

The Miter Joint for Casework

This surprisingly
strong joint gives
furniture clean,
flowing lines

BY DAVID HYATT

Many woodworkers are familiar with the miter joint as used in picture frames or on a solid edging that wraps around a tabletop. However, this joint is also a useful and attractive means of joining the body of a cabinet. Whether constructed from plywood or solid stock, this clean, simple joint shows no core or end grain, and can be particularly appropriate in enhancing clean lines on furniture.

Unlike many woodworking joints, the carcass miter with its long, straight cuts lends itself to easy production with a variety



Clean lines and no end grain. Miter joints allow the grain to flow uninterrupted around this small cabinet.

Miters on the tablesaw



Simple on a left-tilt saw. Here, the thin point of the first miter runs against the rip fence.

of power tools. Although the joint can be reinforced with splines or biscuits, accurately cut mitered surfaces are strong enough for most locations using glue alone.

Cut miters with a tablesaw or router

The fastest and easiest way to cut miters is on a tablesaw, but you'll need a sharp blade to get a smooth, accurate cut with no burning or tearout. With veneered materials in particular, check the entire surface of the tablesaw and outfeed table for bumps that will scratch the thin surface.

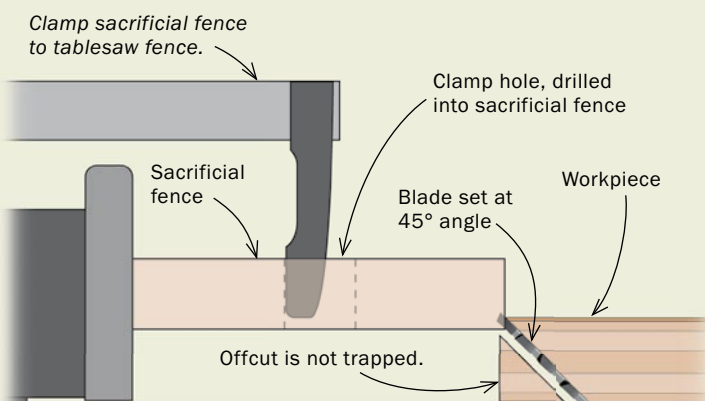
Use a slow, steady feed rate to reduce burning and tearout. Be vigilant about the last few inches of the cut; it is easy to twist the workpiece slightly and make a curved edge that will not fit properly with its counterpart. Also, make sure that the workpiece is pressed down firmly on the tablesaw. If the workpiece is at all warped, it will be difficult to cut a good joint.

Easier on a left-tilt saw—If you own a left-tilt saw, cut the workpiece roughly to size, tilt the sawblade to 45°, and cut the first miter with the inside of the workpiece face down. Then simply spin the workpiece 180° so that the mitered cut is against the fence. Make a series of cuts until the blade cuts the top of the workpiece to the correct width, and complete the cut.

Possible on a right-tilter—On a right-tilt saw, the procedure is slightly different. You could just relocate the rip fence to the

RIGHT-TILT SAWING WITH A SACRIFICIAL FENCE

A simple auxiliary fence and a precision setup make it safer and easier to cut case miters on a right-tilt tablesaw.



Using a right-tilt saw. When cutting the miter on the second side, to prevent the thin point of the first miter from burrowing under the rip fence, attach a sacrificial fence and cut the miter as shown. Hyatt uses a rubberized glove for better control.

left of the blade, but there isn't as much capacity on that side for wide workpieces. To cut miters safely with the rip fence in normal position, first cut the piece to its finished width, then tilt the blade and cut the first miter with the inside of the workpiece face up. If you then turn the workpiece 180° and run the sharp, mitered edge along the rip fence, that edge will try to burrow under the edge of the fence. At best you will get an inaccurate cut; at worst, kickback.

The best solution is to run the edge you are mitering against the rip fence. This will let you cut with the inside of the workpiece face down. To make this cut safely, clamp a sacrificial fence of medium-density fiberboard (MDF) to the rip fence, positioning the MDF so that its bottom surface is about 1/8 in. below the top of the workpiece. Then draw a pencil line along the edge of the MDF fence at the level where the top of the workpiece will make contact. Adjust the position of the rip fence and the height of the blade to a setting where the cut just meets that pencil line. This should ensure that the miter extends the full thickness of the workpiece, but doesn't reduce its width. You will want to make test cuts on a spare piece. With this setup, the offcut will fall away freely under the sacrificial fence.

Cut clean miters with two types of router bit—Although it takes longer to create miter joints using a router, the resulting cut is cleaner than one made on a tablesaw.

To cut miters with a router, first cut the workpiece to its final size. Next, to reduce strain on the router, not to mention the quantities of dust it will create if you are working with MDF, tilt the sawblade to 45° and remove the bulk of the waste, leaving a 1/16-in. shoulder at the corner of the miter.

It is safest to use a chamfer bit in a router table. Because the miter will extend the full thickness of the workpiece, the bearing will have no surface to run against. Instead, the workpiece will be guided by the router-table fence alone. Set the bit height to leave a sharp corner on the workpiece.

A third way to create miters is with a specialized locking miter bit that produces a strong joint with a large glue surface and interlocking parts. Because the height of the bit and the location

Miters on the router table

A CHAMFER BIT MAKES PERFECT MITER JOINTS

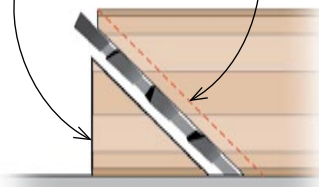
It takes longer to create miter joints using a router, but the cut is cleaner than one made on a tablesaw.



Remove the waste on the tablesaw, then finish with a router bit. Use a router table, where the workpiece can be guided by the fence, not the bearing.

To reduce strain on the router, use the tablesaw to remove most of the waste.

Final routed profile

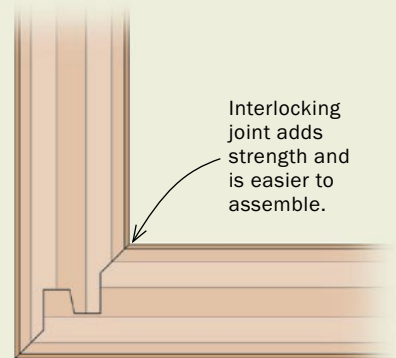


A LOCKING MITER BIT

This router bit offers a specialized variation of the joint: the lock miter. It produces a strong joint with a larger glue surface and self-aligning parts.



Interlocking joint adds strength and is easier to assemble.



One setup, two different cuts. When using a locking bit to create miters, one piece of each corner is run through the bit horizontally (above), while the adjoining piece is run vertically (right).



Use the tape trick for easy assembly



Tape the sections. With the inside of the carcass face down, stretch masking tape across the joints to draw them together. A straightedge at the top aligns the sections.



Flip the boards over. To turn over the sections together, clamp a strip of wood on each side of the top edge.



Glue the miters. Tape the areas adjacent to the inside of the miters to make squeeze-out easy to remove. Apply glue with a roller.



Assemble the carcass. With the base or back installed, roll up the sections and tape closed the remaining corner. Stand the piece on a flat surface and check for squareness.

of the fence must be set exactly, a locking miter bit can be used only in a router table. The pieces should be cut to their final size, and then run past the bit either vertically or horizontally to create the matching sections for each corner.

Assemble the carcass by rolling it up

The best way to assemble a mitered box or carcass is by gluing it all at once. Masking tape makes this possible. Place the four components in line in the sequence front/side/back/side, with the top edges

toward you and the outside face up. Use a straightedge to align the top edges and slide the panels together so that the sharp edges of the miters are touching.

Tape together the three touching joints by stretching short pieces of masking tape across them to create tension, and draw the seam together tightly. To make the assembly stiff enough to flip over to expose the faces of the miters, clamp a strip of wood on each side of the top edge of the panel.

With the inside of the carcass now face up, insert any bottom or back piece and



Reinforce the corners. While the glue is soft, run the shaft of a screwdriver up and down the edge to round over the corners slightly. This closes small gaps and makes veneered corners less prone to catching and tearing.



Peel off the tape. After the glue has set, remove the tape. Pull it across the grain to lessen the chances of pulling away wood fibers.

do a dry run by rolling up the sections. If all is well, lay the sections open again, and run strips of masking tape along the inside edge of each miter joint. The tape will be carefully peeled away after the glue has begun to solidify, removing almost all squeeze-out.

Use a small roller or brush to apply glue to both sides of each miter joint. Then slowly roll up the assembly and apply masking tape to the final, untaped joint. Set the assembly on a flat surface and check that everything is square. Stubborn

joints can be drawn together with band clamps. If you use the locking miter bit, the joints can be clamped with no need for masking tape.

Two ways to reinforce vulnerable corners

Plywood veneer lends itself to miter joints because they conceal the core, but the outside corner of veneered surfaces can chip or sand through easily.

One way to overcome this problem is to burnish the joint. You can use a burnishing tool, but any smooth metal rod such as a

screwdriver shaft will do. Use the tool to rub the sharp corners of the miter joints after the glue has grabbed, but before it dries completely. The sharp edge will be pushed back on itself and will form a small roundover, and the glue will help solidify the burnished corner when it hardens.

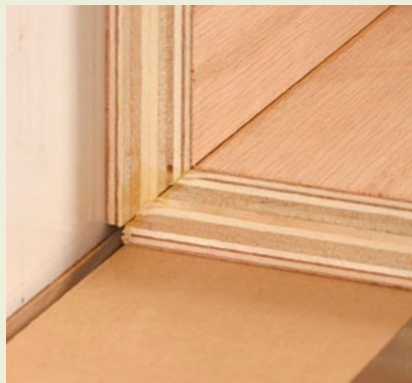
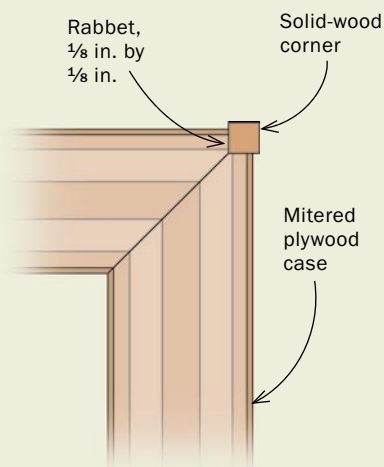
As soon as the joints have dried to the point that they can be handled safely, carefully peel off the masking tape. It's a good idea to peel away the tape in one direction so that it won't pull up the grain of the wood. Burnish the joints several more times as the assembly dries. This process usually will eliminate any gaps in the miter joints that were the result of slight inaccuracies in machining or where the joint was not completely pulled together during clamping. Continue to be very careful when sanding the corner after it has dried or you will sand through the veneer.

Another way to strengthen a mitered corner is to insert a strip of solid wood. It will be almost invisible if the wood and the veneer are the same species and the strip is $\frac{1}{8}$ in. square or less. To create a contrasting design element, use a different species. Once the miter joint has dried, use the tablesaw or router to cut a small rabbet in the corner. Glue on a solid strip that is slightly larger than the rabbet and clamp it with masking tape. When dry, plane and sand it flush with the sides and round over the corner with no danger of sanding through the veneer. □

David Hyatt is a woodworker near Vancouver, B.C., Canada.

SOLID-WOOD CORNER FOR ADDED DURABILITY

To strengthen a mitered corner, a strip of solid wood can be inlaid into it. For an almost invisible joint, use the same species as the sides.



Rabbet the corner. Cut a $\frac{1}{8}$ -in.-sq. rabbet in each corner using the tablesaw or router.



A solid-wood corner. Plane and sand the strip of wood flush with the veneered sides. The corner can then be slightly rounded without risk of cutting through the veneer.