Biscuit-Joining Basics
by Joe Hurst-Wajszczuk

Because biscuit joints are easy to mark out and quick to cut, using one almost seems like cheating. In truth, biscuits may not be as strong as some traditional types of joinery and may not be suitable for heavy-duty loads, but they’re perfect for plenty of projects. Woodworkers and carpenters have been employing biscuits to successfully solve all sorts of assembly and alignment problems for over two decades. The easiest way to appreciate their versatility and strengths is by putting them to use.

The safest way to cut biscuit slots is with a biscuit joiner. This tool is designed to do nothing but plunge-cut arc-shaped slots. (Unlike the router/biscuit-cutting bit combo, the biscuit joiner’s cutter retracts inside the tool as you pull it away from your work.) From there, a flat, football-shaped piece of compressed wood, called a biscuit, fits into a pair of matching slots.

What makes biscuits better than dowels? The size and shape of the slot. The oversized slot lets the biscuit move slightly, enabling you to tweak parts into perfect alignment. However, once glued, the biscuits swell and lock the parts in place.

You can master basic biscuit joiner use in five minutes, but you will continue to learn new tricks with each project. Following are some common joints that you can practice making to familiarize yourself with a new tool or get better reacquainted with your old workhorse.

BEGIN WITH THE TWO SLOT TEST

A biscuit joiner should cut a slot slightly deeper than half the width of the biscuit you’re trying to fit. This space provides some wiggle room, but still ensures that about half remains on each side of the joint. Here’s how to check your joiner’s depth setting. First, make a test slot. Next, stick in a biscuit and mark a pencil line where the biscuit touches the wood, as shown in Photo 1. Now flip the biscuit and mark a second line. Adjust the depth-setting dial on your tool so that overlap is about 1/8", as shown in Photo 2.
FACE-TO-EDGE JOINTS ARE THE BREAD-AND-BUTTER JOINT for biscuit joiners. A biscuit joiner can cut the needed joints to assemble a cabinet in about as much time as it takes to drag a heavy sheet of MDF to your table saw.

Building a simple box provides a good opportunity to explore the advantages and disadvantages of fence- or base-guided slot cutting. Sometimes, you’ll have the freedom to choose the method, but sometimes the decision is made for you. Box-making uses both.

First, position the side and end panels together and draw lines across the joint to mark where you want a biscuit. (As a rule of thumb, place the biscuits about 6” apart.) When you pull the panels apart, you should see marks on the edges and ends.

To cut the grooves in the edge of the end panel, place the work flat on the workbench, as shown in Photo A. Adjust the fence so that the blade cuts a slot roughly through the center of your work. To cut the face grooves in the side, you’ll balance the fence on the panel’s edge as shown in Photo B.

To cut the biscuit slots for the shelf, draw a pencil line across the inside face of the side and clamp the edge of the shelf against the line. Next, mark your biscuit slot marks on the top of the shelf. Resting the biscuit joiner on its base, place it on the side and cut the slot for the shelf as in Photo C. The base also serves as your reference when slotting the sides. Turn the joiner on its head, use the line engraved on the bottom of the tool to align it with your slot marks, and plunge it into the side, Photo D. Once cut, insert biscuits into the grooves and flip the shelf up on the location line.

Biscuit Sizes

To cut grooves for most of the biscuit sizes (0, 10, 20), simply adjust the stop on your biscuit joiner. Smaller FF (or face frame) biscuits are available for the Porter-Cable biscuit joiner. To use these mini biscuits, you’ll need to switch out the standard 4” dia. cutter with a smaller 2” dia. blade.

<table>
<thead>
<tr>
<th>Biscuit Size</th>
<th>Width</th>
<th>Length</th>
<th>Approx. Slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF</td>
<td>1/8”</td>
<td>1 1/8”</td>
<td>1 1/4”</td>
</tr>
<tr>
<td>0</td>
<td>1/6”</td>
<td>1 1/8”</td>
<td>1 1/4”</td>
</tr>
<tr>
<td>10</td>
<td>1/4”</td>
<td>2 1/8”</td>
<td>2 1/4”</td>
</tr>
<tr>
<td>20</td>
<td>1 1/8”</td>
<td>2 1/4”</td>
<td>2 1/2”</td>
</tr>
</tbody>
</table>
Biscuits are also an easy way to build mitered and end-to-edge frames that you would use for picture frames or for a cabinet’s face frame. In this case, biscuits are very useful because they are adding reinforcement to otherwise weak end-grain joints.

Start by selecting the right biscuit. An easy way to do this is to position the joint together then arrange one or more biscuits on top. Drawing a center line on a test biscuit can help you lay out the slots as shown in Photo E. Wider biscuits provide more strength (even if you saw off an end), but there are times when you want the biscuit to be hidden within the joint. When form is as important as function, use the Biscuit Sizing Chart on page 13. When picking a biscuit, don’t forget the wiggle room. The slot is usually about 3/16” wider than the biscuit you’re trying to fit.

When slotting narrow pieces, don’t hand-hold the stock. Because a portion of the blade will be exposed while making the cut, and since the spinning blade can “walk” if the tool or work isn’t properly held in place, it’s too easy to get hurt. Eliminating the risk of a visit to the ER is easy: simply clamp narrow pieces to a stopblock as shown in Photo F. You can now align the center mark on the joiner with the marks on your stock and make the cut. After making the cuts, glue the biscuits into their slots and clamp the frame together. Once the glue has dried, you can slice off the protruding biscuit tip as in Photo G.

Double-Biscuit Joinery

Biscuits don’t fare well when matched against other joints in wood-joint torture tests. Because biscuits are relatively short, it doesn’t take a rocket scientist to realize that this joint isn’t as strong as traditional mortise-and-tenon or half-lap joints.

An easy way to strengthen a biscuit joint is to cut two grooves, as shown at right. In seconds, you’ve doubled the gluing area of the joint. Try to leave a ¼”- to ½”-strip of wood between the biscuits to maximize available gluing surfaces and preserve the strength of the wood. (With careful spacing, you can use the double-biscuit technique on a ¾”-thick rail and stile joint.)

To cut the grooves, I prefer to use spacers instead of my fence. Referencing the joiner and working against my bench is fast, and for those times when I forget to cut a slot, easily repeatable.
Face miters are a way to hide end-and edge-grain when making solid wood boxes or plywood cabinets, but long miters are tough to glue and tricky to reinforce. A few biscuits can solve both problems. They can register the ends so that the corners can’t slip during clamp-up and strengthen the otherwise end-grain joint. A biscuit-reinforced miter is as strong as a full table saw-cut spline, but biscuits can be hidden within the miter for a cleaner-looking joint. (With the table saw, you cut the spline from edge to edge.)

To cut a slot in an angled edge, use your fence. How you cut the slots in the mitered face depends on the fence-adjustment flexibility of your biscuit joiner and your working style. If your router has a fixed fence (or if you prefer working with your workpiece flat against your bench) you will want to try making your cuts as shown in Photo H. Set your fence to 45°, adjust the cutter depth so that it doesn’t slice through the thinner tip of your miter, and make a plunge cut into the end. Some joiners, like the Porter-Cable 557 (see the Buying Guide) have a two-stage fence that can reference the outer face of the miter as shown in Photo I. This design prevents corner alignment problems, especially if the stock thicknesses aren’t equal. The wrap-around style of this fence also makes it easier to hold the tool in place while making the cut.

There are times, as when joining a rail to a leg where you may not want a flush-fitting joint. Your biscuit joiner is equally adept at creating offsets. The trick is to use a spacer that the same thickness as your desired step back. The spacer-offset trick can be used with your biscuit joiner’s fence, or under the base of the tool, as shown here. (I think resting the joiner on top of a large hardboard spacer is a lot easier than trying to sandwich the spacer between the work and biscuit joiner’s fence.)

To make the offset joint, mark the leg and apron for the biscuit slot just as before. Now choose a spacer that is the same thickness as your desired offset. Position the spacer under the jointer as shown in Photo J, position the leg with the show face against the bench and cut the slot. To cut the matching slot in the apron, simply remove the spacer and slot the end of the board as shown in Photo K. Be sure the show face is touching the bench.
THE EDGE-TO-EDGE BISCUIT JOINT

YOU MIGHT WANT TO THINK TWICE before using biscuits for solid-wood edge joints (See “Biscuits or No Biscuits?”). But biscuits are very useful for attaching solid wood edging to sheet goods, and also when you need to straighten out bowed boards. With practice, you may be able to biscuit an edge joint in less time than it takes to read how it’s done.

To start, position the boards edge-to-edge, then make short pencil lines across the joints about every 8” for the slots, as shown in Photo L. Make the first and last slots at least 3” in from the end; that way, you won’t accidentally expose a biscuit if you trim the panel later.

Next, set the joiner’s fence height to cut a slot roughly in the center of the board. To ensure that the joiner’s fence is setting the slot height, and not the base, clamp the board so that the edge sticks off your bench as shown in Photo M. Let the cutter reach full speed before plunging it into the wood.

You’re now ready for glue-up. Because the biscuits swell quickly, do a dry assembly and make sure everything’s set before you open the glue bottle (Photo N). Remove any sawdust from the slots, test-fit your biscuits, and dry-assemble the panel. If everything fits like it should, you’re set to reassemble it for good with glue.

Position the biscuits every 8” across the joint.

Keep the fence flat on the board surface when cutting slots.

Use a biscuit-slot bottle to quickly squeeze glue into the slots.

Polyurethane glue lacks the moisture biscuits need to swell and lock into their grooves. Wetting or misting the biscuits with water before installation will cause the biscuits to swell and activate the poly glue. Conversely, unused biscuits can absorb moisture, swell, and then fail to fit where they’re needed. To keep biscuits from “spoiling”, store them in zipper-lock plastic bags or other airtight containers.

Biscuits or No Biscuits?

Edge joints appear at the end of this article because this may be the biscuit joint’s least important role. First, biscuits don’t add any strength to a carefully jointed edge joint. In fact, biscuits can make good glue-ups more difficult. In the time it takes to apply glue to the biscuit grooves and edge, the biscuits can swell enough to make it harder to pull the joint together. One miscut slot can create an alignment problem that’s mallet-proof.

A bigger problem can occur after removing the clamps. Even though this glue is dry, moisture from the glue can swell the wood above the biscuits. Sanding too soon after glue-up can remove too much wood and create divots when the excess moisture evaporates.

Biscuits can sometimes help pull bowed boards into alignment. When used for a large-panel glue-up, consider using them without glue.
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