

Deck Chair with Flair

Tapers, curves, and angles converge in a sleek, durable outdoor chair

BY ROB HARE

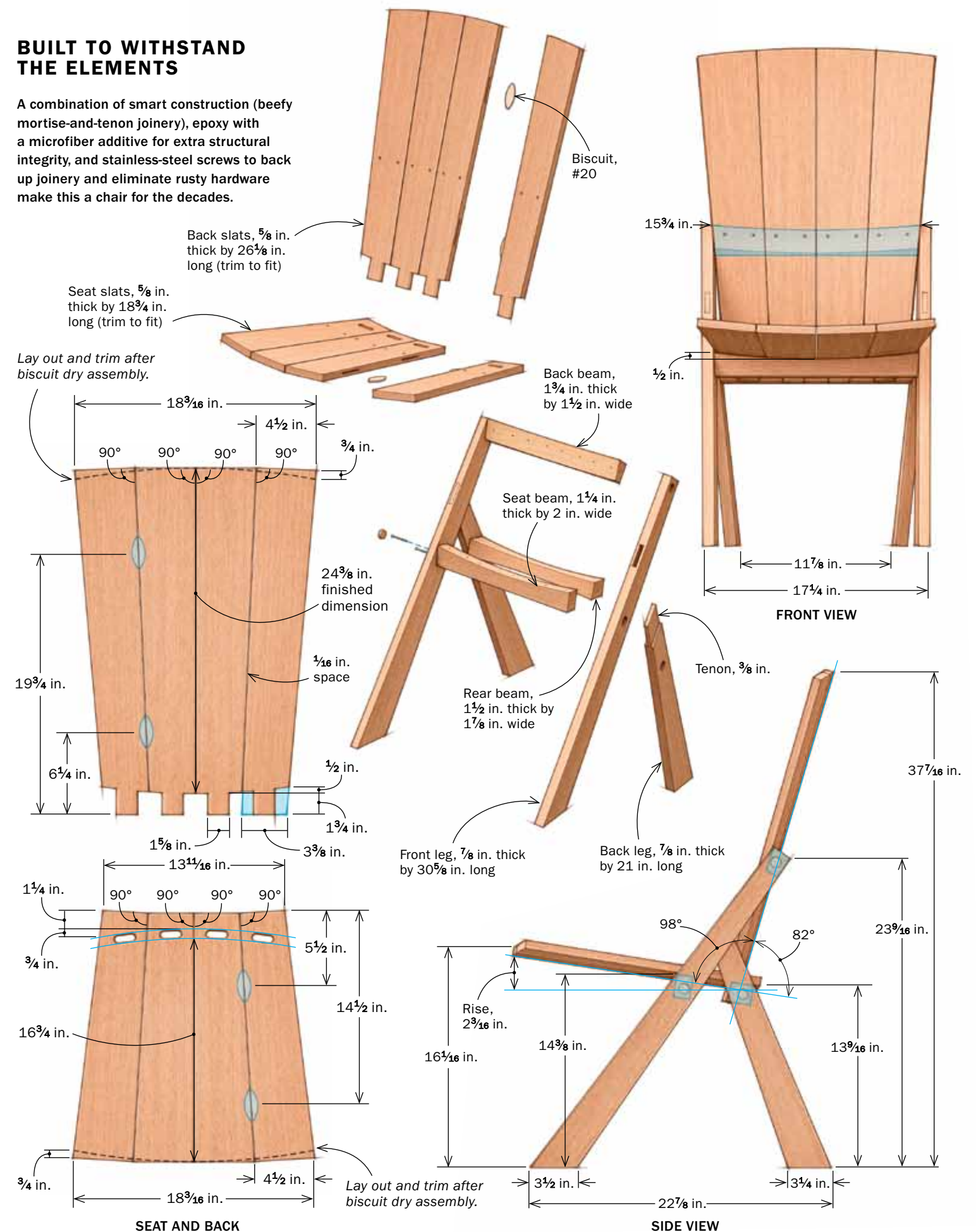
In 1984 I built a gazebo from green white oak. I had a 3-by-4-ft. stone slab table for it, but I needed some comfortable chairs that would do well outdoors. I came up with this design, influenced in part by Adirondack chairs, and used scrap oak from the gazebo, knots and all, to make a set of them. Thirty-seven years later, with zero maintenance and never having been stored indoors, one of those original chairs is still in use.



Time tested. Without finish, this 10-plus-year-old redwood chair has weathered to a gorgeous gray and the construction is still holding strong.

BUILT TO WITHSTAND THE ELEMENTS

A combination of smart construction (beefy mortise-and-tenon joinery), epoxy with a microfiber additive for extra structural integrity, and stainless-steel screws to back up joinery and eliminate rusty hardware make this a chair for the decades.



Seat and back slats

Hare treats the four back slats and four seat slats as separate mini-assemblies. Other than the difference of mortises in the seat and tenons on the back, they get moved along in the same way.



Start with a single-sided taper. An angled plywood jig holds the workpiece in place as Hare rips the taper on one side of each slat.



Biscuits do triple duty. The biscuits locate the seat and back slats front to back. They also lock all four slats into one assembly. Finally, by cutting a #10 slot and using a #20 biscuit, they create a consistent gap between the slats. Adjust the #10 setting so the resulting gap is $\frac{1}{16}$ in.



Mortising jig helps lay out tenons. While the back slats are dry-fitted and clamped, use the mortising jig from the seat slats to transfer layout lines for the tenons onto the back slats.

Start by cutting the pieces to the basic width and length, with the ends square. Joint one long edge, set it into the jig, tape it in place, and then rip the taper. The tapered front and back legs are cut in the same manner with similar jigs.

Seat slat and back slat biscuits

Once the seat and back slats are tapered, you can start getting them ready to assemble. The first step is to cut the biscuit joints. I use #20 biscuits here but I cut the slots for them at a #10 setting. Doing so creates a consistent gap between the slats. I fine tune the #10 depth-of-cut setting to produce $\frac{1}{16}$ -in. gaps. The biscuits keep the slats aligned while also letting the slats flex in unison when you sit back in the chair.

Mortise the seat slats. With the seat-slat assembly dry-fitted flat and clamped together, Hare uses a router template to cut the mortises. With the template clamped in place, he first drills a clearance hole for the router bit (right). Then he uses a bearing-guided straight bit to cut the mortises (far right). Blocking under one edge of the template creates a slope so the mortises are cut at an 8° angle.



Draw the curve. With the seat slats still dry-fitted, Hare uses a framing square and a template to draw the curve at the front of the seat. He'll do the same with the curve at the top of the back slats.



Since then I've built sets in various woods. Because no part longer than 32 in. is needed to build these chairs, cutoffs are a good source of wood. The Honduran mahogany I'm using for a current run of them is all cutoffs from another project.

Taper the slats and legs

I start by getting all the tapering behind me. I use four simple jigs to taper the seat slats, back slats, front legs, and back legs.

There is an optical illusion in this chair. The slats appear to have been tapered on both edges, but I taper just one edge. The two center slats are set up straight edge to straight edge. The outside slats have their straight edge toward the center.



Cut the tenons. Hare cuts the tenons on the bandsaw, but they can easily be cut by hand. Once they're cut, use a rasp and file to round them.



Separate slat assemblies for the seat and back. Using biscuits and epoxy with a microfiber additive to increase structural integrity, Hare glues up the back slats. He clamps the assembly using curved cauls so the back has a curved shape when the epoxy dries. He'll do the same with the seat slats.

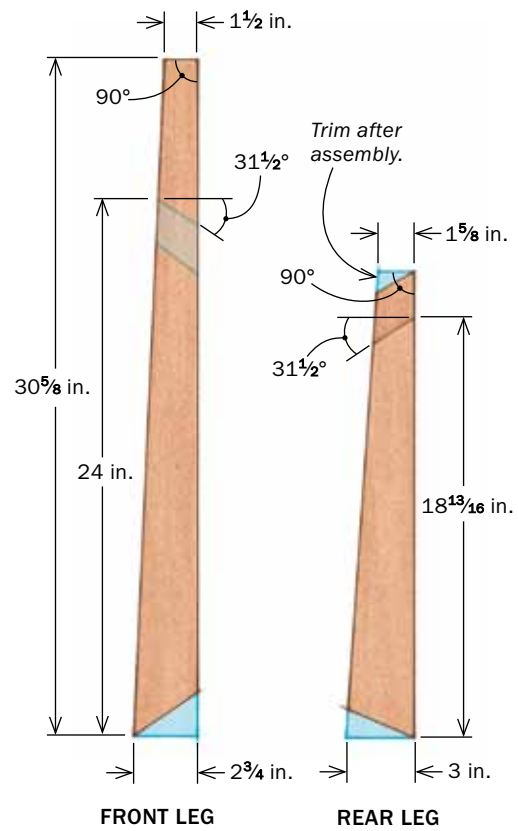


Online Extra

To download plans for Hare's angled mortising jig (above) and curved cauls used in slat assembly (opposite page), go to FineWoodworking.com/289.

Leg joinery

Typical chairs have two front legs and two back legs that don't intersect. But in this Adirondack-inspired chair, the tapered front leg gets a mortise to accept the back leg's tapered tenon.



Cut the mortises. Hare sets the front leg in a fixture with an end stop and tilts the bed of his hollow-chisel mortiser to chop the mortises (right). He transfers the tenon lines to the edge (below) and cleans up the angle by hand with a chisel. Instead, you could rough out the mortise by hand with a drill and clean up with a chisel.



Marking mortise location. Once the legs are tapered with the same type of jig used to taper the seat and back slats, mark the location of the mortise on the front leg. Position the back leg on the front and pencil its location onto the front leg.



Although the biscuit slots have now been cut, they're not yet ready to be glued. Instead, move to cutting the mortise-and-tenon joints that connect the seat and back.

Mortise-and-tenons in the slats

Dry-assemble the seat slats with the biscuits in place, and clamp them up. When you cut the mortises in the seat, the curve of the back and the angle of the seat to the back have to be accounted for. To do so, I make a plywood router template with the four mortises laid out on a curve. I block up one edge of the template so it holds the router at 8° while I'm cutting the mortises.

With the back slats dry-clamped, transfer layout marks from the mortising template to set the spacing of the back tenons. The shoulders of the tenons must match the scoop of the seat. I use a framing square and a template to lay them out. These joints don't have to be perfect, since the seat and back get screwed to the rear beam.

While the slat assemblies are still clamped, lay out the curve at the top of the back slats and the curve at the front of the seat slats. Then take both slat assemblies apart and cut the curves and the tenons on the bandsaw.

Next glue up the two slat assemblies. For adhesive I use a mixture of epoxy and microfiber additive. Mix the epoxy and add some microfiber until it resembles yogurt in thickness. Then glue the biscuits and slats together and clamp them up. I make curved cauls to hold the slats to the correct curve while the epoxy sets.

Leg joinery and assembly

The leg joints can be cut by hand or machine. Decide based on how many chairs you are making and how proficient you



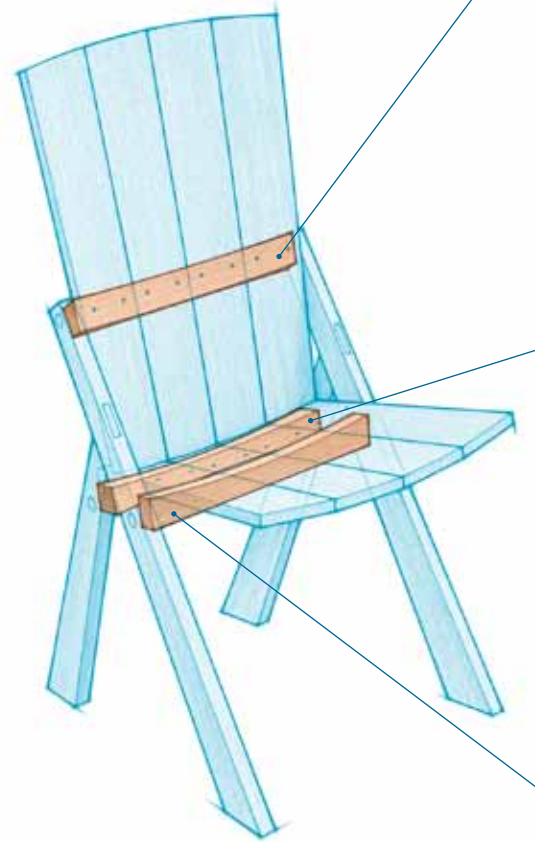
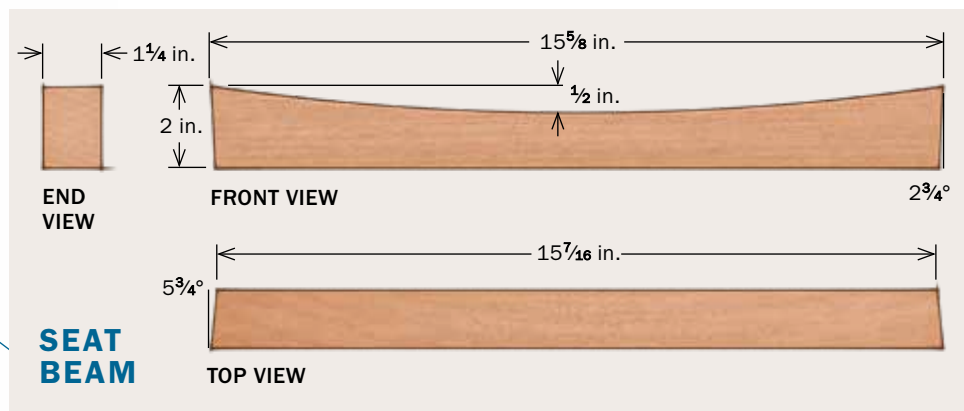
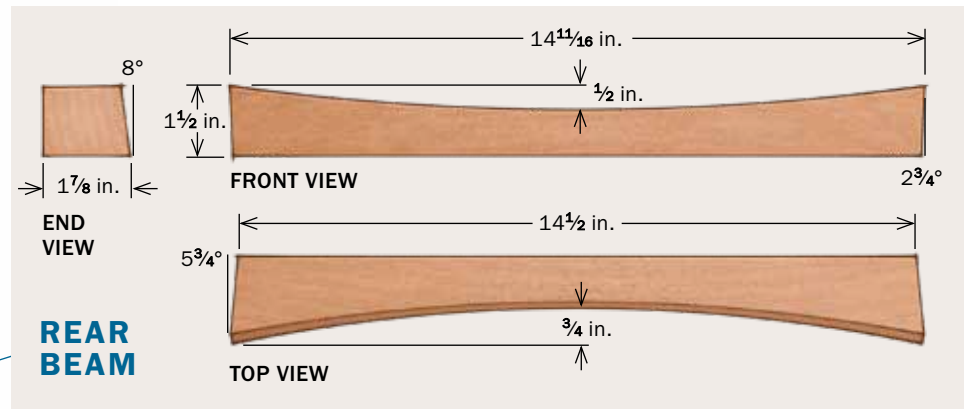
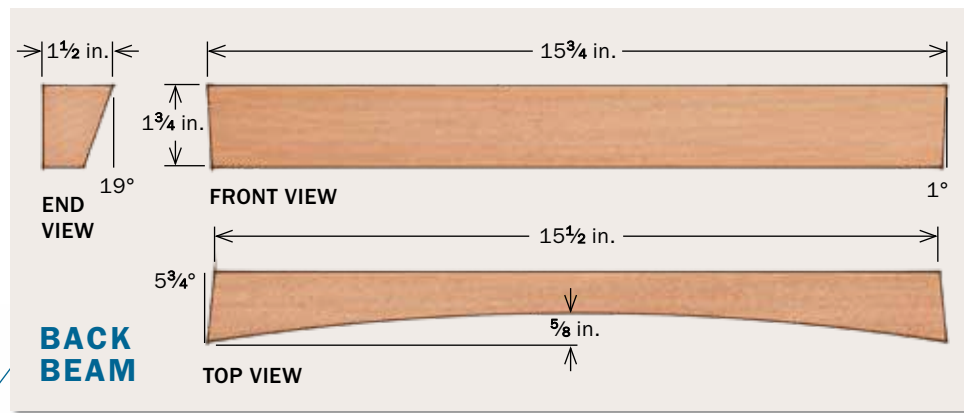
Tablesaw tenons. Hare uses another simple jig with his miter gauge to cut the tenons on the back legs. With the jig screwed to the angled miter gauge, he cuts the first side of the tenon with a dado blade. Then he unscrews the jig, flips it end for end, angles the miter gauge in the opposite direction, and cuts the other side of the tenon. He always sets the 90° corner of the leg into the 90° stop on the jig.



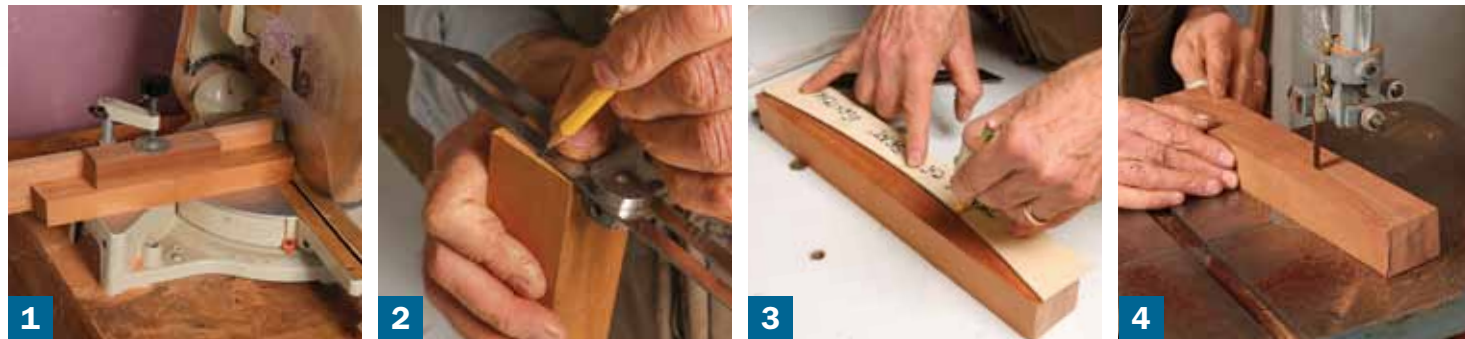
Glue and clamp. This is an outdoor chair, so Hare uses epoxy for his glue-up. Because the leg joint is so visible, he tints the epoxy there with mahogany sanding dust to more closely match the chair. He sizes the joint with a straight epoxy mixture and then adds the dust and applies the tinted epoxy. The mahogany dust, like the microfiber, adds strength.

Three curved, angled crossbeams

The beams are glued and screwed between the two leg assemblies, and the slats are screwed to the beams. The back beam stabilizes the back-slat assembly. The seat beam supports the cantilever of the seat. The rear beam, which fits under the seat slats and behind the back slats, works with the mortises and tenons to lock the back-slat assembly to the seat-slat assembly.



COMPOUND CROSSCUTS, THEN CURVES



Because the two leg assemblies are not parallel, the ends of the beams are cut at compound angles. Make those cuts on the compound miter saw; set one angle by rotating the bed of the saw and the other by tilting the blade (1). The three beams have different curves. Their depth varies and so does their tilt in relation to the face they are cut into. For those curves that are tilted, start by marking the tilt angle with a bevel gauge (2). Then draw the appropriate curve with a template, lining up its ends with the tilt marks (3). Then set your bandsaw table to the tilt angle to cut the curve (4).

Glue and screw two crossbeams in place

This ties the two leg assemblies together to create a frame, and establishes the angles and curves for the back and seat to rest on.



are at handwork. If I had only one or two chairs to make, I would use hand tools and skip the setup time required for machines. But however you cut the joint, the layout needs to be precise, because in addition to coming together at an angle, the joint is tapered. To cut the mortises, I use a hollow-chisel mortiser with the bed angled. The tenons are cut with a dado set on the tablesaw.

Check the fit of the back leg to the front one, tape off any areas where you don't want epoxy, and then lightly butter both parts of the joint with epoxy and assemble them. Trim the end of the through-tenon flush after the glue has set.

Crossbeam curves

There are three crossbeams that tie the legs together and support the seat and back: the back beam, which supports the back slats; the seat beam, which supports the cantilevered seat; and the rear beam, which supports the back of the seat slats and is screwed both to the back slats and the seat slats.



Microfiber additive strengthens screwed butt joints. Hare mixes straight epoxy to seep into the pores and pretreats the joint. Then he adds microfiber to the epoxy before applying a second coat on top of the straight epoxy.



Glue two of the three beams in place. First, do a dry-fit and clamp all three beams in place. While they are still in clamps, tape off around all the joints to keep glue exactly where you want it. Unclamp only the two beams that get glued, the back beam and the seat beam. Leave the rear beam dry-fitted and clamped. Then apply epoxy to the back and seat beams and clamp them in place.



Reinforce the joint. With a 3/4-in. dia. Forstner bit, drill a recess in the front leg where the beam intersects it. Then predrill and countersink for two (#6 x 2-in. square drive, deep thread, stainless steel) screws in each recess. Finally, use waterproof yellow glue to fix a plug in the recess.

The final crossbeam

This beam gets screwed to the seat slats first and then into the back slats, turning them all into one L-shaped unit that then gets tied into the leg/beam framework.

Screw the rear beam to the seat slat assembly. To position the rear beam, Hare fits the back tenons into the seat mortises and sets the inside angle between them to 98° with a bevel gauge. Then he clamps the rear beam to the seat assembly, removes the back, and predrills and countersinks two #6 by 1¼ in. screws per slat into the top of the beam.



The ends of the beams need to be cut to compound angles. This is because the two leg assemblies are not in parallel planes; instead, they follow the tapers of the seat and back. I make those end cuts at the compound miter saw.

The beams also have curves cut into them to cradle the seat and back assemblies. The biggest obstacle here is that the curves are not all cut square to the faces of the beams. To cut these canted curves, either set your bandsaw's table to the appropriate angle or make an angled fixture to clamp to the bandsaw table. If you take care and cut a nice curve, the surface doesn't need to be sanded smooth because the slats will cover the cut.

Crossbeam to leg assembly

I start this glue-up by dry-fitting the beams and clamping them between the legs. After taping off around all the joints, I remove the back beam and the seat beam. I apply glue for those two beams, clamp them in place, and let the epoxy set up overnight. Before screwing those two beams to the legs, I drill a recess for the screws that will be capped afterward. I use two screws for each joint and drill pilot holes so that the end grain doesn't



Install the chair into the frame. Hare clamps small ledger strips to the inside of the legs to support the rear beam while he glues and clamps it in place. After the epoxy is set, he reinforces the beam with two screws, recessed and plugged.



Fit the back tenons into the seat mortises. Check the fit, and use a file to adjust the tenon shoulders so that all the back slats sit perfectly on the seat assembly. Lay the unit on the bench so the seat is vertical and you can see the front side of the tenons (above). Predrill and countersink two screws per tenon into the front of the beam, working from the center out. Use #6 by 1½-in. screws.

split. The rear beam doesn't get glued and screwed in place yet.

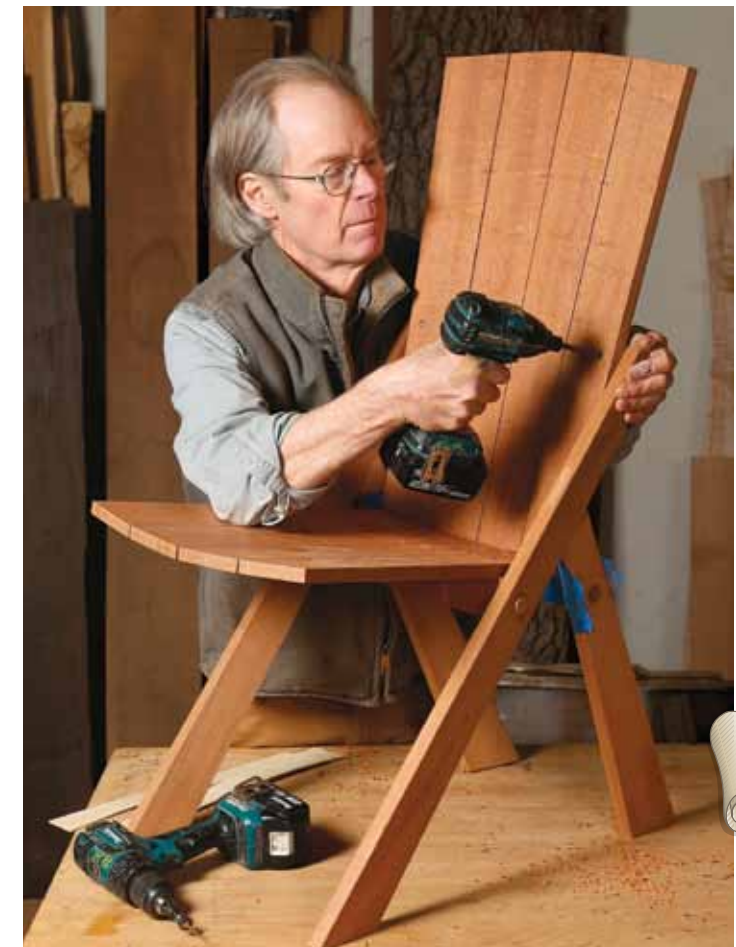
Attaching the seat to the frame

Dry-assemble the seat and back. Check the angle at which they meet and the fit of the tenons. Snug the rear beam into place against the seat and back and clamp it to the seat slats. Remove the back and screw the beam to the seat. Then reinsert the back and screw through the tenons into the beam. Use a handsaw and/or a belt sander to flush the ends of the slats to the rear beam.

The last step is attaching the seat and back to the frame. Apply glue to the ends of the rear beam (now screwed to the seat and back), clamp it between the legs, and add screws. Then screw the back slats to the back beam and the seat slats to the seat beam. Finally, sand the curves at the front of the seat and the top of the back.

I don't apply finish to these chairs. I have yet to find a finish that withstands years of direct weather without maintenance, and I like the gray. I just sit and enjoy. □

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Secure all the slats to the beams. Hare predrills and countersinks two screws per slat, one row across the seat into the seat beam, and one row across the back into the back beam.

To purchase expanded plans and a complete parts list for this outdoor chair and other projects, go to FineWoodworking.com/PlanStore.