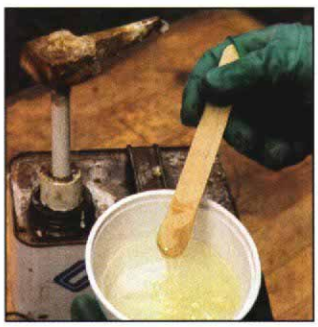
A Garden Bench

A boatbuilder wards off weather with Spanish cedar, marine epoxy and copper rivets



BY
DAVID SNEDIKER

Every spring, when the gardening catalogs arrive in the mail, I know it's about to happen again. My wife will leave the catalogs open, turned to the pages with the garden benches, and she'll ask me to make one for her. This has gone on for years now, and finally, this spring, she hit me with an ultimatum. "Build one, or I'm going to buy one," she said.

Fair is fair. I am a boatbuilder, and she had been asking for years. I'd built myself a fishing boat and a couple of doghouses for Pete and Copper. It was time to build a bench.

When I got to the planning stage, I decided my garden bench—our garden bench—wouldn't have any vertical mortises to catch and hold rainwater, and I'd use copper rivets to fasten any mechanical connections. The bench would have a coved seat and a comfortable cant to the back. I wanted the seat height to be lower than the conventional 18 in.; my thought was that a 16-in. seat height would allow people to sit on the bench in a relaxed position. The bench would be held together with marine epoxy (see the box on pp. 54-55) and made from a maintenance-free wood that would weather to a salty gray in our seacoast town of Mystic, Conn.

Send your kids to college, or make a bench from teak

Last year, I replaced a 22-ft section of rail on one of the Coast Guard's training vessels. I used 16/4 teak, and the cost of the wood alone was $4,000. I'd recently bid on a job to replank a sloop with mahogany. The best price I could find for pattern-grade mahogany was $5.54 a board foot. Teak and mahogany are without a doubt very good marine woods, but I wanted to find something less expensive for the garden bench.

Spanish cedar was the answer. It's about half the cost of mahogany, a quarter the price of teak and its weather resistance is superb. Spanish cedar grows in Mexico and Central America, and it is more closely related to mahogany than it is to cedar. It has a color similar to mahogany and working properties similar to pine, although it's not nearly as soft as pine. It holds a crisp edge and glues up well. Unfortunately, Spanish cedar's popularity as a wood to make humidors has driven up the price. I've seen Spanish cedar advertised for $15 per board foot; I got mine for less than $3 per board foot from a lumberyard that caters to boatbuilders.

All the wood I ordered was 6/4, which required that I laminate

Photos: Scott Phillips

for All Seasons

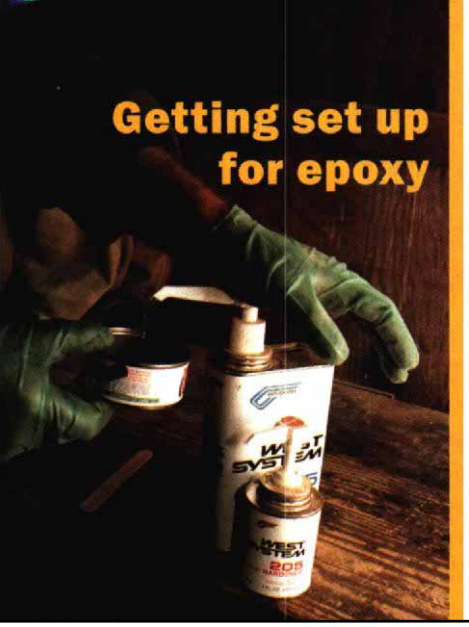
some of the bench's parts. Aside from allowing me to buy thinner, less expensive stock, laminating the back legs that cant at 9° to form the bench's back allowed me to use two pieces of wood with opposing grains to ensure ultimate strength.

The slats for the seats are 15/16 in. thick and 2½ in. wide. They span almost 4 ft. Taken individually, the boards won't hold much weight, but five of them together, with a ⅜ in. space between each board, comfortably support two people on the bench. In fact, the slight springiness of the narrow boards gives a cushioning effect when you sit on the bench.

Thin back slats are decorative, not structural

In the garden catalogs my wife left (not so subtly) lying about, many of the benches had vertical mortises in the back rails. Vertical mortises can become water traps—something I wanted to

Back leg template serves dual purpose. *A medium-density fiberboard (MDF) template, scaled from the plans, is traced on laminated stock for the back legs. Mortise locations for both front and back legs are also marked on the template. Once the template is laid out, measuring is kept to a minimum.*



Getting set up for epoxy

With one big exception, a wooden boat is like a large piece of furniture. If you imagine your dining room table used as a surfboard, you'll get an idea of the stresses and strains a boat goes through.

We use a lot of marine epoxy when we build boats. If you've used epoxy before, you probably remember squeezing goo out of messy little tubes of hardener and resin and then being unsure if you got the proportions just right. Well, forget the uncertain proportions of resin to hardener. A company called Gougeon Brothers makes an almost-foolproof, totally waterproof epoxy called West System.

Gougeon makes epoxies with different working times, and it makes a slew of different additives with weird names like microballoons and microlight. Some additives fill gaps, and some turn the epoxy into a structural component.

The second best thing about West System epoxies is the technical support offered by the company. It has a whole library of manuals that explains the different epoxies, the different additives and their uses. And when you call the company (517-684-7286), you're not on hold listening to Mantovani for 10 minutes; there are patient technicians on the other end who know their stuff.

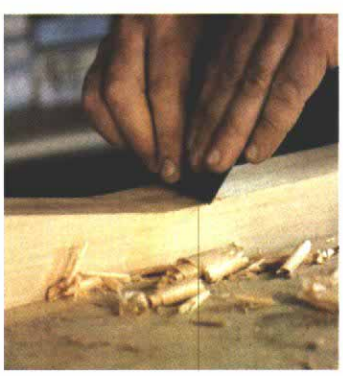
avoid in my bench. I applied the slats to the back of the rails, which did several things. It let me avoid having any vertical mortises that could hold rain water, and it gave the bench back a little depth, not unlike a fielded panel in a door. Also, I could assemble the rest of the bench and then experiment with different slat sizes and spacing until I found something that pleased my eye.

I used a hot glue gun to tack different slats with different spaces between them before I found a pleasing configuration: 10 slats 1¾ in. wide. Of course, you could try different combinations of slats and spaces if you find my layout not to your liking. The space between the back slats is about equal to the width of the boards that make up the seat slats, with a half-width space between the back legs and the first back slat at each end.

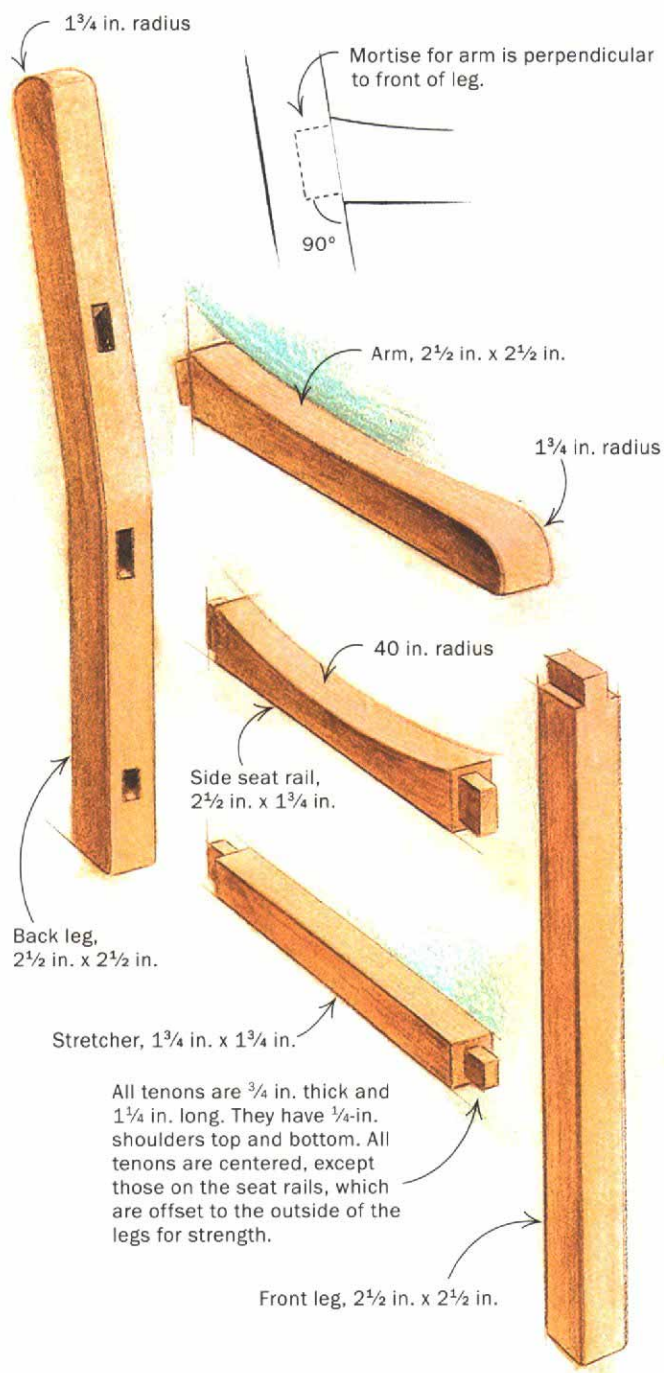
The back slats and the seat slats are fastened with copper rivets (see the box on p. 57), a technique foreign to many woodworkers but as common to boatbuilders as nails are to carpenters.

Fair curves for the arms and seat stretchers

In boatbuilding parlance, a curve is called fair if it is pleasing to the eye and devoid of kinks and flat spots. Aside from the 2¾ in. radius on the top of the back legs, there are two curved components on my bench—the arms and the side seat stretchers. I arrived at the curve of the arms by bending a thin piece of wood along the length of the arm blank. When I found a curve that pleased my



Plane the straights, scrape the corners. *After roughing out the back legs on a bandsaw, the author dressed the legs' front side on a jointer. The legs' back side, with their inside corners, had to be dressed by hand. He used a plane on the straight sections of the legs and a scraper on the hard-to-reach inside angles.*

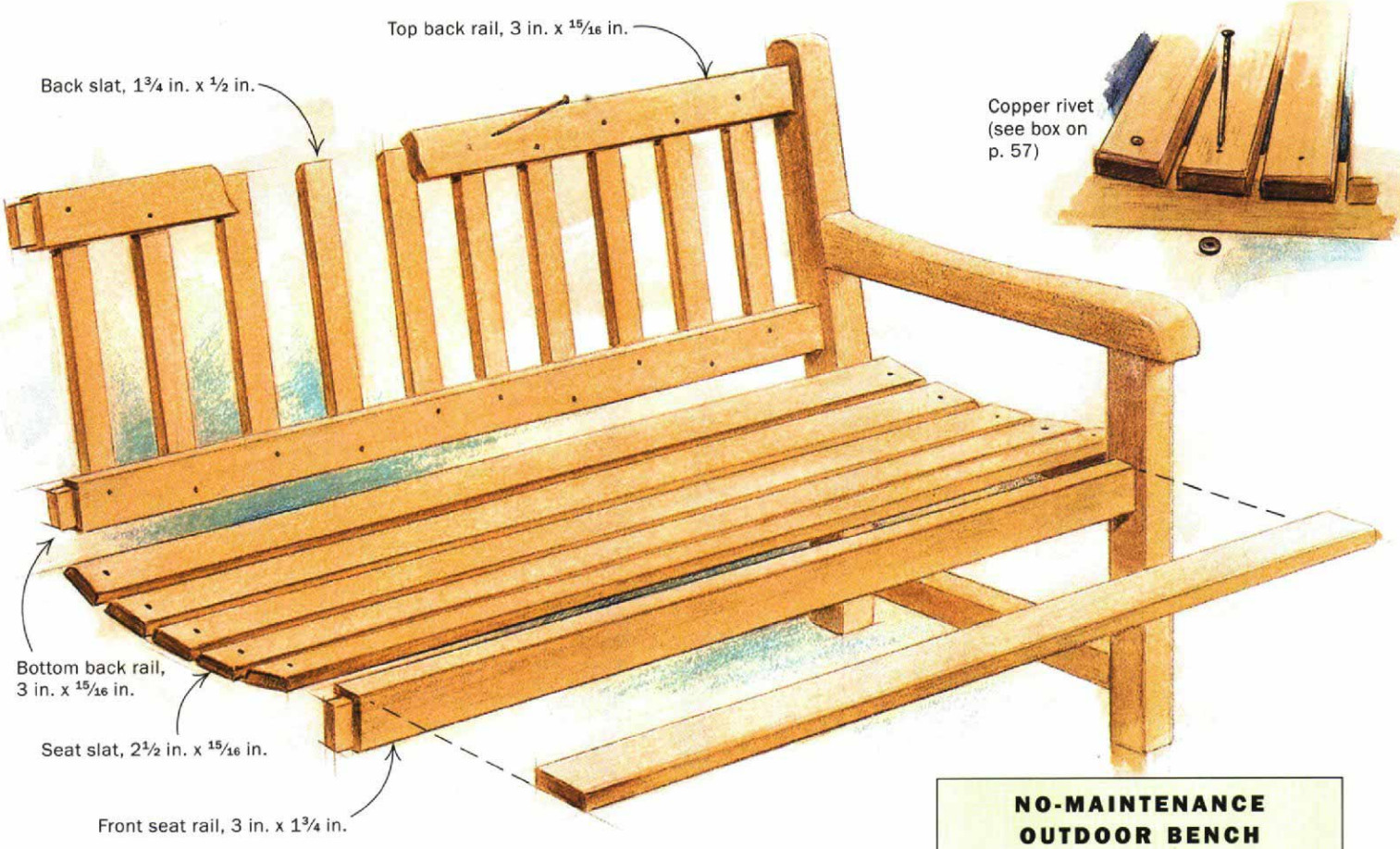


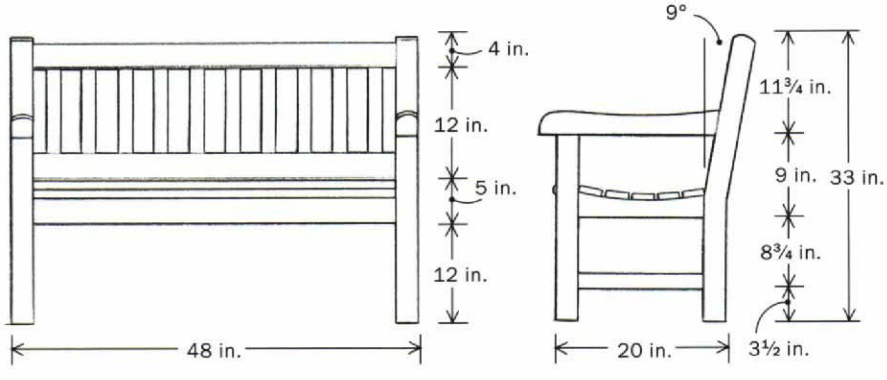
The first best thing about West System epoxies is the calibrated pumps that screw onto the top of the containers of resin and hardeners (available in sizes from ½ pint to 5 gal.). No guessing, no messing—one push of the resin pump, one push of the hardener pump and you have a perfectly proportioned batch.

There are a few things to keep in mind when using epoxy. When you think you've stirred the ingredients together for long enough, stir a little more. And never spread epoxy with your stirring stick. Throw it away, and use a clean spreader. We use disposable flux brushes. Epoxy is good glue because of its tenacious adhesion to almost everything. During a glue-up, we lay down waxed paper on any surface we want to keep epoxy-free. White vinegar is pretty good at dissolving uncured epoxy; alcohol is better. We always wear gloves when working with epoxy, and if we have a major glue-up to do, we don Tyvek suits because if epoxy gets on your clothes, forget about it.

Epoxy cures by an exothermic chemical reaction; it gives off heat as it hardens. When the reaction starts, finish your clamping in a hurry, or pull everything apart and scrape off the still-viscous epoxy. What once was the consistency of maple syrup will quickly turn to heavy cream, then leather and before you know it, your tools will be stuck to the wood. The reaction is far from instantaneous, and as mentioned, different West System products go off at different speeds.

When we want something to stay glued forever, we use West System epoxies, available at most boatyards. They aren't inexpensive, but no good insurance is. —*D.S.*

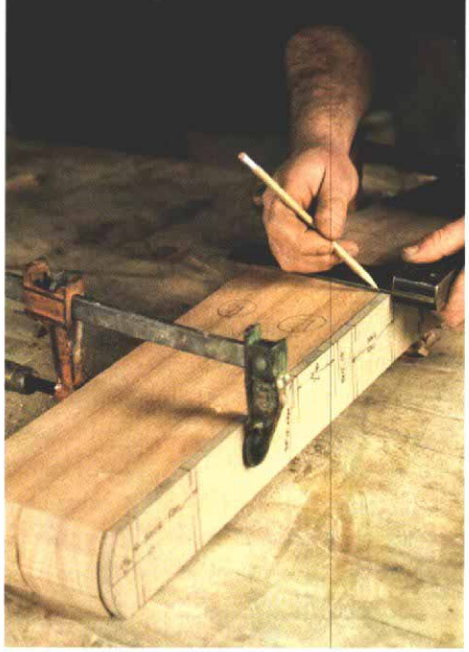




NO-MAINTENANCE OUTDOOR BENCH

The author's design, his construction techniques, even his choice of wood all kept in mind that the garden bench would stay outside year-round. The copper rivets will oxidize to a pleasant green color and won't stain the weather-resistant Spanish cedar wood. There are no vertical mortises in the bench's construction that will trap water, and the mortise-and-tenon joinery is held together with waterproof marine epoxy.

Drawings: Tim Langenderfer

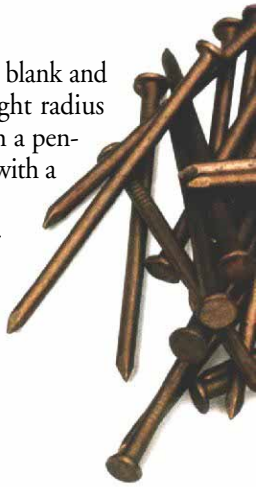


Avoid making two left legs. *The back legs have identical shapes. The only difference between the two is the locations of the mortises for the seat rail and the bottom stretcher. To avoid confusion when laying out mortises, the author labels the legs L and R and clamps them with the template in their proper orientation.*

Empirical angle checking. *With the exception of the joint between the bench arm and the back leg, the bench parts intersect at right angles—what boatbuilders call normal off. From his plans, the author knew what the arm-to-back-leg angle should be, but for the tightest fit, he wanted to check the angle from the actual construction. He dry-clamped the leg stretcher between the legs, and using a square and a bevel, he determined the exact angle. He then transferred the angle to his tablesaw for cutting the arm's tenon shoulders.*

eye, it was just a matter of tracing a line onto the blank and cutting along the line with a bandsaw. The slight radius along the top of the arm's width was drawn with a pencil, roughed out with a handplane and finished with a spokeshave and sandpaper.

For the curve on the side seat rails, I cut a plywood template 15 in. wide—the distance between the bench's front and back legs. I swung an arc with a 40 in. radius from the plywood's centerline across the width of the plywood and then cut along the arc and traced the curve onto the roughed out side rails.



Construction notes

Most of the bench's frame is held together with centered mortises and tenons. Offsetting the seat-rail mortises to the outside of the front legs allowed me to make stronger full-length tenons on the seat rails themselves (see the drawing on p. 54).

I used a router and a 5/16-in. roundover bit to smooth the exposed edges of the bench. Where the arms meet the front and back legs in a flush joint, I finished the roundovers with a file and sandpaper.

There are many excellent exterior finishes on the market, but I decided to leave the bench unfinished. Spanish cedar is very resistant to water, weather and worms, and it will turn a pleasing driftwood color if it is left in the raw. Besides, if I applied finish one season, I would have to do it again the next season, and that's one maintenance regimen I'd rather not start. As a way to stop water from wicking into the end grain, I painted the bottom of the bench's four legs with a coat of epoxy.

Six slats and five spaces. *One seat slat fits tight to the back legs and another overhangs the front seat rail by ½ in. Between the remaining four slats are five spaces. The author subtracted the combined width of the four slats from the distance between the front and back slats. Dividing that remainder by five gave him the width of the spacer blocks that hold the seat rails tight when they are riveted.*

Further tips on the bench's construction are explained in the photos and in the captions. I'm happy, and my wife is happy. Bring on summer! □

David Snediker and his understanding wife, Roberta, live in Mystic, Conn.

Copper rivets

Take a look at an old pair of Levis. The knees may be blown out and the hems have probably failed, but the copper rivets at the major stress points are, undoubtedly, still holding strong. And guess what holds together the ironwork in a skyscraper? Rivets. Lots of them. Wooden boats are held together with rivets for the same reason; they are a one-time, permanent fastener.

Rivets are often used to fasten wood too thin to accept a screw and a bung, such as the back slats on the garden bench, but they can be used to face join all types of wood. In the simplest terms, riveting is a matter of through-nailing two pieces of wood, slipping a washer over the pointed end of a nail and then pounding on the end of the nail until it mushrooms over. In the age of self-drilling, galvanized drywall screws and biscuit joiners, rivets may seem low-tech, but it's somehow reassuring that their brute strength doesn't rely on high-torque spinning or the glue-activated expansion of compressed wood fibers.

Copper is wonderful for riveting wood. It is malleable enough to peen easily around a copper washer. All rivets are made of two parts: nails and burrs, sometimes called roves. Burrs look like washers. Nails look like carpenter's common nails, and in fact, they are sized in similar penny weights. Eight penny is referred to as 8d, 10 penny as 10d and so on. Like all nail wire gauges, the higher the number, the smaller the diameter.

Copper nails are sold by the pound; burrs are sold by the ounce. To order rivets and burrs, try Jamestown Distributors at (800) 423-0030 or The Wooden Boat Shop at (800) 933-3600. You want to get nails that are at least ½ in. longer than the combined thicknesses of the wood you are going to fasten. Too long is not a problem because you are going to snip off the pointed end of the nail during the riveting process. What is a problem is if you order the wrong size burr. Ideally you want a burr one gauge size larger (that is, one hole size smaller) than the nail you are using. That's because it's easier to flatten the end of a nail around a tight burr than one that jumps off the end of the nail every time you hit it.

You only need one special tool to set rivets, and you can make it faster than you can read this paragraph. Drill a ¼-in. hole 2 in. deep into the end grain of a scrap of hardwood that's about the size of a hot dog. The thing you just made is called a rove set. You'll need a heavy, squarish piece of iron (riveters call it a buck). A sledgehammer will do fine. You need a lightweight ball-peen hammer. And here's how you set rivets:

Drill a pilot hole through both pieces of wood to be riveted, Use a drill bit that's one size smaller than the diameter of the nail. Tap the nail through the pieces of wood. Put a rove over the nail point. Using the hardwood hot-dog-with-a-hole, tap the rove tight to the wood. Then, and this is important, snip off the end of the nail a distance from the face of the rove equal to the nail's diameter.

Back up the head side of the nail with the buck—push hard!—and start tapping the stub end of the nail with the flat end of a lightweight ball-peen hammer. Hit the stub end just hard enough to dent it. Rather than kink the nail in the hole with hard blows, what you want to do is start to spread the nail stub around the rove. Tap, tap, tap with the flat head of the hammer until the stub is flattened. Then use the ball end of the hammer to round over the flattened copper stub. Tap, tap, tap until the rove and the nail head just dimple each face of the wood.

If the boards are tight, the rivet is set. Should the boards ever shrink and loosen on the rivets, cinch them with a few more hammer taps. Try that with a bunged screw. Riveting is fast and efficient. Using a rivet to fasten wood reminds me of the slogan of a popular lacquer-like home-hairdo product of the 1960s: Set it and forget it. *-D.S.*