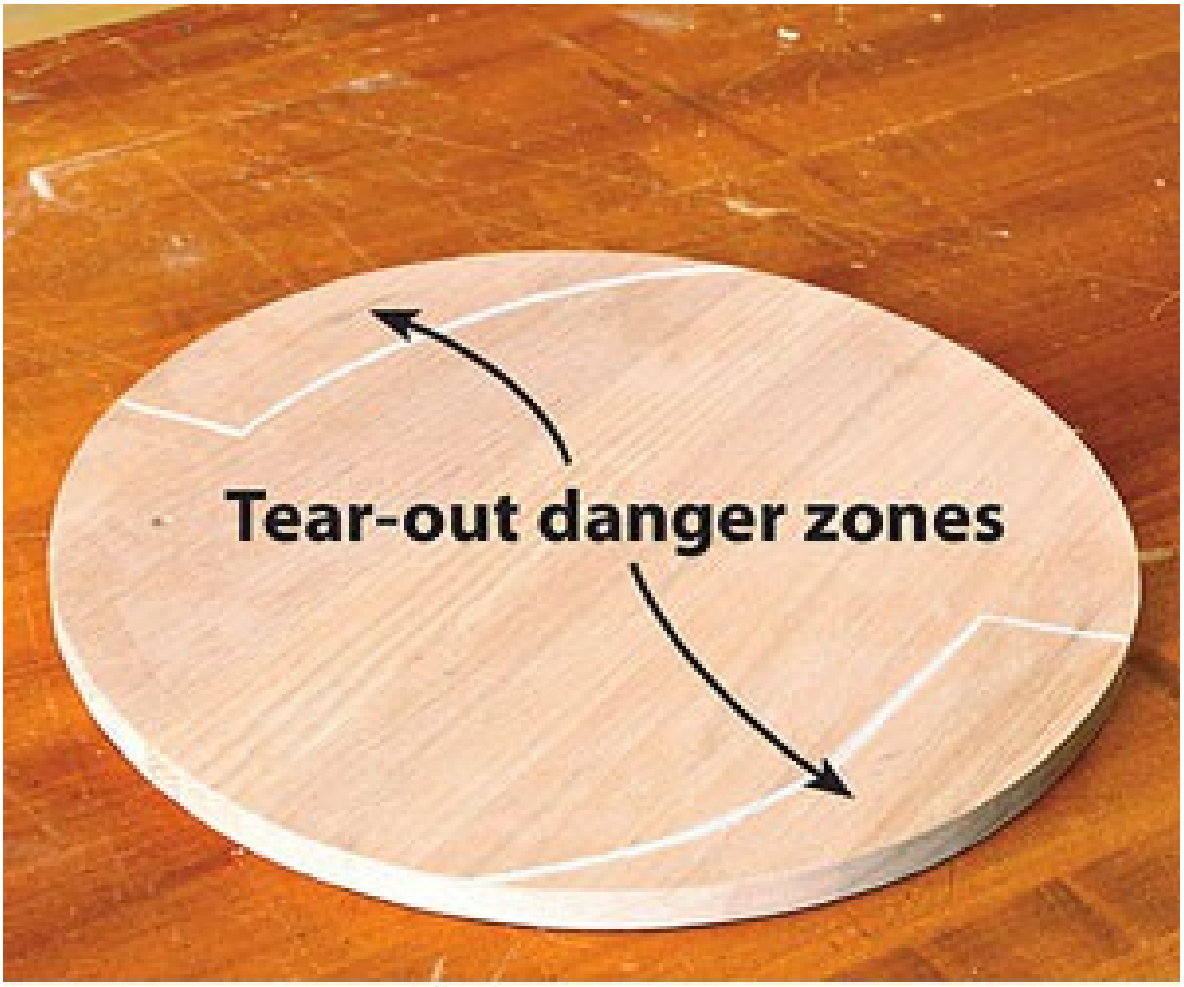
## All about tearout

Few things frustrate a woodworker like painstakingly shaping a curvy workpiece, only to have a router bit tear out the grain during final machining. Tear-out occurs when the spinning bit encounters grain that isn't strongly supported by its own structure. It often happens in the transition area from end grain to edge grain, where the wood gives way along the grain, as shown, rather than accepting the shape of the bit. Although tear-out can occur during any routing operation, curved pieces are particularly prone.




**Danger zones feature grain that parallels the edge and is prone to tear-out.**

## General rules

Here are some general rules to help reduce the chances for tear-out:

- **Use a sharp bit.** Dull bits chop at the wood rather than slice it cleanly.
- **Rout in 1/8"-deep increments** to limit the amount of material being removed at one time.
- **Maintain a wide stance** (feet at least shoulder-width apart) to avoid being caught off-balance.

**Divide and conquer**

Before putting the router to the wood, identify the tear-out-prone "danger zones" on your workpiece, as marked with chalk in photo. Routing these zones in a normal left-to-right (counterclockwise) direction increases your chances for tear-

out. Instead, climb-cut the danger zones: right to left (clockwise) on outside edges, and left to right (counterclockwise) on interior edges.


**Rout the areas unlikely to tear out before moving on to the danger zones.**

## Rout the easy edges first

Begin by routing the edges not prone to tear-out as usual....


**Climb-cut the danger zones, holding the router firmly to guard against jerking.**

## A steady hand for climb cutting

Next, climb-cut the tear-out-susceptible areas. Repeat these steps until you achieve the finished depth of cut. Finally, rout the entire profile in the usual direction to remove any bumps or ridges caused by the jumpy climb cut.

**The unsupported tip of this shelf bracket broke away as the router made a simple round-over beaded profile.**

## More helpful tips

When possible, climb-cut using a handheld router with your workpiece clamped securely to the bench, rather than attempting it on a router table. Why? Because climb cutting—routing in the same direction as the rotation of the bit—on a router table can pull the workpiece from your grip, throwing it off the table. It also exposes your hands to the spinning bit.

No matter whether a workpiece edge curves outward (as with the tabletop shown previous slide) or inward (as on the shelf brackets, shown in photo), climb-cut troublesome areas to prevent tear-out.


**By leaving extra material to back up the bracket point, any tear-out will happen on the waste side of the line.**

## Watch for tear-out prone edges

Workpieces that narrow near the end as shown in photos might tea

**Leave about 1/16" of waste material so the router needs only to shear off fine shavings rather than large chips that cause tear-out.**

## Oversized pieces can minimize tear-out

To avoid tear-out, cut the piece oversize, rout the curved edge, and then rout the piece to final size.

When using a template to create a workpiece, cut away the waste material as close to the cutline as possible. Then, when you rout with a flush-trim or pattern bit, you can run the router in either direction with little chance of tear-out.