

A master of many tasks

The router's versatility is one of its biggest selling points. It can profile many different edges, duplicate patterns, cut rabbets and dados, and cut mortises.



PROFILES



JOINERY



PATTERN ROUTING



Safe, Accurate Handheld Routing

Tips for getting the most from this essential power tool

BY BOB VAN DYKE

Honestly, the router is my least favorite tool. It is loud, whiny, tiring, and messy—like some people I know. But it also is the most useful, versatile, and, when used correctly, the most accurate among any of the handheld power tools. It is capable of making accurate dadoes, grooves, rabbets, precise joinery including mortise-and-tenons, and edge details and moldings. It can also follow nearly any well-made pattern to create an almost infinite variety of shapes.

Routers can be used handheld or mounted (inverted) in a router table. This article concentrates on handheld router techniques. For information on router tables, check out my video series on router-table

fundamentals at FineWoodworking.com and Fundamentals, “Getting started with router tables,” in *FWW* #270.

Fixed based vs. plunge routers

A plunge router can do everything that a fixed-base router can do, but it can also make stopped cuts. This makes it ideally suited for cutting deep and accurate mortises and stopped dadoes and grooves. So, the obvious question is why bother with a fixed-base router at all? You can get along without one. My first and only router for over 10 years was a 3-hp plunge router. It was the same router Tage Frid used in all his articles in the early days of this magazine and it was clear to me that he

knew what he was doing, so that was the router I bought and I did everything with it. However, the higher center of gravity of the plunge router does make it tippy when working along an edge. This makes the lower-profile fixed-base router a better choice for tasks like rabbets and edge details.

Basic router safety

The plunge router can be turned on with the router resting on top of the workpiece as long as the bit is retracted. You can then plunge into the work, make the cut, and fully retract the bit when finished. The plunge router should never be turned on or off with the bit extended.

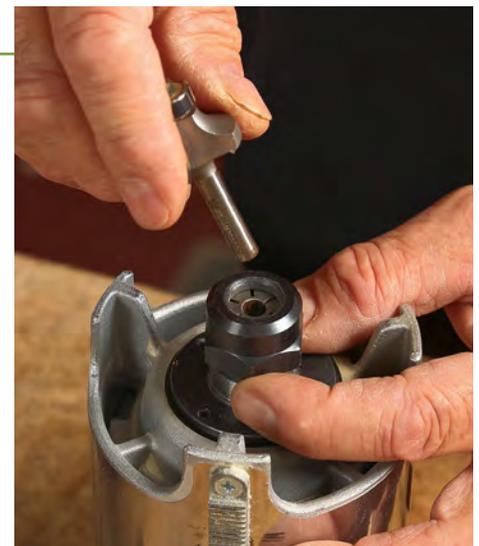
Installing the bit



Keep it clean. Any dirt, grit, or rust can interfere with the solid grip the collet has on the bit's shank. It is critical to clean the spindle and collet periodically with 4/0 steel wool or a synthetic abrasive pad.



Hold and tighten. All collets are tapered, and as the locking nut is tightened it compresses the collet “fingers,” which exert equal, consistent pressure around the shank of the bit.



Insert the bit. Place the bit so that at least $\frac{3}{4}$ of the shank is seated in the collet. If the bit bottoms out, pull it back out about $\frac{1}{8}$ in. or it could loosen while it is in the cut.

Edge work

The lower profile fixed-base router is generally better for tasks where the router is running along an edge, such as edge profiles and rabbets.

ROUTING A SIMPLE RABBET

Add stability to the base. Van Dyke retrofits all his fixed-base routers with an offset base, making holding the router while routing an edge easier. One hand is always resting on the base while the other is holding the handle, which gives a very secure grip.



Setting the depth on a fixed-base router. Simply adjust the motor until the bit extends past the baseplate the desired amount and lock it. Holding a small ruler or scale vertical on the router base is a challenge; a scale with graduations on the end makes the task easier. You can also set the depth with spacer blocks or keyway keys. Always test the cut on a scrap.



AN EASY REMINDER
With your right thumb pointing toward the stock, your forefinger shows the direction to rout.

Rout in the right direction. Feed the router so the wood is going into the rotation of the bit. With a handheld router this usually means feeding it left to right and you will feel the bit pulling itself into the workpiece. You should always feel the resistance of the router bit going into the wood when you begin a cut. The easiest way to keep feed direction straight when using a handheld router is to use the thumb and forefinger trick shown in the drawing at left.



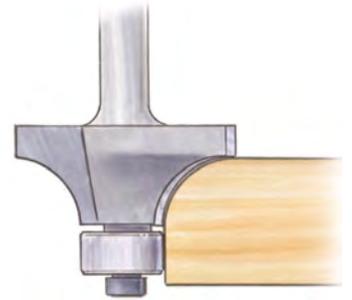
Cut the rabbet. Taking a very deep cut in one pass can be dangerous and will usually yield a rough surface. A better alternative is to take a shallow cut first and readjust to the final depth for the second pass.



FOUR PROFILES FROM ONE BIT

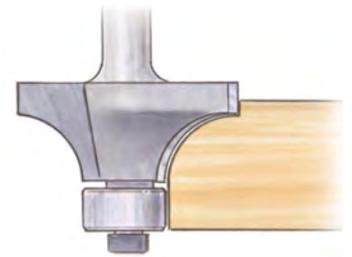


One bit, two bearings, multiple profiles. By varying the depth of the cut and changing the size of the bearing, you can create different profiles with the same bit.



ROUNDROVER

With the larger bearing installed, set the bit flush to the base to get as much curve as possible without creating a fillet.

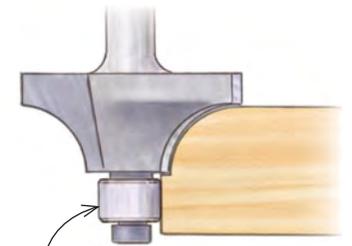
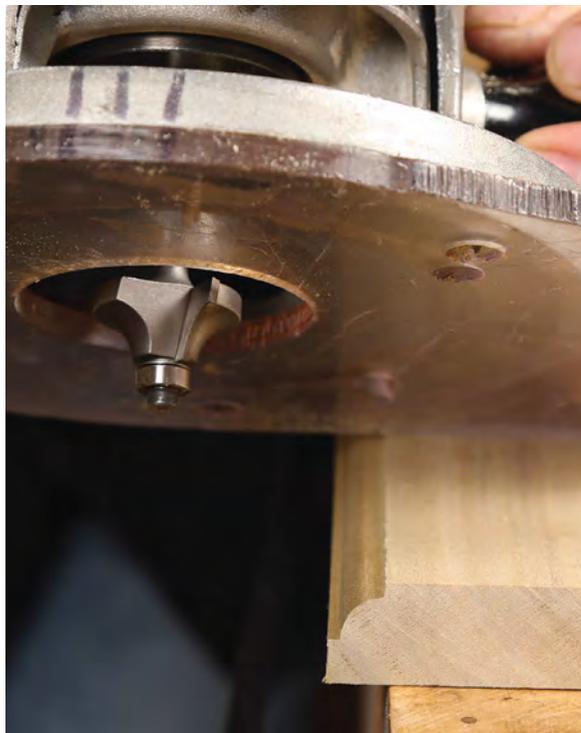


FILLET AT THE TOP

Again, with the larger bearing, set the height of the bit so its corner extends past the router's baseplate. This cut will create a roundover with a fillet on top.



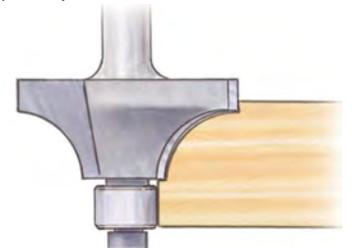
Change out the bearing. Use an Allen key to loosen the bearing, take off the $\frac{1}{2}$ -in. bearing, and put on a smaller, $\frac{3}{8}$ -in. bearing.



Smaller bearing

FILLETS BOTTOM AND TOP

Switch to the smaller bearing, and you can cut a fillet at the bottom (above). Lower the bit to create fillets top and bottom (below).



Using a fence

If you aren't using a bearing-guided bit, a handheld router should always be used with an attached guide of some sort. You can add a fence to the router or to the workpiece.

ADD A FENCE TO THE ROUTER



A fence on the router. A simple and effective method for cutting dadoes and grooves parallel and near to an edge is to attach a commercial or shopmade fence directly to the router.



TWO WAYS TO SET THE DEPTH ON A PLUNGE ROUTER



Strike a depth line. A simple way to set the depth is to make a mark on the edge of the workpiece, plunge the router to hit that mark, lock the plunge lock, and tighten the depth-control bar.



Insert a spacer. With the router turned off, plunge down so the bit just touches the surface of the wood (left), and tighten the plunge lock. Insert a spacer that matches the desired depth of cut between the turret stop and the depth-stop bar (right). Lock the depth bar and retract the router. Plunge depth will be the thickness of the spacer.



CLAMP A STRAIGHTEDGE TO THE WORKPIECE

Locating a straightedge.

When using a straightedge as a fence you need to account for the offset between the bit and the edge of the router base. To ease the task Van Dyke routed a groove in a scrap of MDF to act as an offset guide. Line up the groove in the guide with the layout line and make a mark at the edge of the guide. Then align the fence to the mark and square it before clamping it in place.



Consistent routing. Make a clear, easy-to-read registration mark on the outer edge of the base. Always keep that mark against the fence to be sure of consistent results when making your offset guide and routing.



The depth of cut on the fixed-base router is fully established before you turn it on. When turning it on, make sure you have a secure grip, and that the router is resting on the surface of the wood with the bit well out of contact with the workpiece.

Router sizes

A variety of motor sizes are available, from under 1 hp up to 3¼ hp. But because most routing tasks are not demanding enough to require the power of a 3-hp router, the bigger routers are way more power, weight, noise, and vibration than you typically need. When that much power is needed you will usually have more success using a large router in a well-fitted router table. On the

other hand, extremely small routers like laminate or “trim” routers, while incredibly valuable and useful tools, are often too small for many everyday routing tasks.

Medium-sized routers, 1½ to 1¾ hp, will handle all but the heaviest jobs and this is what I recommend as a first router. The good news is that most manufacturers offer their mid-size routers as a “kit” which includes a single motor with both a plunge and a fixed base, giving you the best of both worlds for a lot less money than buying two individual routers.

Router bit size, and consequently, router collet size, is a factor that also should be considered. Most bits are available with either a ¼-in. or ½-in. shank. Some large bits are only available with a

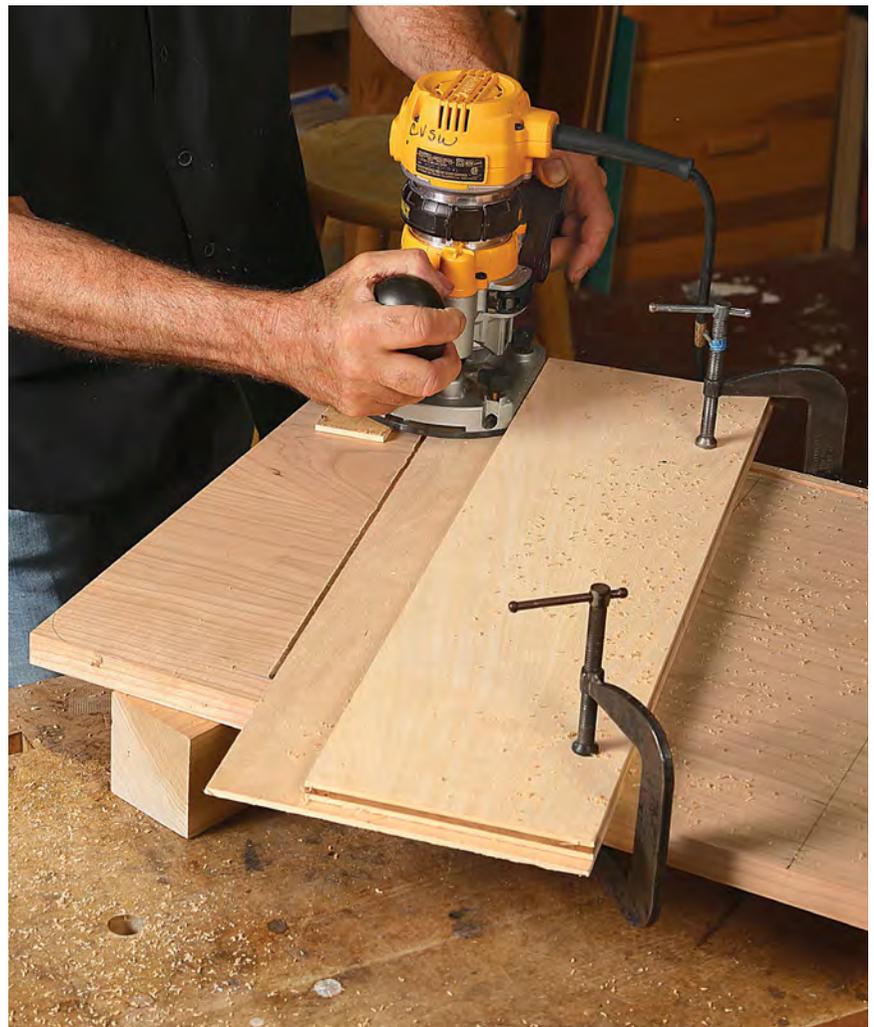
Zero-clearance fence

For repetitive cuts with the same bit, it's worth the extra time to make this fence. Setup is easy because the edge of the base shows you exactly where the bit will cut.

Make the fence. Use pin nails or screws to fasten a straight piece of wood parallel to the edge of a piece of $\frac{1}{4}$ -in. plywood. Keep it about $3\frac{1}{2}$ in. from the edge of the plywood. Clamp the assembly to the edge of the bench, making sure it hangs over enough that the router bit cannot cut into the bench. Run the router left to right against the fence to cut off the excess plywood. This fence is now the exact offset for that router with that bit, so label it as such and keep it for future use.



Anti-tilt spacer. To keep the router from tipping while running against the fence, Van Dyke uses double-sided tape to attach a $\frac{1}{4}$ -in. spacer to the bottom of the router base. To use the zero-clearance fence, clamp it to your workpiece with its edge on the layout line. This jig is especially useful for situations where the cut is not parallel to any edge.



T-square fence

Used to rout dados square across the width of cabinet sides, this jig is easily made and incredibly useful.

Criss cross and add some screws.

To make the jig, screw two pieces of approximately 6-in.-wide plywood together at exactly 90°. To create an alignment mark, make a shallow, short cut into the straightedge with the router registering against the fence. This makes locating the jig on your workpiece a simple matter of matching the routed mark to a layout line.



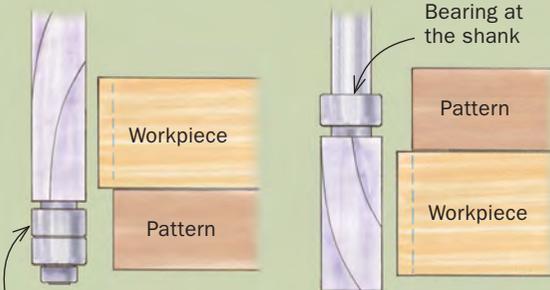
Clamp and go. Clamp the workpiece to the bench and the jig to the workpiece (above), making sure the straightedge is pressed firmly against the work. **Note:** The alignment mark you routed is specific to the router and bit you made it with, but by rotating the jig and/or turning it over, you can expose seven new edges that can be used for different routers and bits. Make sure to mark which bit and router you use where.

Pattern routing

An almost infinite variety of shapes can be made with a handheld router and a well-made pattern.

Shaping to a pattern.

Van Dyke uses patterns made of plywood, Masonite, or solid wood to replicate shapes of any kind. First, he uses a jigsaw to cut out most of the waste (right), then clamps a routing pattern beneath the workpiece (far right), and makes sure both are securely clamped to his bench.



Bearing at the end

FLUSH-TRIM BIT

PATTERN BIT

Bit options. When using a flush-trimming bit (as in the photos here), place the pattern below the workpiece; when using a pattern bit, the pattern goes above the workpiece. Both bits have a bearing the same diameter as the cutter and trim the workpiece flush to the pattern. Take extra care when using the pattern bit. If the router tips, the bit will usually tip into the workpiece, ruining your work.



Guide bushings

Another effective way to follow a fence or template is with guide bushings.

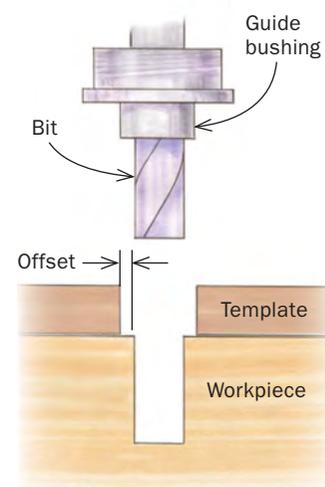
Guide bushing set.

Made to be attached to a router's sub base, guide bushings are run against a fence or template. Van Dyke cuts the bearing cylinder short so it can be used with thin templates.



The bushing and the template.

Guide bushings don't automatically cut flush, because of the offset between the outside diameter of the bushing and the diameter of the router bit. The router template must be sized to account for this offset.



1/2-in. shank, so if you want flexibility, make sure that your first (or only) router can accept both 1/4-in.- and 1/2-in.-shank bits. Smaller routers that only take 1/4-in.-shank bits are great, but I would have one only as my light-duty router.

Feed rate

How fast you move the router as you rout is dependent on a number of variables, but the goal is to get the best quality cut with little to no burning. Too fast a cut will usually result in a rougher surface, while too slow a cut may produce burning. Routing end grain is more prone to burning, so you may need to speed things up in that situation. Making a test cut is always a good way to decide on the feed rate. Using a dull router bit will always give you an inferior cut and since bits usually cost less than \$8 to sharpen, I send my bits out regularly to a good professional sharpener. □

Contributing editor Bob Van Dyke runs the Connecticut Valley School of Woodworking.



Plunge with a bushing. This is an effective way to make large mortises. The routing will be easier and more accurate if the majority of waste is first removed on the drill press.