

Build a Contemporary Pencil-Post Bed



Tapered facets, beveled cutouts, and ebonized ash give this Shaker classic new panache

BY JEREMY ZIETZ

In designing this bed I set out to make a stately piece with a light, clean presence. I wanted to reference the classic Shaker pencil-post form, but also to make a nod to early American Windsors, which I did with the slightly wandering hand-planed facets on the posts. By adding to those elements some streamlined Danish Modern touches—the cutouts and curves rimmed with wide chamfers on the headboard and footboard—as well as a pigmented finish on the ash, I aimed to bring the piece into the contemporary bedroom while keeping its traditional roots at the forefront.

Sturdy stealth joinery

The joinery was an important aspect of the design. To get four-poster beds as tall as this through doorways and up and down stairs, it's typically necessary for the headboard, footboard, and rails to be separable from the posts. As a result, you commonly find exposed bed bolts on these beds, a look I definitely wanted to avoid. To make the bed rock-solid yet completely knock-down without visible hardware, I crafted a joinery system that combines slip tenons with steel bolts and buried screw plates.

The bed's horizontal members fit into stepped mortises in the posts. The shallower outer mortise accepts the full thickness and width of the horizontal member, and the deeper inner mortise accepts a slip tenon. These stepped mortises (which I cut while the posts were still square) provide strong shoulder contact yet don't require the shoulders to be angled to match the post's taper; and they make for very clean, gap-free joints despite being knockdown.

I made the headboard in two stacked halves joined with an unglued spline. Both

STEP MORTISES FOR THE POSTS



Route the outer mortise. Using a plywood template and a plunge router with a guide bushing, cut the shallower, outer mortise to accept the rail.

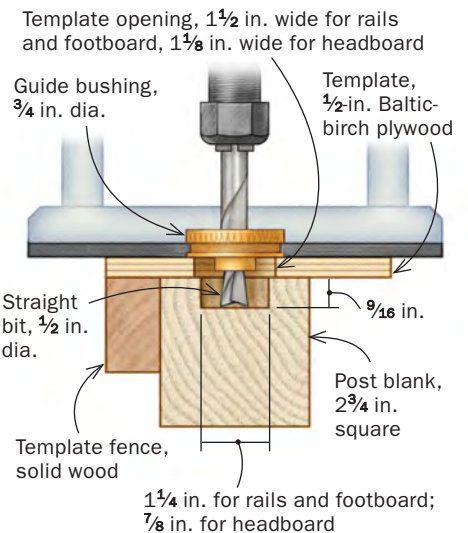


Swap templates for the inner mortise. A mating template guides the router to cut the deeper, inner mortise for the slip tenon.

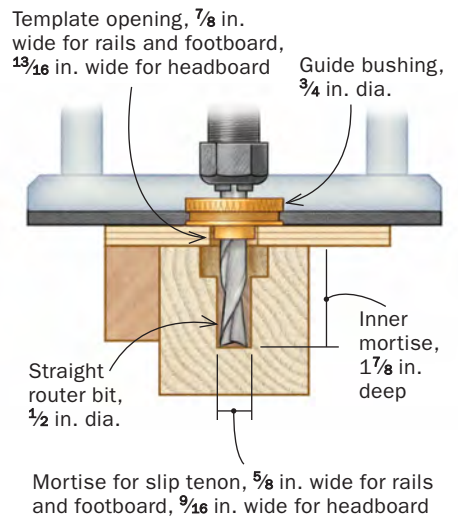


Square it up. With all the routing done, chisel the corners of the outer mortises square.

ROUTING OUTER MORTISES



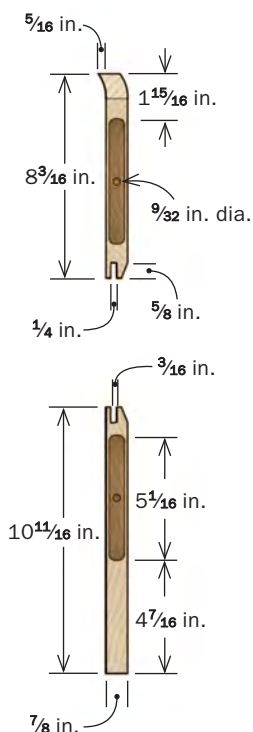
ROUTING INNER MORTISES



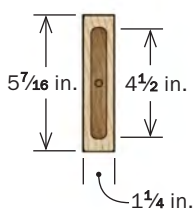
Fitting time. Having milled the rail close to size, Zietz uses a handplane for the final fitting.

PENCIL-POST BED

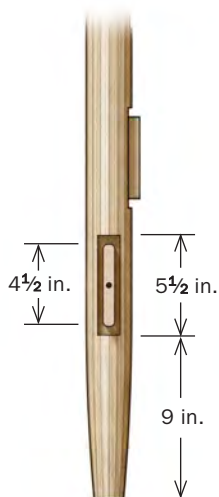
The dimensions shown are for a queen-size mattress.



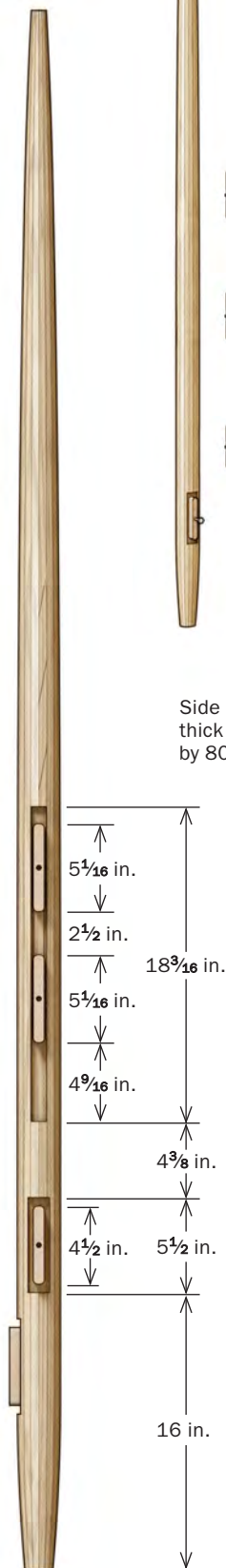
HEADBOARD SIDE VIEW



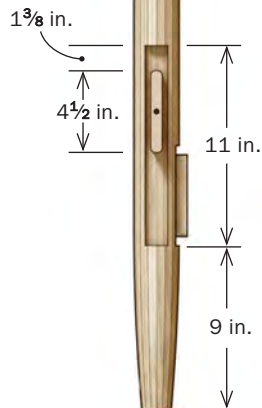
HEAD RAIL SIDE VIEW



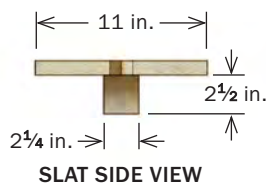
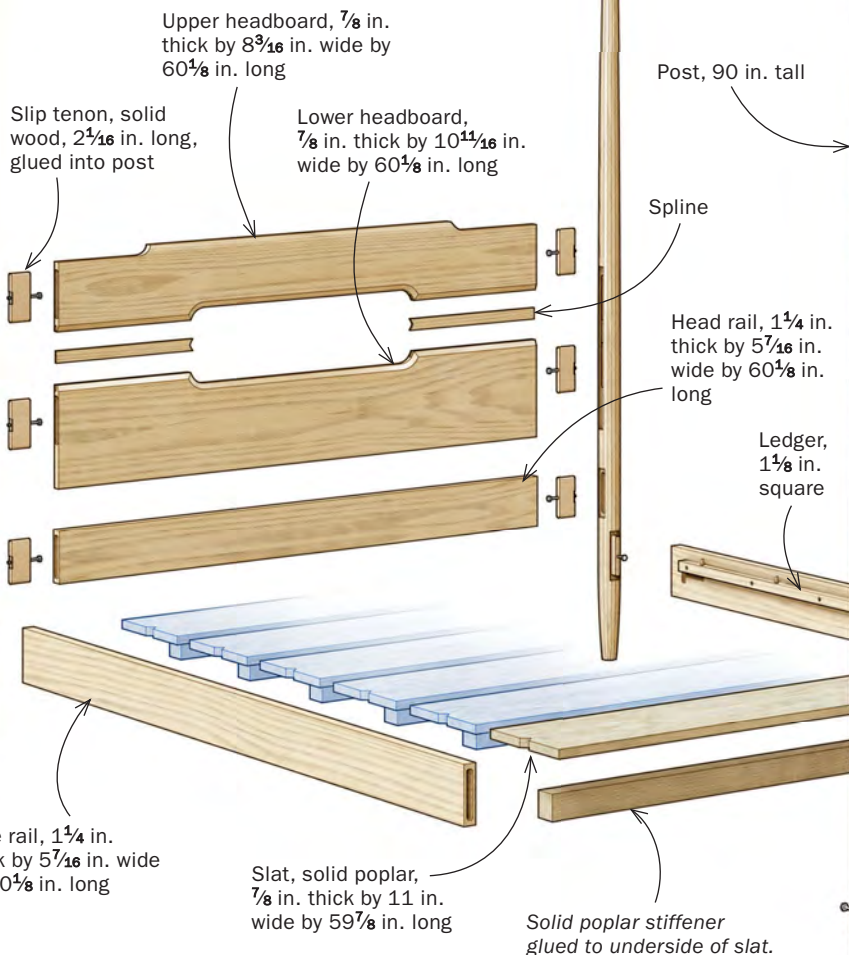
SIDE RAILS MORTISE LAYOUT



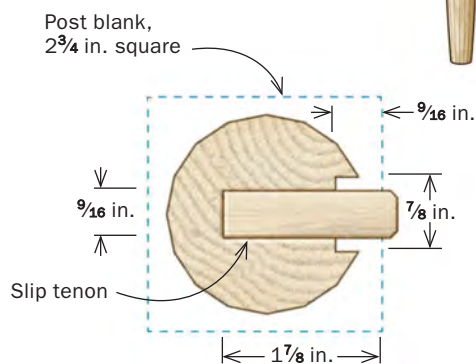
HEADBOARD MORTISE LAYOUT



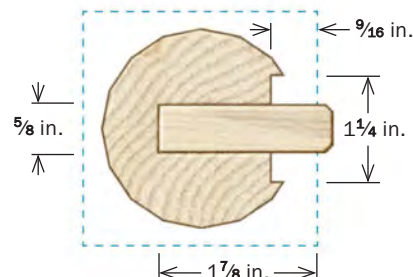
FOOTBOARD MORTISE LAYOUT



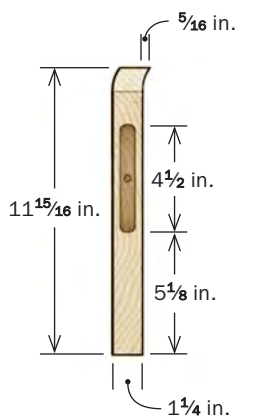
SLAT SIDE VIEW



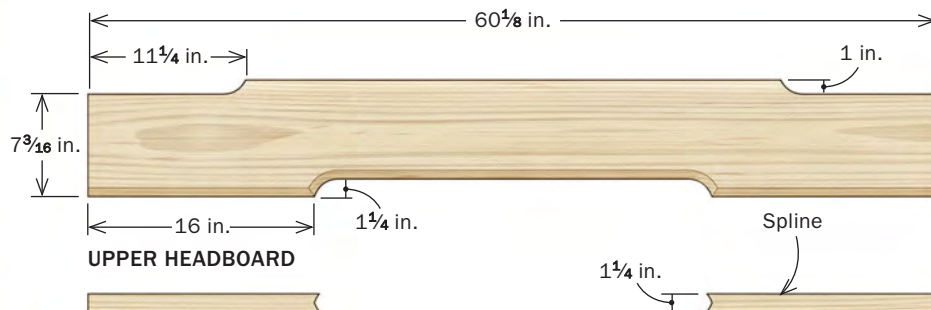
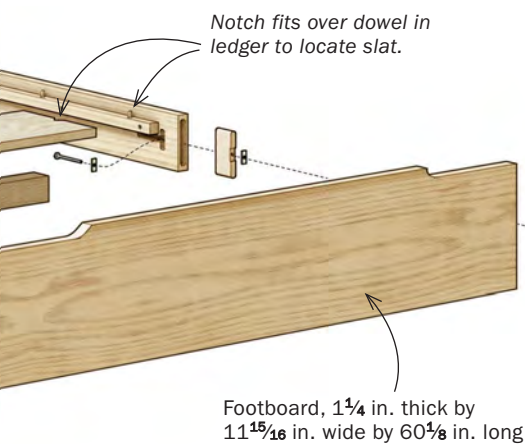
HEADBOARD MORTISES



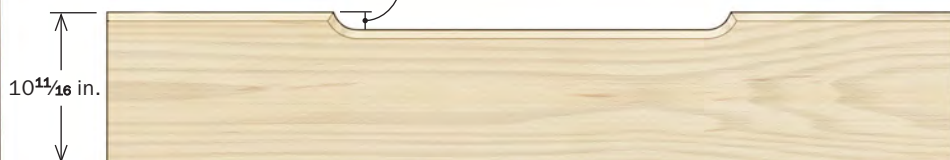
ALL OTHER MORTISES



FOOTBOARD SIDE VIEW



UPPER HEADBOARD



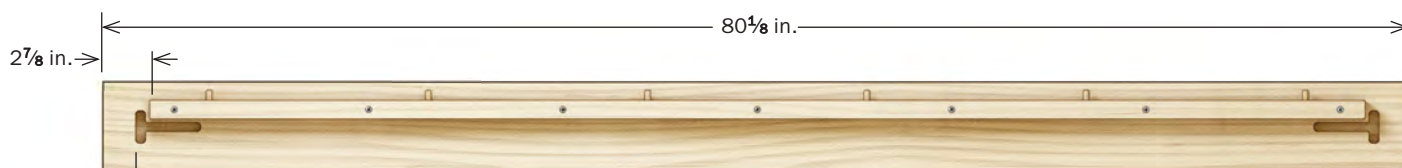
LOWER HEADBOARD



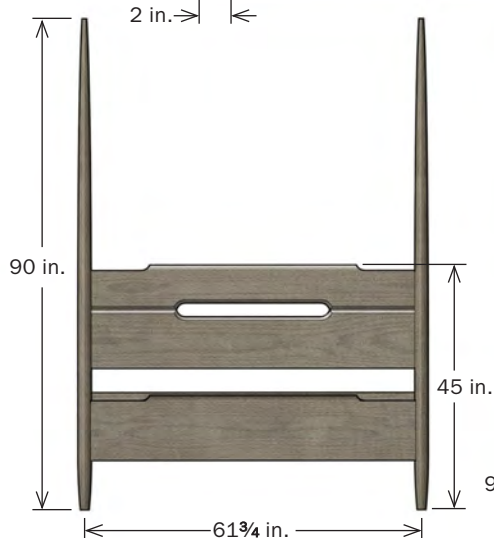
HEAD RAIL



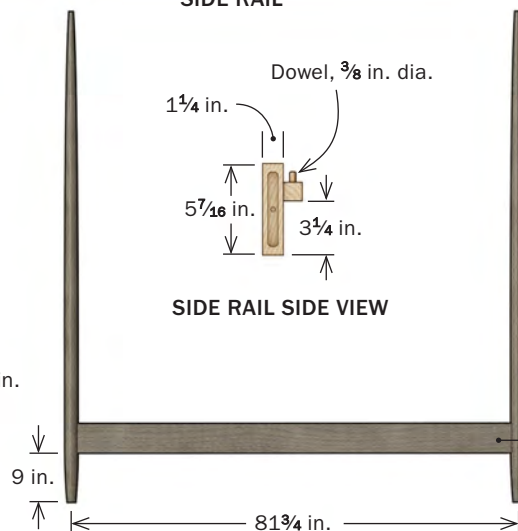
FOOTBOARD



SIDE RAIL



FRONT VIEW



SIDE RAIL SIDE VIEW

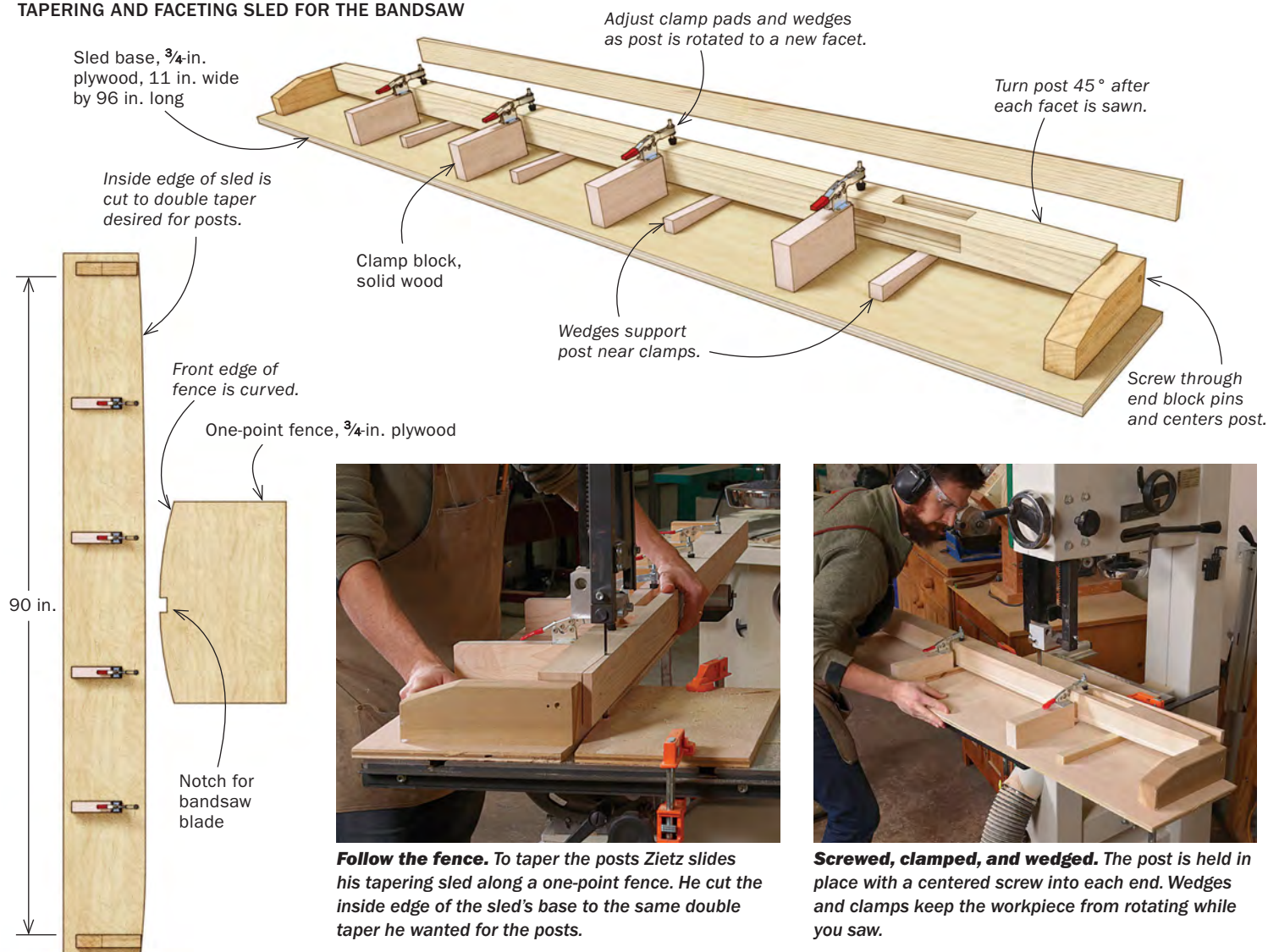
SIDE VIEW



Built of ash, the bed is ebonized with coats of black aniline dye and black Osmo Oil Stain, then finished with Osmo Polyx-Oil clear matte.

SHAPE THE PARTS

TAPERING AND FACETING SLED FOR THE BANDSAW



Follow the fence. To taper the posts Zietz slides his tapering sled along a one-point fence. He cut the inside edge of the sled's base to the same double taper he wanted for the posts.

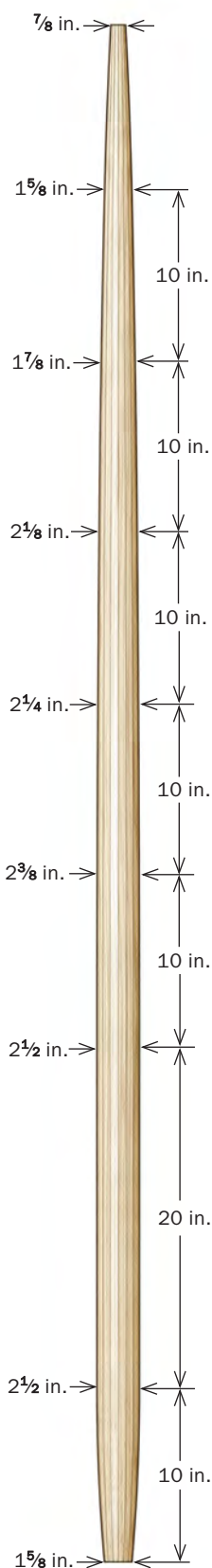


Screwed, clamped, and wedged. The post is held in place with a centered screw into each end. Wedges and clamps keep the workpiece from rotating while you saw.



Octagonal tapers. Turn the post 45° between taper cuts (above), then re-wedge, adjust the clamps, and saw again. It's an unwieldy sled. Infeed and outfeed rollers—along with help from a friend—keep the sled from sagging and make the sawing cleaner and easier.





Fair the bandsawn facets. Use a handplane to flatten and smooth the eight bandsawn tapered facets.

halves are tenoned into the posts, but they expand and contract independently. I made the joint between the halves a highlight of the design, emphasizing it with wide chamfers and a long, lateral opening.

Post and rail work

I started the build by milling the posts square. Then, to cut the stepped mortises in them, I used paired templates with a plunge router and guide bushing. I cut the outer mortise, then switched to another template to cut the deeper, inner mortise.

With the stepped mortises in the posts complete, I planed the headboard, footboard, and rails to thickness so they were a bit overtight in their mortises. Then I did the final fitting with a handplane. After fitting, rip $\frac{1}{16}$ in. off the bottom edge of all the horizontal members to leave room for expansion.

I used a PantoRouter to cut the mortises for the slip tenons into the ends of the horizontal members; that makes things pretty easy, but you could make these cuts with a plunge router and a simple jig.

Taper and facet the posts

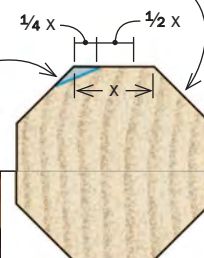
To give the posts their faceted double taper, I used a combination of sawing and handplaning. I started with the bandsaw, using a sled built for the purpose. I had cut one long edge of the sled's plywood base to the same double taper I wanted for the posts. As you slide the sled along, you keep the tapered edge of the base pressed against a one-point fence, and the post comes out double-tapered too. With

LAYOUT FOR PLANING FINAL FACETS

Tick marks guide handplaning to create new facets.

Then use a handplane to create the final eight facets, making the post 16-sided.

After cutting the post to a tapered octagon, plane those facets smooth.



To guide the handplaning, make a series of tick marks at several intervals along the post. Make two tick marks on every facet, inseting them by one-quarter the width of the facet.



Mark for more facets. Next you'll take the post from eight to 16 tapering facets. To guide the planing, pencil a pair of tick marks on each facet.



Taper to the tick marks. Working to the sets of tick marks, Zietz planes eight new facets. He prefers the slightly uneven lines left by the handplane to a machine-perfect result.

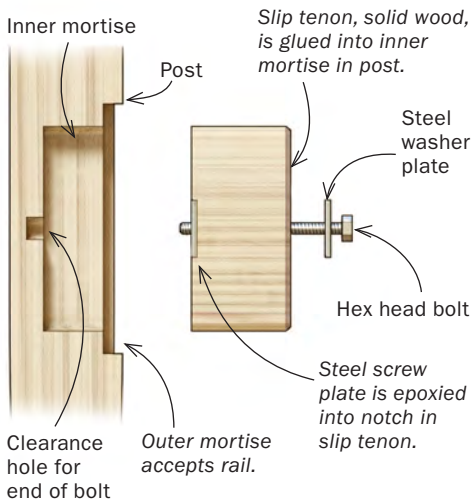


A chamfer to finish the facets. Around the top and bottom of each post, create a small chamfer with a knife or chisel.



HIDDEN HARDWARE

SLIP TENON AND STEEL BOLT SECURE THE BED



Drill for the bolts. Having milled the slip tenons to size and cut them to length, drill a through-hole to accept the bed bolt.



A notch for the screw plate. To cut the notch, Zietz slides the slip tenon back and forth between stop blocks at the tablesaw.



Glue in the plate. The screw plate is glued in place with the bolt threaded into it to keep it in position (above). As soon as the epoxy begins to grab, back out the bolt. Once the epoxy cures, clean off any excess and then glue the slip tenons into the posts with yellow glue (right).



one face of the post tapered, rotate the post 45°, reset the wedges and clamps, and taper the next face. Cut eight faces this way to make a double-tapered octagon.

The finished post has 16 facets. To get the final eight, I used handplanes. Taking a post to the bench, I first cleaned up the initial eight facets, flattening and smoothing the bandsawn surfaces. When those eight facets were clean and even, I made pencil marks on each facet and handplaned to the marks to create the final eight facets. When all 16 facets were shaped, I addressed any tearout with a finely set smoothing plane or scraper. It's best to avoid too much sanding, which can soften the effect of the facets.

Bolt those tenons

I made the slip tenons and their bolt hardware next. After I thickened the slip tenons, rounded over their edges, and cut them to length, I drilled a hole for the bolt. At the tablesaw, I cut a notch in the slip tenons for the screw plate. Before gluing the slip tenons into the posts, I epoxied the screw plates into their notches. To do so, I put a bolt through the slip tenon and threaded it into the screw plate, then used quick-set epoxy to adhere the screw plate into its notch. Once the plate was secure, I unscrewed the bolt and let the epoxy cure.

While the epoxy dried, I drilled the long bolt holes into the ends of the horizontal members. I used an extra slip tenon (with

no screw plate) to guide the hand drill. I next did the same with the posts, inserting an extra slip tenon and using it as a guide to drill a 1/4-in.-deep hole for the end of the bolt. With that done, I glued the real slip tenons into their posts with yellow glue.

T-shaped slots on the inside face of the rails and footboard and on the back face of the headboard allow you to insert and tighten the bed bolts. To cut the T-slots, I used a router jig and a guide bushing.

Shape the headboard and footboard

The bevels, cutouts, and carving on the head- and footboard are relatively restrained, but they are vital to the bed's style. To shape the cutouts, I made stop



Mortise the rails. Zietz uses a PantoRouter to cut the mortises in the rails, headboard, and footboard. Alternately, you could use a handheld plunge router and template.

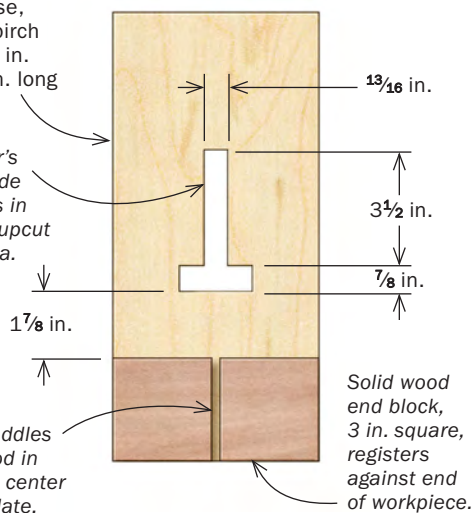


Dummy tenon makes a smart drilling guide. To drill the deep bolt holes in the rails, headboard, and footboard, insert an extra slip tenon in the mortise and use it to guide the bit.

T-SLOT ROUTER TEMPLATE

Template base,
 $\frac{1}{2}$ -in. Baltic-birch
plywood, $6\frac{1}{4}$ in.
wide by 16 in. long

Plunge router's
 $\frac{1}{2}$ -in.-dia. guide
bushing rides in
T-slot. Spiral upcut
bit is $\frac{1}{4}$ in. dia.



Groove straddles
threaded rod in
bolt hole to center
T-slot template.

Solid wood
end block,
3 in. square,
registers
against end
of workpiece.

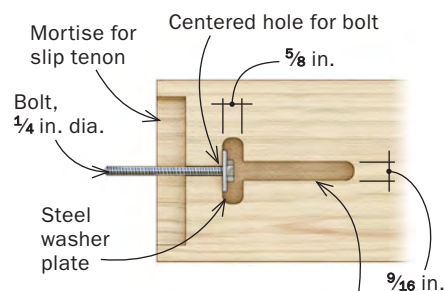


Template-rout the T-slot. The template's end stop perfectly positions the T-slot. To center the template, a groove between the end blocks fits over a length of threaded rod temporarily inserted in the bolt hole.



TIGHTEN UP

The long leg of the T-slot allows you to drop the bolt in place, and the short leg provides clearance for tightening the bolt with a wrench.



T-slot, cut on inside face of rails and footboard, and on back face of headboard, enables insertion of bolt and washer plate.

SHAPE THE HEADBOARD



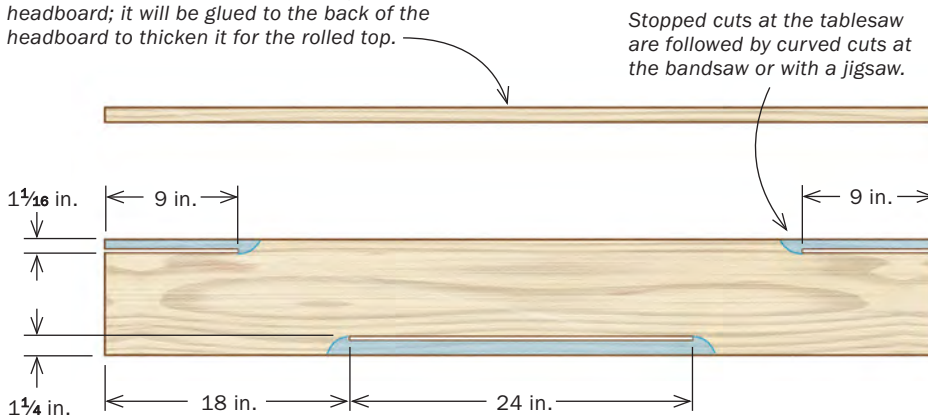
Start with subtraction. To create the rolled detail on the top edge of the headboard, rip a 1-in.-wide strip from the top of the workpiece. Set it aside to be glued on later.



High fence for sure grooving. The halves of the headboard meet with a spline. Cut spline grooves along the bottom of the upper headboard and the top of the lower headboard.

STOP CUTS AND PLUNGE CUTS FOR HEADBOARD

First rip a 1-in. strip from the top edge of the upper headboard; it will be glued to the back of the headboard to thicken it for the rolled top.



cuts on the tablesaw and curved cuts on the bandsaw. I cut about $\frac{1}{16}$ in. from the line on the curves, and worked to the line using a spindle sander and spokeshave.

The wide chamfers where the halves of the headboard meet were cut with a bearing-guided 15° panel-raising bit in the router table. I started with the bit lowered and raised it gradually, cutting no more than $\frac{1}{8}$ in. per pass. I smoothed them with a handplane and finish sanded with 220-grit paper on a sanding block.

The next step is creating the rolled top edge on the headboard and footboard. First I glued a 1-in.-wide strip to the back face at the top edge. To shape the convex rolled curve, I used a handplane and a spokeshave. For the concave curve, I removed waste at the tablesaw, then used a 2-in. fluting plane. A gooseneck scraper and sandpaper on a radiused sanding block helped fair the curves. With a gouge I added a scalloped texture to the shoulders of the rolled area.

To prepare for finish, sand to 220 grit and wipe with a wet rag to mitigate grain raising during dyeing. Sand with 320 grit, then ebonize with aniline dye. Apply Osmo oil stain, then finish with two coats of Osmo Polyx clear coat, sanding lightly with 800-grit paper between coats. □

Jeremy Zietz is a furniture designer in the San Francisco office of Steelcase.



Stop cuts on top. To create the scooped detail on the top of the headboard, use the tablesaw to make stopped cuts in from each end. Then make the curved cuts at the bandsaw or with a jigsaw.



Plunge cut for the slot. Use a high fence as you plunge-cut for the cutout at the center of the headboard. Keep the edge of the board tight to the fence as you lower it and the far end of the board flat on the outfeed table.



Turn off at the end. Zietz shuts off the saw at the end of the plunge cut and waits for the blade to stop before lifting the workpiece clear.

Thicken the top.
The 1-in. strip ripped from the upper headboard's top edge now gets glued to the back face along the top.



Front face of upper headboard



2 Bevel at the back.
Once the glue is dry, Zietz bevels the back of the added strip, removing waste before creating a concave surface there.



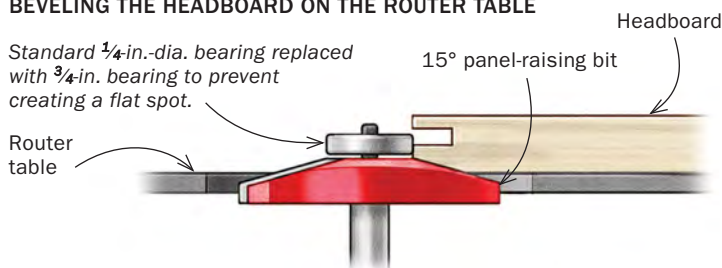
3 Clean up the curves. After bandsawing the curves to rough shape, clean them up with a spindle sander or spokeshave.



4 Routing the wide bevels. At the router table with a bearing-guided panel-raising bit, Zietz bevels the bottom edge of the upper headboard.

BEVELING THE HEADBOARD ON THE ROUTER TABLE

Standard 1/4-in.-dia. bearing replaced with 3/4-in. bearing to prevent creating a flat spot.



5 Final cleanup. Zietz uses a fluting plane and then a gooseneck scraper to fair and smooth the concave curve on the back of the upper headboard. He creates the convex rolled edge on the front with handplanes and a radiused spokeshave.

