

# Take the **Plunge**

The biscuit machine's ability to turn butt joints into strong, accurate spline joints in a heartbeat has revolutionized the way cabinets are built. Biscuits are usable in practically any woodworking material, but they are ideally suited for joints in sheet goods such as plywood, flakeboard and medium-density fiberboard (MDF), where they are faster and better than just about any other joint. Biscuits are the Volkswagen Beetle of woodworking joints: inexpensive, dependable, uncomplicated, unfinicky. No one would mistake them for hand-cut dovetails, but when you need basic transportation, they're hard to beat.

# A bit about the machine

There is a good deal of variation in quality and price among biscuit machines. Without getting into a full-scale comparison of the many machines available, there are a few things I can recommend to anyone sizing up the field.

First, take a test plunge. You can get a feel for a machine's plunge action without even turning it on. Avoid any machine with excessive play in the plunge action, as any slop here will result either in a joint that does not come together easily or in one that won't perfectly line up. Then examine the fence. It should operate easily and accurately and lock down positively. The best machines have a fence that folds out of the way without losing its height setting. Look for a fence that locks down parallel with the cutter. You can get by with one that isn't self-aligning, but it means extra work every time you set the fence. Be wary of fences that are difficult to tighten securely or that require an additional tool to tighten them.

A convenient dust bag or vacuum-hose connection is important both for keeping the shop clean and for keeping wood chips and dust from flying back at you. Finally, although the biscuit machine's blade does not have to be changed very often, ease of changing it, and the number of settings that need to be readjusted afterward, should also inform your selection.

# Safegrip, good posture

To cut an accurate biscuit slot, the fence of the biscuit machine must be held perfectly flat on the face of the board. If the fence is not being used, the base of the machine must be placed along with

# Getting good at using a biscuit machine

#### ROBERT W. ΒY LANG





Lightning-fast layout. The speed of biscuit layout is one of the prime advantages of the system. A freehand pencil slash across the joint is all it takes. Even if the slash isn't square to the joint, the slots will be aligned.

Switch

Handle

Spindlelock pin

Adjustable fence

QUICK TOUR OF THE TOOL

Dust bag

Base

Centerline

of blade

Originated in Switzerland in the 1950s, biscuit joinery is a powerful technique executed with a simple tool. Learning to use biscuit joinery efficiently and to its full potential takes experience, but a single session is sufficient to learn how to operate the machine.



Plunge-depth adjustment knob. The knob has settings for the three primary sizes of biscuits. M is for maximum depth.



#20



Nice teeth. The biscuit machine's blade is nearly always out of sight, but for safety's sake, it should never be out of mind. The vertical red line marks the centerpoint of the blade. Align it with the layout lines to cut a slot.



# **BISCUIT BASICS**

In his job as a cabinetmaker with a high-end renovation company, the author relies heavily on biscuit joinery in the many custom cabinets and built-ins he makes. Here, he builds a small plywood shelf unit to demonstrate how he lays out and cuts some essential biscuit joints.

#### **BEGINNING AT THE END**

Cutting slots into the face of a board near one end takes good posture and a steady stroke. There is very little bearing surface, so it is easy to let the machine tip, which will result in a mislocated slot. Mark layout lines on the face of the board rather than on the end so you can see them easily without bending down.

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## GET TO KNOW GUIDE BOARDS

For slots in the face of a board, guide boards provide both a reference surface and a place to strike the layout lines. Here, a guide board establishes the distance from the floor to the underside of the bottom shelf. Stops stapled on one edge and one end make it a cinch to align.





the workpiece on a reliably flat surface. If the machine or the workpiece is tilted at all, the two sides of the joint will not line up.

For cuts using the fence, it is common practice to hold the fence down with one hand while using the other hand to push the machine forward. But this should be avoided because it places your fence hand directly above the path of the blade. As with any sawblade, keep your hands away from the blade's path. It takes practice and a bit of finesse to hold the machine by the handle and still get a feel for keeping the fence properly mated against the workpiece throughout the plunge, but the increase in safety makes the time spent developing this skill well worthwhile. When plunging the cutter horizontally, hold your arms still and push forward with your whole body to reduce the chance of tilting the machine.

## **Dead-simple layout**

One of the great advantages of biscuit joinery is that the location of the slot along the vertical axis is determined by the fence or by the base of the machine—no layout is needed. When working with  $\frac{3}{4}$ -in. material, the simplest method of setting the fence is to place the machine and a piece of stock on a flat surface and bring the fence down to the face of the stock, This way, the machine will be registered to cut both from the fence and from the base of the ma-

## PERFECT SPACING



When you have parts that are equally spaced, you can cut the slots for them by "stepping" a guide board. The guide board's width will determine the distance from the bottom of one shelf to the bottom of the next. Cut slots along one edge of the guide board and fit



them with biscuits. Mate those biscuits with the first row of slots. By using the upper edge of the guide board to register the machine against, you can now cut the second row of slots. To cut the third row of slots, mate the guide board with the second row. The guide board's top and bottom edges must be perfectly parallel with each other, or the error will accumulate with each new row of slots you cut.





Continued on next page

chine. In the horizontal axis, a pencil slash across the joint is often all the layout that's needed. For example, to edge-join two narrow boards, layout is a matter of placing the boards edge to edge and making pencil marks freehand, estimating the distance between marks by eye. There is no reason to make the lines square to the joint, because the machine will be lined up with the first fraction of an inch of the layout line—even a line drawn diagonally across the joint will produce accurately mating slots. Also, because of the shape of the slot and the biscuit, there is some room for adjustment side to side. As to eyeballing the distance between the slashes, unless there is some compelling reason for locating a biscuit exactly

(as in gluing up blanks for raised panels, where a biscuit might be revealed during machining), extra time spent in locating biscuits precisely will not improve the quality of the finished joint.

Parts to be biscuited should be marked with a slash or an X to indicate which face is the top (in relation to the machine). This will ensure that parts are oriented correctly as you cut the joints and also during assembly.

# Nobody likes soggy biscuits

However you cut the slots for them, you want your biscuits nice and dry. That's because biscuits are made to expand. They are

#### OUT ON THE EDGE

For slots to be cut at the ends of boards, identical parts can be stacked and marked with layout lines. After doing this with all the shelves, the author screwed a block to his work surface to act as a stop while he cut all the slots.



#### **ADDING EDGING**

Solid edging can be added to a piece either before or after assembly. Here, the author lays out and cuts the slots for a poplar face frame after the birch plywood shelving unit is together. He registers the cuts from the outside of the unit because the face frame will be flush on the outside, its overhang to the inside.

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stamped out of sheets of beech in the factory, and the die compresses them. When glue hits biscuits, they absorb moisture and swell in thickness, producing an extremely tight joint. Because biscuits are like little sponges waiting for a spill, they must be stored in airtight containers. I store the bulk of my biscuits in the twist-tied plastic bags they come in. I decant them a pint at a time into a wide-mouth plastic bottle with a screwon lid. For biscuiting on site, I'll sometimes fill a resealable sandwich bag with biscuits and drop it in my tool belt.

# Snack on this: biscuits and water-based glue

It is best to use water-based glues (yellow or white) for biscuit joinery, because they provide the moisture required to make the compressed bis-

cuits swell. Epoxies and reactive polyurethane glues (Gorilla glue, for instance) don't provide this necessary moisture. They'll hold a biscuit joint together, but it won't be as tight as it would be with a moisture-expanded biscuit. If, for exterior work, for instance, you need a truly waterproof adhesive, try using urethane glue and spritzing the biscuits with water before gluing them in. One test has shown this to strengthen such joints (see *FWW*#118, p. 110).

It is important to use the proper amount of glue. Too much glue in the slots, and it will squeeze out everywhere. Too little, and it won't provide enough moisture for the biscuits to expand, reducing the strength of the joint. It will take practice to get the right amount of glue in the right places. Basically, you want the glue on the sides of the slot, not puddled at the bottom. There are dedicated glue applicators available, or you can use a brush or a stick to spread the glue evenly, but I just lay a line of glue at the top of each side and let it drip down. Glue should be placed in all the slots of the first workpiece before any biscuits are inserted. If you insert a biscuit each time you glue a slot, the biscuits begin swelling before the joint can be put together, making alignment and assem-

> bly difficult, if not impossible. After putting glue in all the slots in one workpiece, I insert biscuits and then put the second ration of glue directly on the biscuits and assemble the joint. If you put glue in the slots on both workpieces, you get a lot of dripping glue when you invert the second workpiece to assemble the joint.

> After assembly, clamps can be removed fairly quickly. Depending on the temperature of the materials and the room, the biscuits will swell up enough in a few minutes to prevent the joint from creeping apart. Adequate drying time should be allowed, however, before stressing the joint, to permit the joint to achieve its full strength.

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All puffed up. Because the machines that stamp out biscuits compress them, biscuits absorb water-based glue and expand to lock a joint. The biscuit at right

puffed up so much after a quick immersion in water that its stamp marks disappeared.

# **BISCUIT-JOINT OPTIONS**

#### EDGE JOINT

When edge-joining solid wood, biscuits are used mainly for alignment, because the joint is strong enough without them. Glue is not required on the biscuits. Place biscuits every 6 in. to 12 in.. depending on the flatness of boards to be joined.



# **OFFSET JOINT** Here, a typical leg-and-apron joint create the offset. To guarantee correct spacingbetween paired slots, use a spacer when cutting the second slot in each part.

When edgejoining sheet goods, glued biscuits are required for strength. Place biscuits every 6 in. or so.

Spacer

block

#### CORNER JOINT

In sheet goods, this is a reliable corner joint for cabinetry. It is typically made in <sup>3</sup>⁄<sub>4</sub>-in. stock with one #20 or #10 biscuit placed every 3 in. or 4 in.

If made in solid wood, such a joint is less sound, because all the glue surface in the slots cut into the vertical piece would be end grain. Perhaps use epoxy or urethane glue.

A simple jig stabilizes an unsteady operation.



Index mark for slot

Fence support keeps machine from tilting.

# **FRAME JOINTS**

assembly.

Mitered-Excellent in solid stock or sheet goods, a miter joint can be used in picture and mirror frames, cabinet doors, window and door casings. Slots can be registered from the fence or base of the machine. The joint can be adjusted for perfect tipto-tip alignment at

Butted-Suitable for solid stock or sheet goods, a butt joint is commonly used for face frames on cabinets. The smallersized biscuits now available considerably reduce the minimum width of the frame members. Consider double-biscuiting joints under stress.





is double-biscuited for strength. The fence is used at different settings for leg and apron to

First slot

Same fence setting for second slot





Cut slots to inside of midpoint of miter to avoid plunging through workpiece.

## MITERED **CORNER JOINT**

This joint is usable in solid stock, but it's better in sheet goods, especially MDF, where grain direction is not an issue. Layout lines go either on the inside or outside faces of the workpieces, depending on the type of fence used. No tip-to-tip adjustment of the parts is possible once the slots are cut.

Miter fences-Fences for miter slotting come in many types: some with the angle fixed, some adjustable, some combining fixed and adjustable. Slots can be cut with the fence set at 45° or 135°. Either will work, but a fence set at 135° registers off the outside edge, or tip of the miter, and ensures excellent alignment of the tips.

Fixed at 45°





Adjustable 0° to 90°



Adjustable 0° to 90° with fixed attachment





Drawings: Vince Babak