

Durable Deck Stairs

Ipé decking covers beefed-up stringers and a newel-post assembly that won't rack

BY SCOTT GRICE

Deck stairs for a small yard had better be beautiful to look at because there's no way to hide them. Although this might sound like a risky situation, it is also an opportunity. Deck stairs done well can add a sense of balance and unity to a small yard and can become a feature to be celebrated rather than a utilitarian eyesore.

I recently took on a job where I had just such an opportunity. The homeowner's backyard was small, and the landscaping had been mostly destroyed during a remodeling project that was nearing completion. The homeowner had a fresh slate for landscaping, and the deck stairs that I built would be the first feature there. I knew that in the future, the stairs would be a prominent part of a fastidiously landscaped backyard haven.

The finished look affects the framing

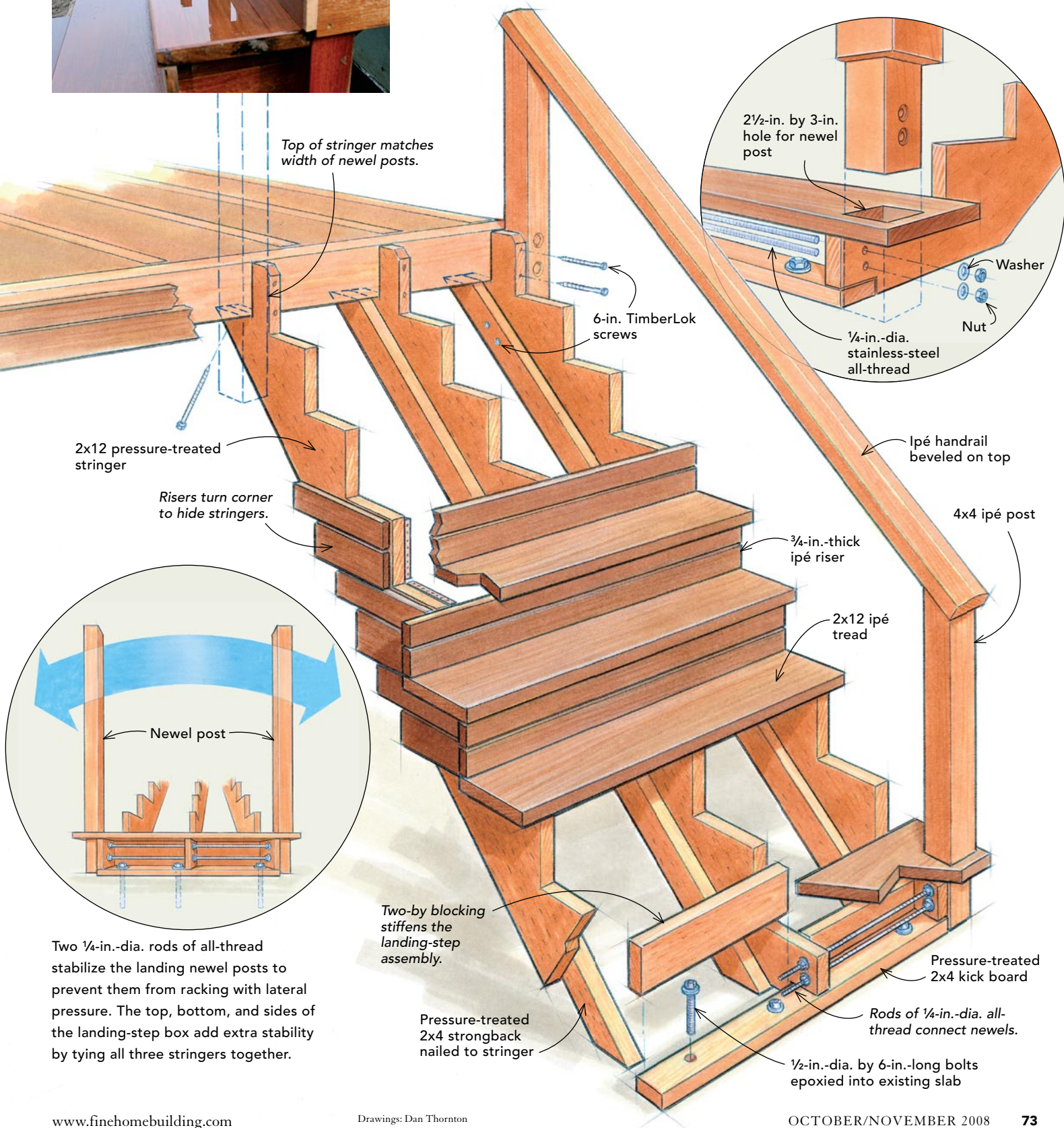
For both durability and aesthetics, ipé was the decking choice. Ipé is highly resistant to rot, it is incredibly dense, and when sealed with tung oil, it develops a dark-brown patina over time. Also, ipé is heavy and hard to cut, and it has been known to pull itself loose from framing because of the extreme force it exerts with seasonal movement. The ipé risers for these stairs are made from $\frac{3}{4}$ -in.-thick decking, but the

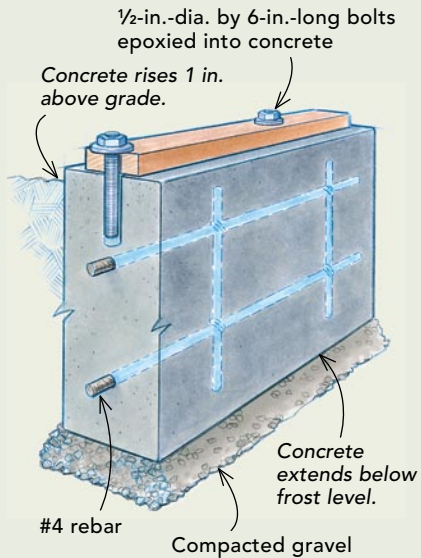




STRONGER STAIRS, TOP TO BOTTOM

At the top of the stairs, newel posts are incorporated into the framing to create a seamless transition from stairs to deck. At the bottom of the stairs, a rigid box is incorporated into the landing step using epoxy, 1/2-in.-dia. bolts, and 1/4-in.-dia. all-thread. This ensures sturdy newel posts and a solid connection to the concrete slab. The stringers that connect the deck and the slab are strengthened with 2x4 strongbacks.





Supporting stairs without a slab

When I don't have the luxury of an existing slab, I build a big footing and hide it under the stair framing. A stair footing is simply a block of reinforced concrete that carries the weight of the stairs and prevents the bottom of the stairs from kicking out. I usually make the footing big enough to support the stair framing fully but small enough to be hidden when the stairs are finished. The back side of the footing is under the stairs, so I run it thicker than necessary to give myself a little wiggle room.

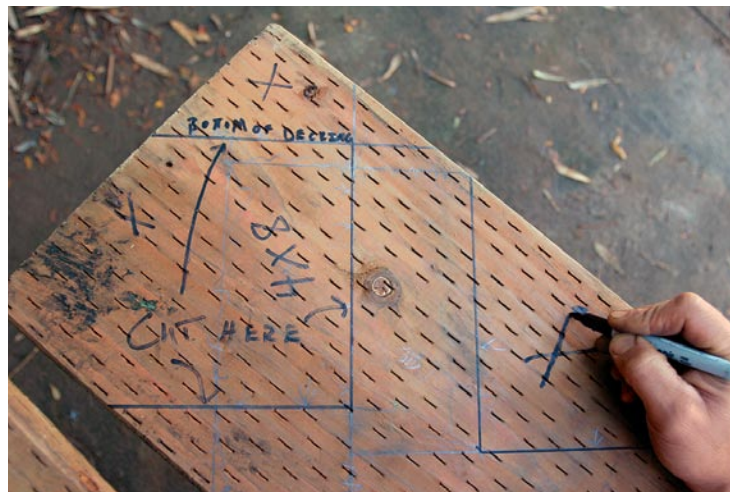
With the footing laid out, I excavate to below frost level, compact 2 in. of gravel at the bottom, and build a form. I keep the top of the form no more than 1 in. above grade, but high enough to keep the bottom of the stringers out of the dirt, if possible. The form is typically small enough that I can mix the concrete I need by hand. Depending on the depth of the form, I add one or two pieces of rebar across the width to reinforce the concrete. Once the concrete has cured and the stair stringers are connected to the kick board, I drill holes with a rotary hammer and use epoxy to secure 1/2-in.-dia. by 6-in.-long bolts through the kick board and into the footing.

BE ORGANIZED AND ACCURATE WHEN MAKING STRINGERS

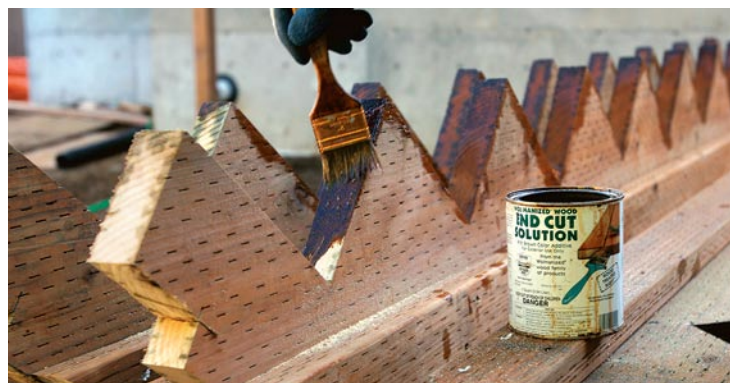
The first step in constructing deck stairs is to figure out where and how the stringers will connect the deck to the ground. Once I establish the exact number and size of treads and risers, I draw all the elements on the stringer before I begin cutting. I take the time to be as accurate as possible and double-check my measurements. Also, even for a small set of stairs, I ensure that the stringers are strong enough to carry the load and are protected against rot.



Take time to be accurate. When laying out the stair's rise and run on a pressure-treated stringer, I use a Speed Square placed against the stair gauges to mark the exact location of the next rise. When marking the next rise and run, I align the framing square to that line. This reduces the margin of error introduced when marking each step.



Use the stringer as a story pole. Before making any cuts, I draw all the cutlines as well as any other important elements, such as the height of the decking, the thickness of the treads, and the top of the concrete.



Make stringers that last. To protect stringers against rot, I coat each cut surface with wood preservative. To prevent a stress failure, I attach one strongback (a 2x4 cleat nailed flush to the back edge of the stringer) to each side of the center stringer and one strongback to the inside of each outside stringer.

treads are 2x12s. I frame stairs as strong as possible, but because this deck called for ipé, the framing was particularly important.

I did a few things to ensure the framing was strong enough. First, I minimized the distance the stringers had to span by eliminating one step. This increased the stair rise to 8 in., which is tall but still within acceptable range. To ensure the stringers wouldn't flex under load, I used pressure-treated 2x12s (the largest dimension available at the lumberyard). Also, I nailed 2x4 strongbacks to both sides of the middle stringer and to the inside of each outside stringer. Strongbacks dramatically increase the rigidity of stringers, so I never build exterior stairs without them.

The transitions at the top and bottom of the stairs also affected the framing. At the top, the last riser needed to continue seamlessly as the deck's fascia. The fascia was spaced off a 4x8 supporting beam by the thickness of the newel posts, which complicated the stringer attachment. I solved the problem by using the stringer strongbacks and the top newel posts to help support the stairs (drawing p. 73).

The bottom transition incorporated an existing concrete slab to support and secure the stairs. To ensure solid newel posts and to protect the entire stair assembly from racking or twisting, I beefed up the landing step. With extra blocking and all-thread rods, I created a rigid box at the bottom of the stairs that includes the newel posts. I bolted this assembly to the concrete slab.

Meticulous stringer assembly pays off

Beefy stringers don't do much good if they are not cut or crowned properly. Stringers are the backbone of the staircase, and I've found that less-than-perfect stringers compound problems down the road. Perfect

USE NEWEL POSTS TO STRENGTHEN STRINGER CONNECTIONS

Top and bottom stringer connections are potential weak points for any set of stairs. At the top, a combination of TimberLok screws secures the stairs to the deck. At the bottom, I created a box assembly with enough rigidity to anchor the landing newel posts firmly. I secured this box assembly to the existing slab to prevent the stair stringers from moving away from the deck over time.



TimberLok screws secure the top. I secure the top of the stringer to the deck's beam by driving 6-in. screws through the vertical face; however, this mainly prevents lateral movement. To carry the load, I drive fasteners up through the strongbacks into the deck beam. Additionally, the newel posts (installed later) at each side of the top of the stairs help to carry the load by being fastened to both the beam and the stringers.



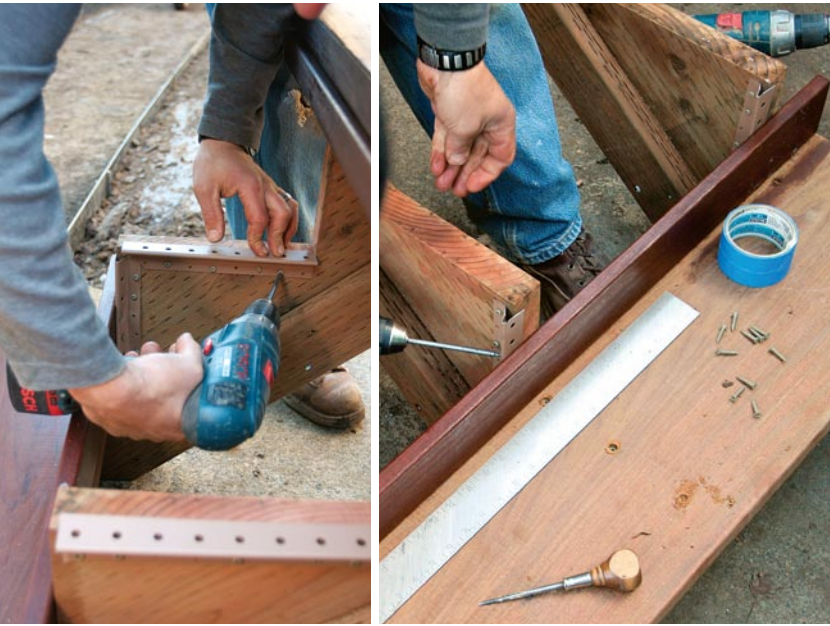
The newel post slips through the tread. I cut down the bottom of the newel post to allow it to pass through a hole in the tread. Because the tread helps to stabilize the newel post, I keep the tolerances between the hole and the post as tight as possible.



Connect the newels through the base. I pass 1/4-in. all-thread through holes I've drilled in the base of the newels and matching holes drilled in the ends of the stringers. Countersunk into 1-in. holes, nuts tightened over washers secure the newels and can be used for plumb adjustment. To increase adjustability, I place washers and nuts on the all-thread rods at both sides of the center stringer.

ADD DURABILITY BY ADDING DETAIL

A little attention to detail will raise the craftsmanship of stairs from pure utility to an ornamental feature in the yard. The easiest way I've found to improve the look of deck stairs is to hide the fasteners and framing lumber. This not only creates a better look but also can help the stairs to last longer.



Screw the treads from underneath. I use the Deck Master hidden-fastener system (www.grabberman.com) because I found the galvanized J-channel system is strong enough for ipé, a dense wood that exerts a lot of force with seasonal movement. Also, securing the treads from below does not create a place for water to penetrate the framing and potentially cause rot.

stringers begin at the lumberyard. Pressure-treated lumber is not high quality in the first place, so I take the time to select stringer boards that are free of big knots. I choose boards with a slight crown (I orient the crown up to help fight gravity), but without cups, twists, bows, or checks. Also, I buy lumber that is long enough to catch the framing square when I'm laying out the cuts for the top and bottom connections.

I use stair gauges on a framing square to lay out stringers. To increase accuracy, I use a Speed Square to mark the transition from one step to the next (top photo, p. 74). When I draw and number the steps, I leave a little room at the top and bottom of the board. At the top step, I

draw the way the stringer will attach to the deck. Once that is done, I make adjustments for tread thickness. If I had cut these stringers and installed them without accounting for tread thickness, the first step up from the concrete would have been taller than the other steps.

Accounting for tread thickness is easy. From the height of the first riser, I subtract the thickness of the tread. I mark a new cutline on the stringer and label it. Typically, I account for the thickness of the decking at the top of the stairs by including it in the overall height calculation. But just to make sure, I draw and label the decking on the stringer along with all the other framing elements that affect stringer framing or stair height.



Hide the stringers. I continue the riser detail around to the sides of the stringers, spacing the boards $\frac{1}{8}$ in. to allow for water drainage (inset photo). The gaps also add to the visual interest of the stairs.

Before I start cutting, I double-check measurements and layout marks for accuracy. I use a circular saw to make cuts. At inside corners, however, I finish the cuts with a handsaw instead of overcutting and weakening the stringer. After the first stringer is cut, I use it as a template by clamping it to an uncut stringer board and tracing the outline. After I've cut all the stringers and fastened the strongbacks, I coat all the fresh-cut surfaces with wood preservative.

Finishing details affect the experience

You don't typically hear someone say, "I had a great experience with my deck stairs today," but any casual observation of a backyard party assures us that deck

stairs are used for more than simply climbing up and down. People sit and lounge on them. They stop to talk midspan. During quieter times, deck stairs collect flowerpots and garden art and even substitute as a potting bench. Consequently, I like to make the deck stairs as inviting as possible.

Wide is better than narrow. I like the stairs to be at least $3\frac{1}{2}$ ft. wide at the inside of the newel posts, and wider if possible. I make the treads at least 11 in. from front to back to allow enough room for people and pots. I chamfer all sharp edges and sand rough spots. Finally, I hide all the fasteners by screwing from underneath or countersinking the screws and plugging



Streamline the post connection. The top riser is continuous with the deck's fascia for a clean transition. The outside course of decking is full width and is notched around each newel post.



the holes. As I mentioned, hiding the fasteners improves the look of the stairs and reduces the chance of water damage, but it also makes the stairs nicer to the touch and eliminates the fastener location as a source of splinters.

Obviously, all deck stairs should conform to local code requirements. I installed the cable-rail system according to the manufacturer's specifications. I beveled the top of the handrail to shed water and to make it more comfortable to grab. In some code jurisdictions, I also would have to install an additional handrail that is easier to hold. □

Scott Grice lives with his wife and daughters in Portland, Ore. Photos by John Ross.

Plug all locations screwed from above. It's not possible to hide all the fasteners by screwing from below. There are always some locations, like handrails, where it is much easier to drive a fastener from above. I don't worry about it, but I take the time to plug every location screwed from above to maintain a streamlined appearance and to prevent water penetration.