

handwork

# Make a coopering plane

BY CLARK KELLOGG





I love using coopering planes. The long, curling scoop-shavings they make, and the slightly burnished, rippled surfaces they leave are incredibly satisfying to the touch. They can be used for a few different tasks, such as texturing a panel or creating a profiled molding, but their raison d'être is making curved surfaces across the width of a board. And, more often than not, they are the best way to create such a curve.

Although using a coopering plane, with its curved blade, can seem intimidating at first, in practice the tool is not different from an ordinary smoothing plane. If anything, I find coopering planes easier to use, because I don't worry about obtaining an absolutely glass-smooth surface. I'll show you how I build a wooden coopering plane: shaping the sole to match the curve of the blade, and grinding and sharpening the blade.

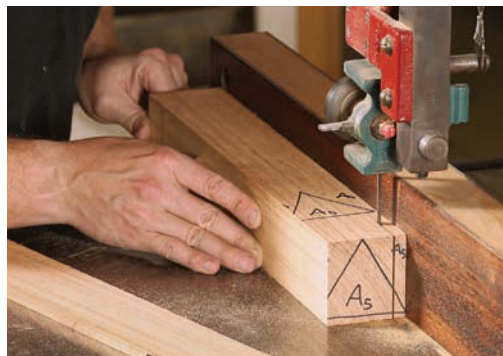
The coopering planes I make are based on James Krenov's classic bench plane design. Indeed, all of the geometry is essentially the same; the only difference is a slightly thicker sole to account for the curve of the blade.

#### Make a bench plane, then shape the sole

Start by building the body using the technique popularized by Krenov (see David Finck's "Wood Planes Made Easy," *FWW* #196). Start with a blank, cut off the cheeks, and

## Plane sandwich

Cutting apart the plane body greatly simplifies the process of making the throat and mouth, but be sure to glue the parts back together accurately.



**Cut the cheeks.** A consistent feed rate and smooth motion produce the cleanest cut. The sides should be  $\frac{3}{8}$  in. thick.

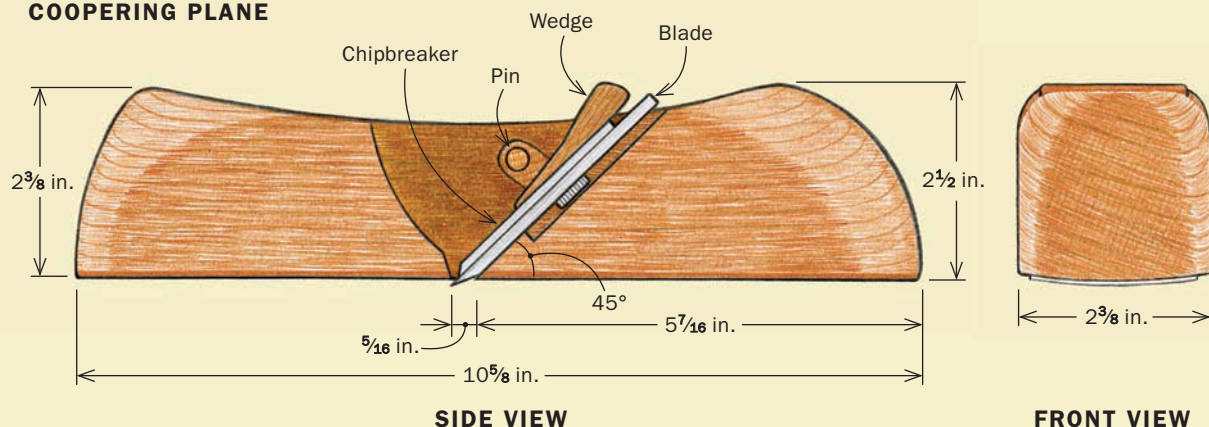


**Clear the throat.** After cutting the back of the throat, or bed, at  $45^\circ$ , cut the front side. Kellogg prefers a sweeping arc here to a straight cut.



**Glue it back together.** Clamp the plane's center to the bench to keep it and the sides in alignment on the bottom. A bit of paper prevents the plane from getting stuck to the bench.

#### COOPERING PLANE





## Curve the sole

Accurate layout removes most of the difficulty. Careful and judicious planing takes care of everything else.



**Mark a centerline.** Scribe centerlines on both ends of the plane body, and then connect them along the length of the sole with a pencil line.



**Lay out the curve.** After aligning the template with the centerline, trace the curve onto the end grain. Repeat at the other end.

**Add a reference mark on the side.** This line helps you keep the curve constant along the entire length of the sole.

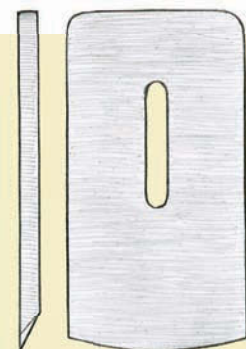


**Shape the sole.** Plane along the edges of the sole first, where there is more material to remove (below). Move to the center last, working toward the centerline from both sides.

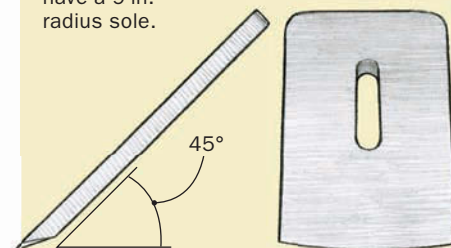


### BED ANGLE CHANGES BLADE RADIUS

When angled at 45°, the blade's effective radius is about 1½ times its actual radius. So a plane with a 6-in.-radius blade should have a 9-in.-radius sole.



6-in. radius at 90°



9-in. effective radius at 45°

### SOURCE OF SUPPLY

**RADIUS-EDGE PLANE IRON**  
hocktools.com



create a throat. Then glue the parts—minus the throat waste—back together. After the glue is dry, it's time to shape the sole.

Begin by laying out the sole's curve on both ends of the plane body. This curve is flatter than the curve of the blade, because the blade projects through the sole at a 45° angle. The 45° bedding angle creates an effective radius that's larger than the blade's actual radius. To find the effective radius without breaking out a geometry textbook, a good rule of thumb is to multiply the radius of the blade by 1½.

Make a template of the sole's curve on card stock. After cutting a centerline into both ends of the blank, and connecting the two lines with a pencil line along the sole, trace the template onto both ends



# Hone the blade by hand

Sharpening a blade with a radius can be tricky, but a hollow grind is a big help. Scooping out the bevel leaves two points of contact, making it easier to register the blade on a sharpening stone.



**Honing with a swing.** The action is similar to the pivot used at the grinder. Start at one corner (left), and pivot your wrist as you move the blade down the length of the stone. You should be honing the blade's trailing corner when you reach the end of the stone (right).



of the body. Complete the layout with a marking gauge line along the body's side that connects the ends of the curves.

Now clamp the plane body in a vise, sole up. Use a block plane or small bench plane to shape the sole down to the layout lines. Start at the edges, and slowly work toward the center. Finally, use a hard sanding block, sanding with the grain, to remove any facets. When that's done, sharpen the blade.

## Go low tech to get sharp

Hock blades come hollow ground, but at some point you'll need to regrind the bevel. I do it with a bench grinder. Center the blade on the tool rest and then swing it through a curve with the bevel always on the wheel. Don't worry too much if the grind isn't perfectly symmetrical or the arc fair. As long as you are in the neighborhood of the radius, you should be fine.

The blade is thick enough to balance easily on the two points created by the fresh hollow grind, so hone freehand. The idea is to swing the blade from one side to the other like a pendulum as you move sideways down the length of the stone. I begin with a 1,000-grit stone, move to 4,000-grit, and polish on an 8,000-grit stone.

Now set the blade for a light cut, tap in the wooden wedge, and take a test cut. Adjust the blade as you would on any other wooden plane. □

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**Even shine along the edge.** You are done honing when there is an even polish along both the top and bottom of the bevel. At that point, remove the burr on the back of the blade.

## When it's time to regrind



**Hollow-grind the bevel.** Begin with one corner of the blade in contact with the wheel (left), and then pivot the blade so that the bevel runs smoothly across the wheel, stopping when you reach the other corner (right).

