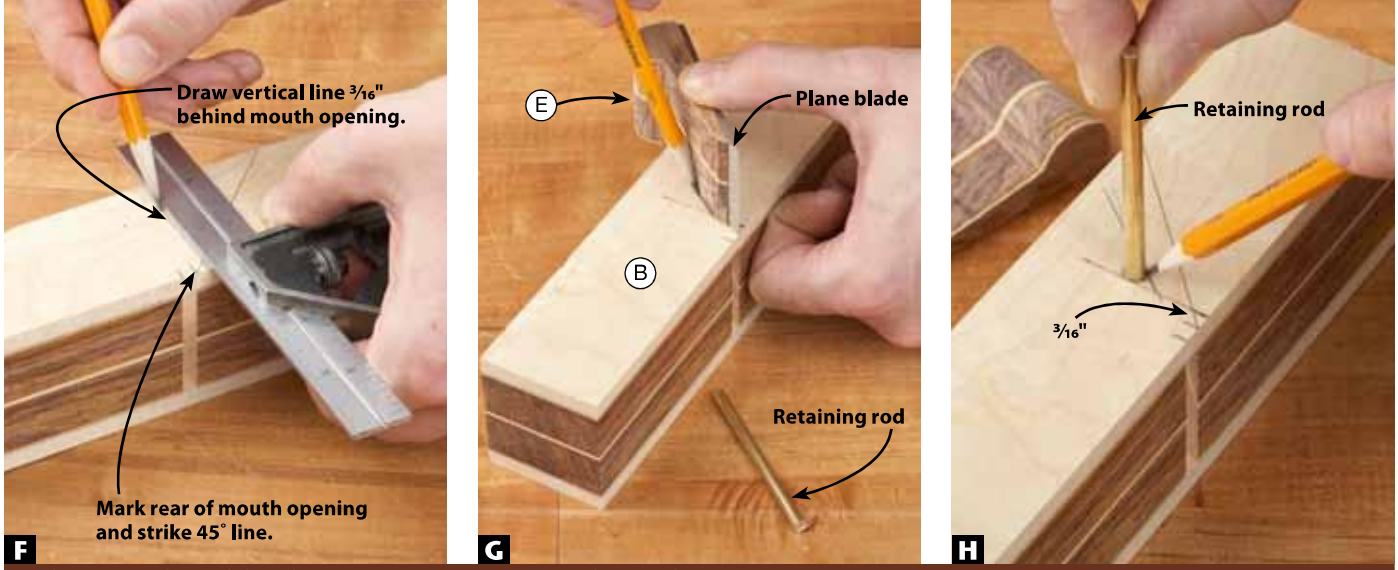
Lay waxed paper on your bench, then glue the cheeks (B) to the core (A/C/D), keeping the ends and bottom edges flush.

E OPEN THE MOUTH A LITTLE

Guide the plane body with a pushstick and make very light passes across the bottom face, sneaking up on the final mouth width.

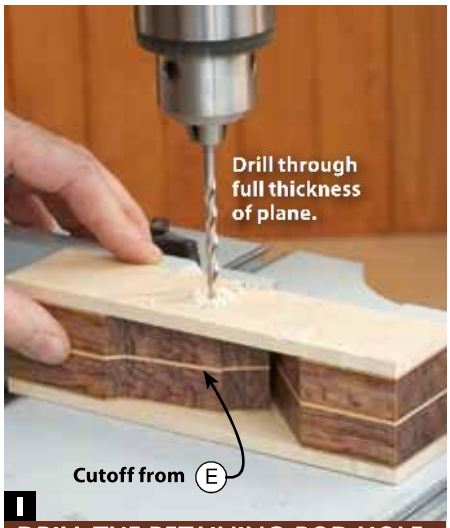
1 BODY ASSEMBLY VIEW





PLOT THE ROD POSITION WITH MINIMAL MEASURING

Draw a vertical line 3/16" behind the first line [**Photo F**]. Align the wedge (E) and plane iron with the diagonal mark, with the iron's tip flush with the bottom of the cheek (B) [**Photo G**]. Trace along the top of the wedge. Place the rod tangent to the two lines [**Photo H**], and trace around it.



DRILL THE RETAINING-ROD HOLE

Prevent chip-out by using the wedge (E) cutoff as a backer block while drilling the ¼" hole for the retaining rod.

Quick Tip! For precision, shim the adjustments. Instead of making small adjustments by moving the rip fence, try adding strips of 2"-wide masking tape to the rip-fence face.

Add the wedge and iron

1 Make a copy of the **Wedge Pattern** from the *WOOD Patterns*® insert, and spray-adhere it to the side of the wedge (E) blank, with the straight edge flush with the long edge of the blank. Bandsaw and sand the wedge to shape, saving the cutoff for use later.

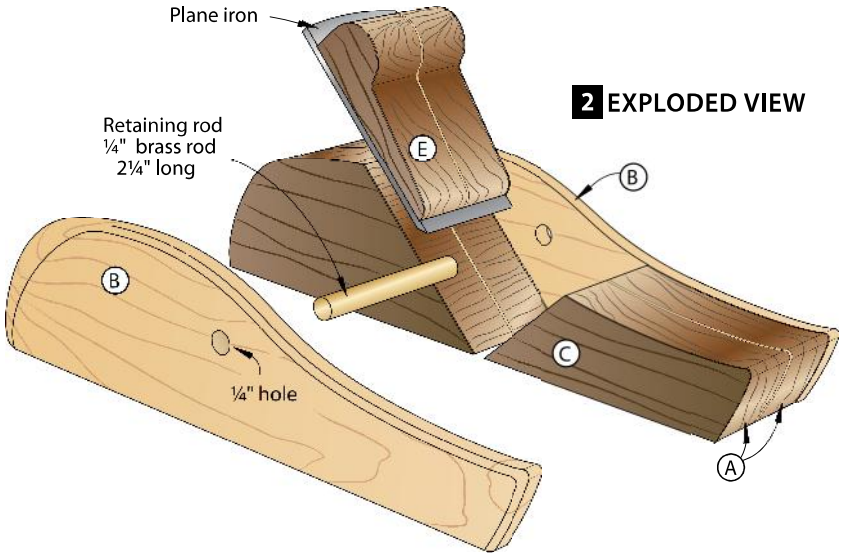
2 To locate the hole for the brass retaining rod [**Drawing 2**], plot on a cheek (B) the location of the rear angled bed. To do this, make a vertical mark on a cheek aligned with the rear of the mouth opening. Extend a line 45° from that mark. Then follow the steps in **Photos F, G,** and **H**.

3 Drill the hole for the retaining rod [**Photo I**], then tap the rod in place and sand it flush with the cheeks (B). If the rod doesn't fit snugly, secure it with a dab of epoxy.

Shape a feel-good body

1 Make a copy of the **Body Pattern** from the *WOOD Patterns*® insert, and spray-adhere it to a cheek (B), flush with the bottom edge and aligning the highest rear point of the profile with the top of the angled bed. This position isn't critical; just get it close. Bandsaw the body (A–D) to rough shape, cutting 1/16" outside the line.

2 Draw a curve for the heel of the plane [**Photo J**], then begin shaping the heel on a disc sander [**Photos K, L**]. Finish shaping the heel and smoothing the curves by hand-sanding to 150 grit.



2 EXPLODED VIEW

MORE RESOURCES

FREE VIDEO

- Watch a free video on sharpening at: woodmagazine.com/sharpenvid.

RELATED ARTICLES AND VIDEO

- Download Matt Seiler's video on building this hand plane and another at: woodmagazine.com/seilervid. $
- "Low-tech, Foolproof Sharpening," issue 149 (July 2003) woodmagazine.com/sandsharp. $
- "Get Sharp, Stay Sharp," a look at three different sharpening methods, issue 186 (Oct. 2008) woodmagazine.com/sharpeners. $
- Interested in making more of your own hand tools? Find plans at woodmagazine.com/handtools. $

$ = Download these items for a small fee.

J

USE A SHOP-FOUND TEMPLATE

To lay out the curve for the heel of the plane, trace around a glue bottle or any other item with an appropriately rounded end.

K

L

WORK BY FEEL AS YOU SHAPE THE HEEL

Begin by sanding to the layout line [Photo K]. Then round the heel from top to bottom and blend it into the cheeks [Photo L]. Test the feel of the plane in your hand frequently as you work. Stop when you have a smooth curve that feels comfortable.

3 Retrieve the wedge (E) and plane iron, and place them in the throat of the plane. With the plane resting on a piece of scrap, tap the wedge down firmly to burnish the area under the retaining rod. The burnished area should extend across the full width of the wedge. If not, sand the top of the wedge to flatten it. Then, working on self-adhesive sandpaper on a flat surface, sand the bottom face of the wedge until it seats firmly under the rod, and the end sits ⅜" from the tip of the iron.

4 Finish-sand the plane and wedge to 320 grit, then apply a finish. We wiped on boiled linseed oil, rubbing it out with a cotton cloth. After the finish dries, refer to the instructions *below* to learn how to adjust the plane's cutting depth and blade alignment. Keep your plane within easy reach; you'll enjoy looking at it as much as using it.

Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Matt Seiler**
Illustrations: **Lorna Johnson**

Materials List

Part		BLANK SIZES T	W	L	Matl.	Qty.
A*	core	¾"	2"	8"	C	2
B*	cheeks	¼"	2"	8"	M	2
C*	dark veneer	1/64"	2"	8"	W	2
D*	light veneer	1/64"	2"	8"	M	4
E*	wedge	¾"	1 19/32"	2½"	C/M/W	1

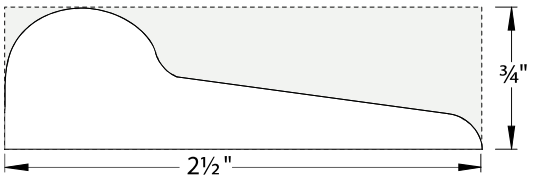
*Parts initially cut oversize. See the instructions.

Materials key: C–cocobolo; M–maple; W–walnut.
Supplies: Double-faced tape, spray adhesive, 1 9/16 × 4⅛" plane iron, ¼ × 2¼" brass rod.
Bit: ¼" drill bit.

Iron adjustments: Plane and simple

To set up your new plane, you'll need a wood mallet or lightweight hammer. Place the plane on your bench and insert the iron into the body with the bevel down. Slide in the wedge on top of the iron and under the retaining rod. Press the plane against the bench, and give the wedge a light tap to secure it. At this point, the iron should not extend below the sole of the plane.

Adjust the iron forward and back with light taps on the plane body. A tap at the rear (*above right*) retracts the iron for a lighter shaving. A tap at the front (*right*) increases the depth of cut. Sight down the sole to see if the iron projects evenly across its width. Tap a top corner of the iron to adjust it parallel to the sole.



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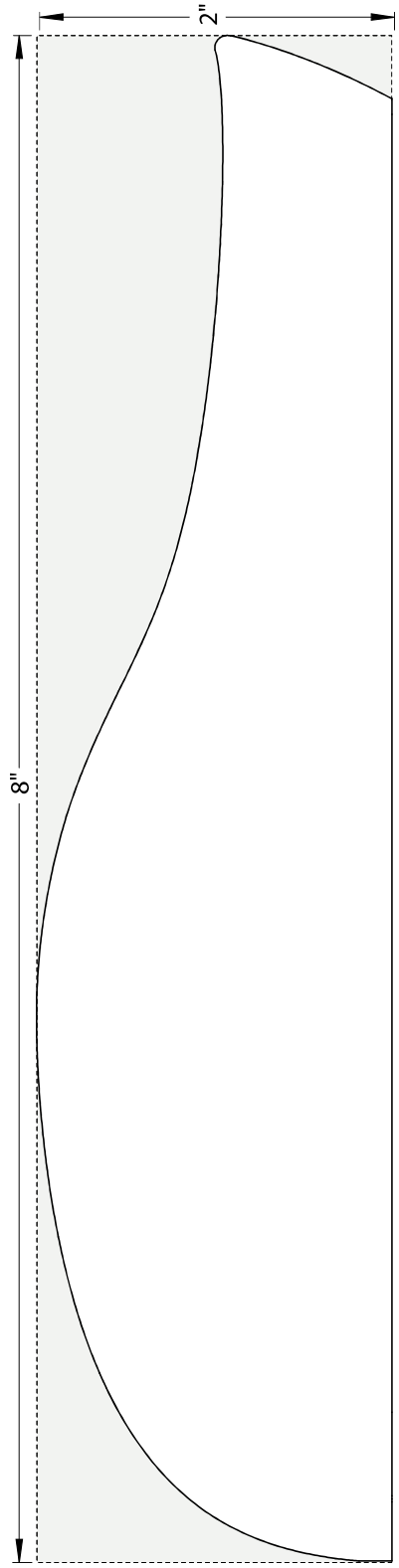
WEDGE FULL-SIZE PATTERN



BODY FULL-SIZE PATTERN