

The Complete Guide to Building A Deck

Atlanta 2012

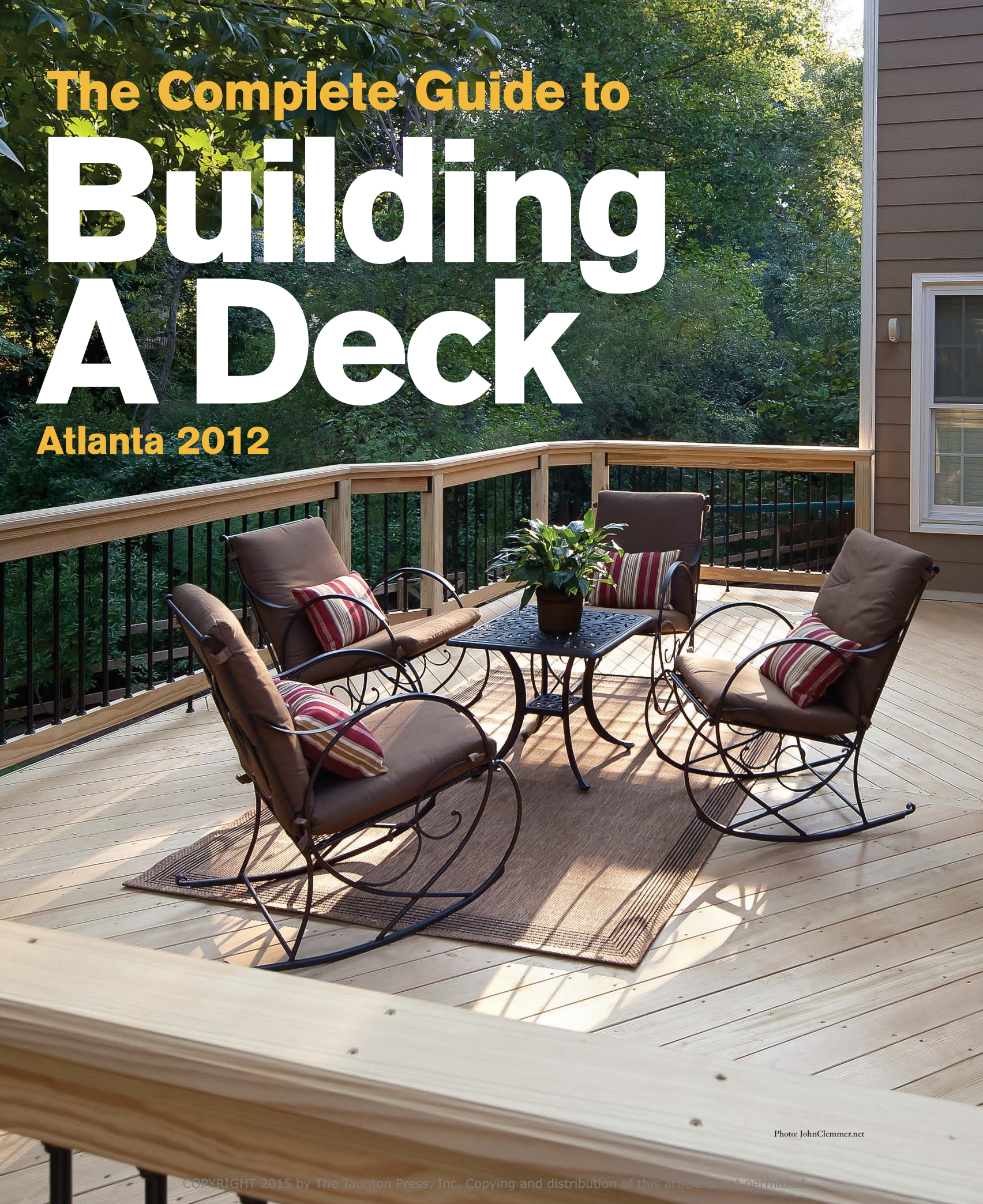


Photo: JohnClemmer.net



Follow veteran deck builder Bobby Parks and his crew as they construct a new raised deck on a Georgia home. Featuring clipped corners, tubular balusters, and decking laid diagonally, the project combines standard lessons in deck construction with smart ideas any deck builder can use to make a simple deck special. Parks explains his approach step-by-step, with advice on framing, building stairs, setting posts, and adding railings.

THINK SAFETY In most areas of the country, you need a building permit for a deck to ensure that it sits on an adequate foundation, is built properly with

Check✓Code rot-resistant materials, and is attached securely

to the house. Throughout this article, this symbol will alert you to where you should make sure your deck conforms to local building codes. For your own protection, wear safety glasses when cutting or nailing, wear hearing protection as necessary, and be careful when working from ladders or the framing of an unfinished deck with no railing.

Angled planks and a custom railing make this deck special. Here's how to make it your own.

BY BOBBY PARKS

My company designed and built the deck profiled here to replace a relatively new deck whose code violations were too numerous to mention. Our clients, who live in an Atlanta suburb, had asked us to integrate the new deck with an existing grade-level patio and to use materials that would perform well and look good for many years. Because they liked the look of natural wood but wanted to minimize maintenance, we used vertical grain pressure-treated decking kiln-dried after treatment (KDAT). The frame and railings are pressure-treated as well, and the balusters are aluminum.

A crew of three built this deck. They established the ledger, erected the beam, and then filled in the framing. Decking was installed next, followed by the footings, posts, railings, and stairs. To be efficient, we didn't wait to complete each stage of the process before moving to the next. While one carpenter was starting the layout for one phase, the other two could finish the previous phase. □

Bobby Parks owns Peachtree Decks and Porches in Alpharetta, Ga. Photos by Charles Bickford, except where noted.



Photo this page: JohnClemmer.net. Product photos: Dan Thornton. Drawings: Toby Welles/WowHouse.

ATTACH THE LEDGER

Because the ledger is connected to the house's framing, it must be flashed to prevent water from getting behind the ledger and into the framing, where it could compromise the attachment points and cause the deck to separate from the house. I use three pieces of vinyl flashing, bending the bottom piece into a "Z" to fit behind the ledger. For more protection, use self-adhesive membrane as the final piece, which laps over the top (drawing below right).



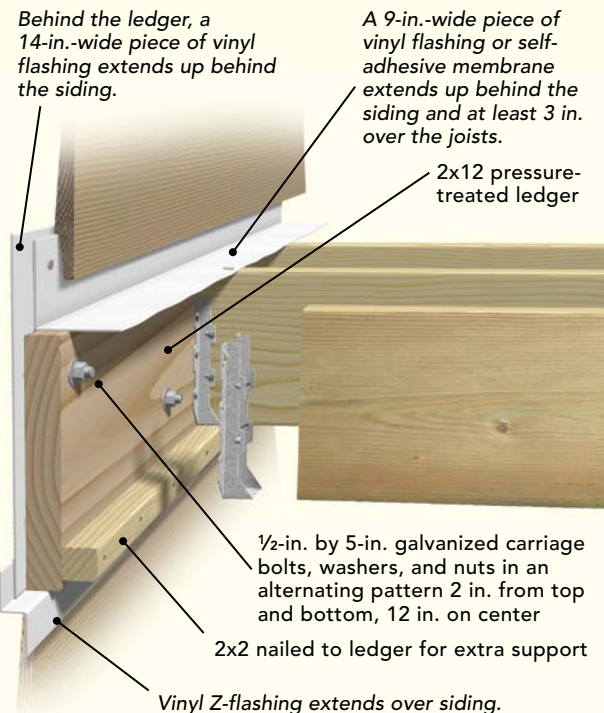
Bend vinyl with a nail set. The easiest way to make precise bends on vinyl flashing is to use a straightedge and to score the bend line with a nail set or a similar tool that won't cut through the material.



Put the ledger in place. After you install the Z-flashing and a wide piece of vinyl flashing, tack the 2x12 ledger in place with 16d galvanized nails. Its position is determined by a previously chalked level line and checked with a level during installation.



The fast way to lay out bolts. My crew typically doesn't drill the holes for the carriage bolts that secure the ledger to the house until the joists are tacked in place temporarily. The wait lets them space the bolts so that they don't interfere with the joist hangers.



Check Code

Recent changes to the International Residential Code (IRC) spell out spacing requirements for ledger bolts and require the installation of additional hardware to increase the strength of the deck-ledger connection. Consult with your local code official to determine how the code applies in your area.

FRAME THE DECK

We use a post-and-beam cantilever method rather than a doubled outer-deck band. Cantilevering deck joists over a carrying beam creates a stronger structure that minimizes the distance the joists have to span. In turn, this increases the deck's live-load capacity, or its ability to carry weight beyond that of the deck itself. This method also makes it easier to include bays and bump-outs in the deck's design without locating a post at every corner.

1. RAISE CARRYING BEAM ON TEMPORARY POSTS

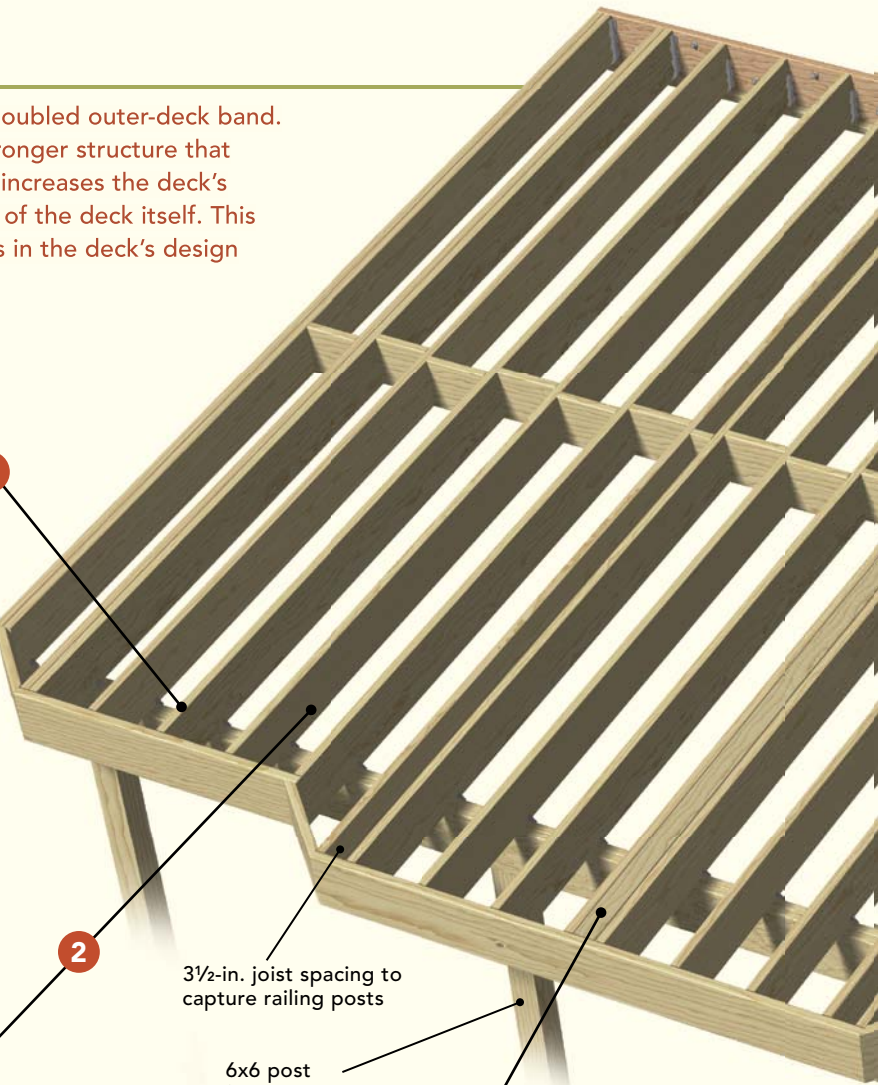


Raise the beam, and run out the sides. After two temporary posts are braced plumb, the doubled 2x12 beam is lifted into place. The perimeter joists are brought out from the ledger and trimmed flush with the outside edge of the beam.

2. INSTALL JOISTS ON 12-IN. CENTERS



Reasons for more joists. Locate the joists on 12-in. centers to increase the deck's load capacity and to shorten the distance between decking fasteners created by the diagonal decking pattern planned for this deck.



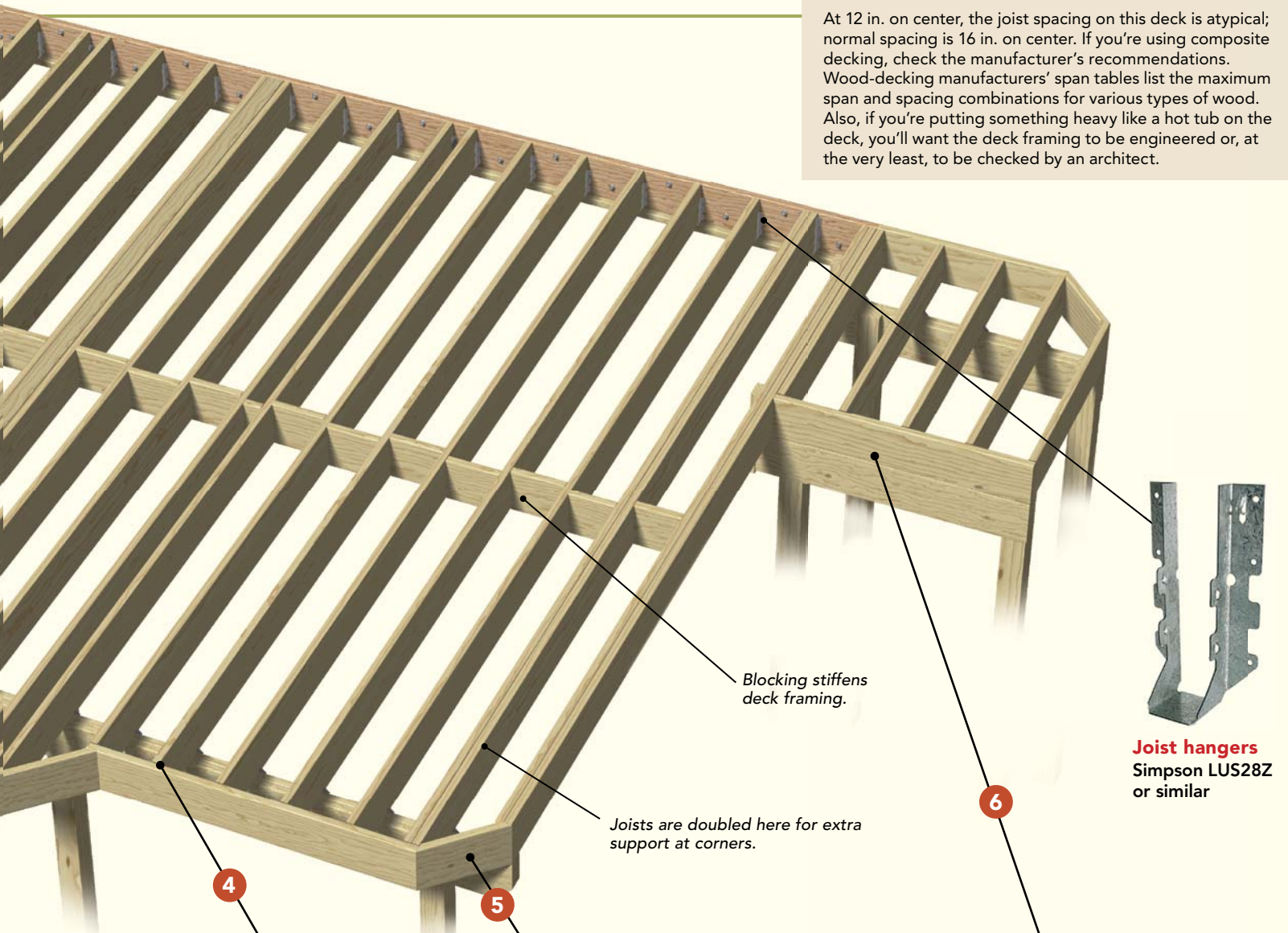
3. ADD BACKING FOR DIAGONAL DECKING



A parting beam supports the ends of the decking. To support the diagonal decking detail at the center of the deck, nail together a parting beam. Two 2x10 joists are joined with a full-length 2x4 along the top edge and spaced accordingly with 2x4 blocking underneath.

Check✓Code

At 12 in. on center, the joist spacing on this deck is atypical; normal spacing is 16 in. on center. If you're using composite decking, check the manufacturer's recommendations. Wood-decking manufacturers' span tables list the maximum span and spacing combinations for various types of wood. Also, if you're putting something heavy like a hot tub on the deck, you'll want the deck framing to be engineered or, at the very least, to be checked by an architect.



Blocking stiffens deck framing.

Joists are doubled here for extra support at corners.

Joist hangers
Simpson LUS28Z
or similar

4. TRIM THE OVERHANG



Define the perimeter with chalklines. Once the joists are in place, mark the amount of overhang beyond the beam, snap a chalkline, and cut off the excess.

5. INSTALL THE PERIMETER BANDS



Miter the corners. After installing the long runs of perimeter bands, miter shorter sections at both ends, and nail them across the corners.

6. ADD THE UPPER STAIR'S LANDING



Hang the upper landing from the deck. Strap-hang the two carrying beams from the deck's rim, and support them with temporary posts. Then frame the landing box on top, and brace it square to the deck.

INSTALL DECKING ON THE DIAGONAL

The decking is the finished skin of the deck, so we put a lot of effort into its visual details and installation. We often use a diagonal decking pattern because it looks good, and we can run single boards out to the perimeter, avoiding butt joints in the field. On this job, we used 2x5 vertical-grain pressure-treated yellow pine that doesn't cup as much as wider decking. We attach the decking with coated deck screws, drilling pilot holes for all screws to reduce splits. For the sake of accuracy, we don't use screw guns with extensions.

1. ESTABLISH THE ANGLE



Run the first board from the corner. The 45° decking angle is established by measuring a right triangle from the intersection of the house and the parting beam, then snapping a chalkline as a reference for the first board.

2. INSTALL DECKING EFFICIENTLY



Cover the area quickly. For better workflow, lay out the decking from the first board toward the perimeter, leave it long, and tack it into position. Later, someone will go back, drive all the remaining screws, and trim the board ends around the perimeter.

3. SMALL AREAS CAN TAKE MORE TIME

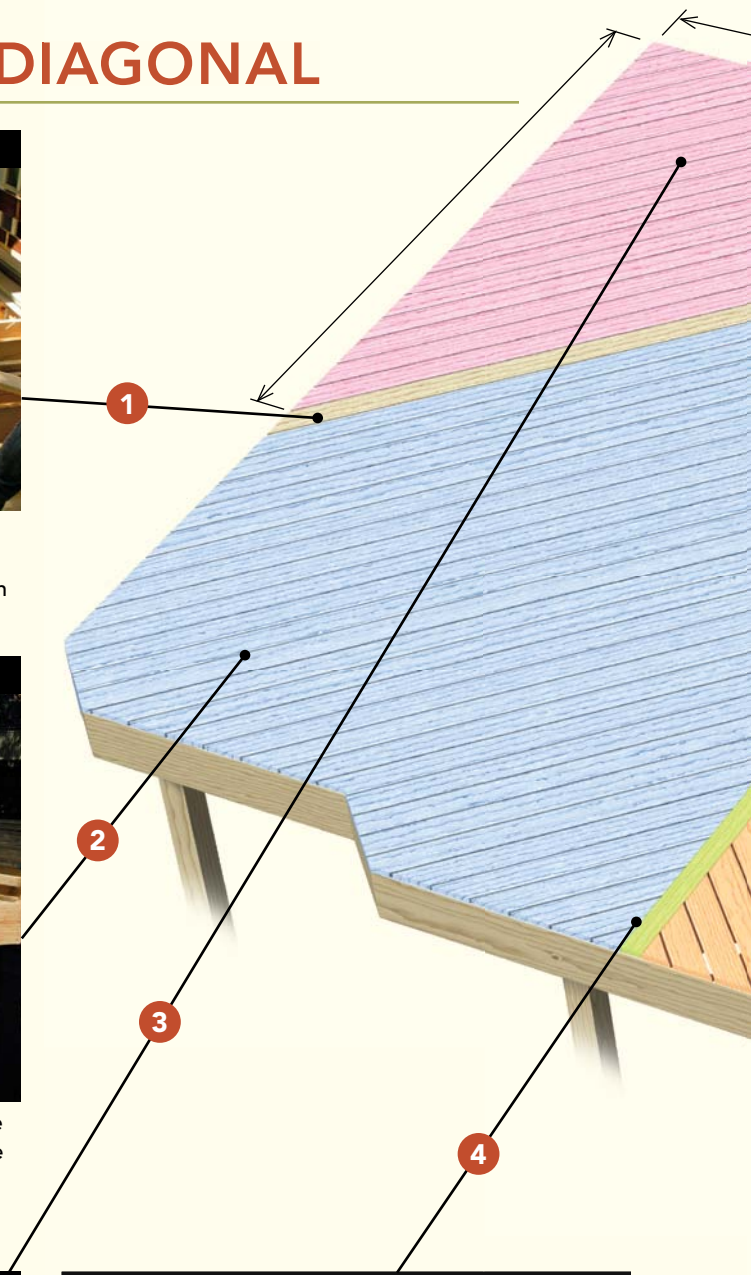


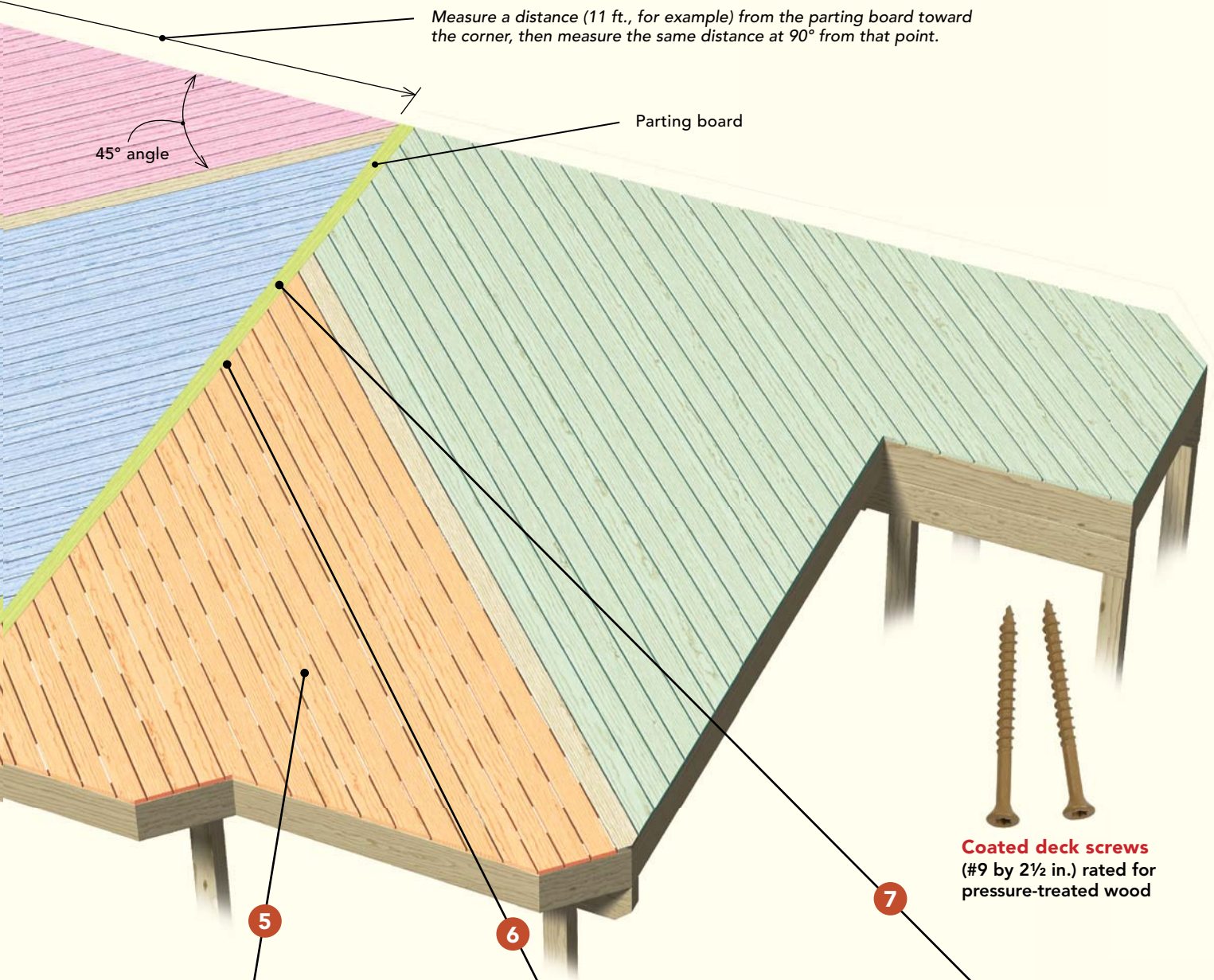
This is the place for precise cuts. Once the outer portion is filled in, the inner corner can be tackled. Hemmed in by the house, each board must be cut to fit on both ends.

4. CREATE A SPACE FOR THE PARTING BOARD



Chalk the midline, and cut. When one side of the decking is complete, chalk a line just inside the parting beam, and trim the deck-board ends at the line. Always use blue or white chalk; red is indelible.





5. FILL IN THE OTHER SIDE



Start in the middle. To establish the duplicate angle, install a group of three or four boards, and align them with the opposite side. Starting in the middle reduces the chance of accumulated error. Check the angle, then fill in decking on both sides of the group.

6. CHALK ANOTHER LINE, AND CUT



Trim the centerline. Once the decking is completed, snap and cut a line on the parting beam to create the exact space for the parting board. A straight line looks better, so work slowly.

7. INSTALL THE PARTING BOARD



Make it tight. Rip the center decking strip, called a parting board, with a slight bevel on both sides so that it fits snugly in the space between the two fields of decking. A sledgehammer and block will persuade the fit.

SET FOOTINGS AND POSTS

For this deck, the carrying beam and the beams beneath the stair landings are supported by 6x6 posts. Each post is mechanically fastened to a concrete footing and to the beams. The 6x6 posts are spaced approximately 6½ ft. on center under the carrying beam.



Find the center of the footing. To locate the footings, plumb down from the beam. You don't need a plumb bob for this; a tape measure is a lot faster. This establishes the center of the footing. From there, mark the hole.



Connect footing to soil. Even though this 24-in. by 24-in. by 12-in. footing was dug in highly compacted clay, a grid of ½-in. rebar still ties the concrete to the bottom of the hole.



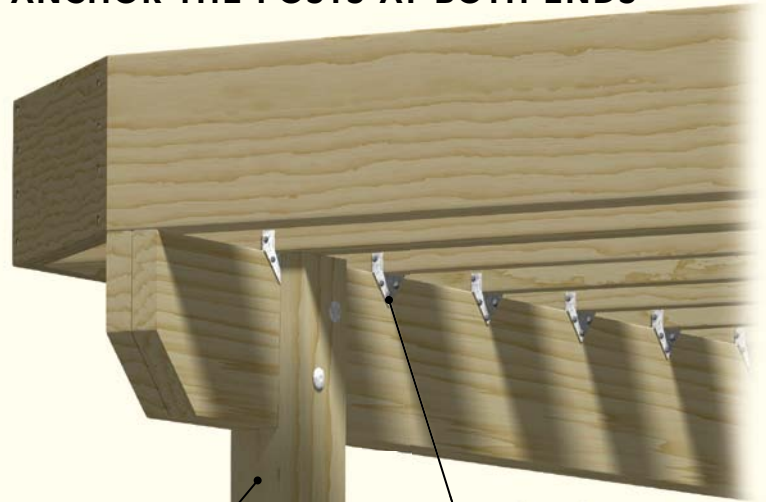
Flatten the footing. After the concrete is mixed and poured into the footing, trowel the surface smooth.



Anchor the post base. The next day, the concrete should be set but not cured. After checking the precise location of the post, use a hammer-drill and masonry bit to drill a hole for the post base's anchor bolt.



ANCHOR THE POSTS AT BOTH ENDS



A 6x6 pressure-treated post is notched to support the carrying beam.



Hurricane straps
Simpson H1Z or similar, installed between beam and joist to prevent wind uplift

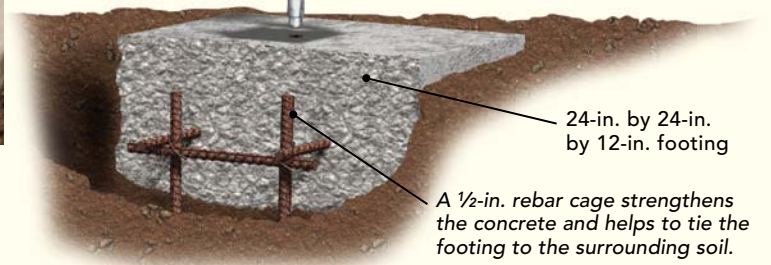
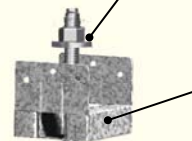
Check Code

The number, size, and depth of concrete footings or piers vary with the size of the deck, the regional climate, the soil conditions, and the codes. Consult the IRC and/or local code officials to find the most appropriate methods for your area.

Galvanized wedge anchors and washers
(5 in. by 5/8 in.)



Galvanized 6x6 post base
(Simpson ABA66Z or similar)



24-in. by 24-in. by 12-in. footing

A 1/2-in. rebar cage strengthens the concrete and helps to tie the footing to the surrounding soil.

Raise the permanent post. Measure the distance between the post base and the beam above. Notch the 6x6 post at the top, set it into the post base, and plumb it into position.

INSTALL RAIL POSTS AND RAILINGS

Spaced at a maximum distance of 6 ft., the 4x4 railing posts are cut to a length of approximately 46¼ in. so that they span the distance between the bottom of the framing and the top of the railing (36 in. above the decking). On this job, the balustrade was made from 2x4s on edge with aluminum balusters (www.solutionsaluminum.com). Baluster cups and end brackets are from Deckorators (www.ufpi.com). A 2x6 railing cap strengthens the railing and adds a higher degree of detail.



Mark the railing post locations. Using a cutoff, trace the post positions onto the deck so that the post will sit just inside the rim.



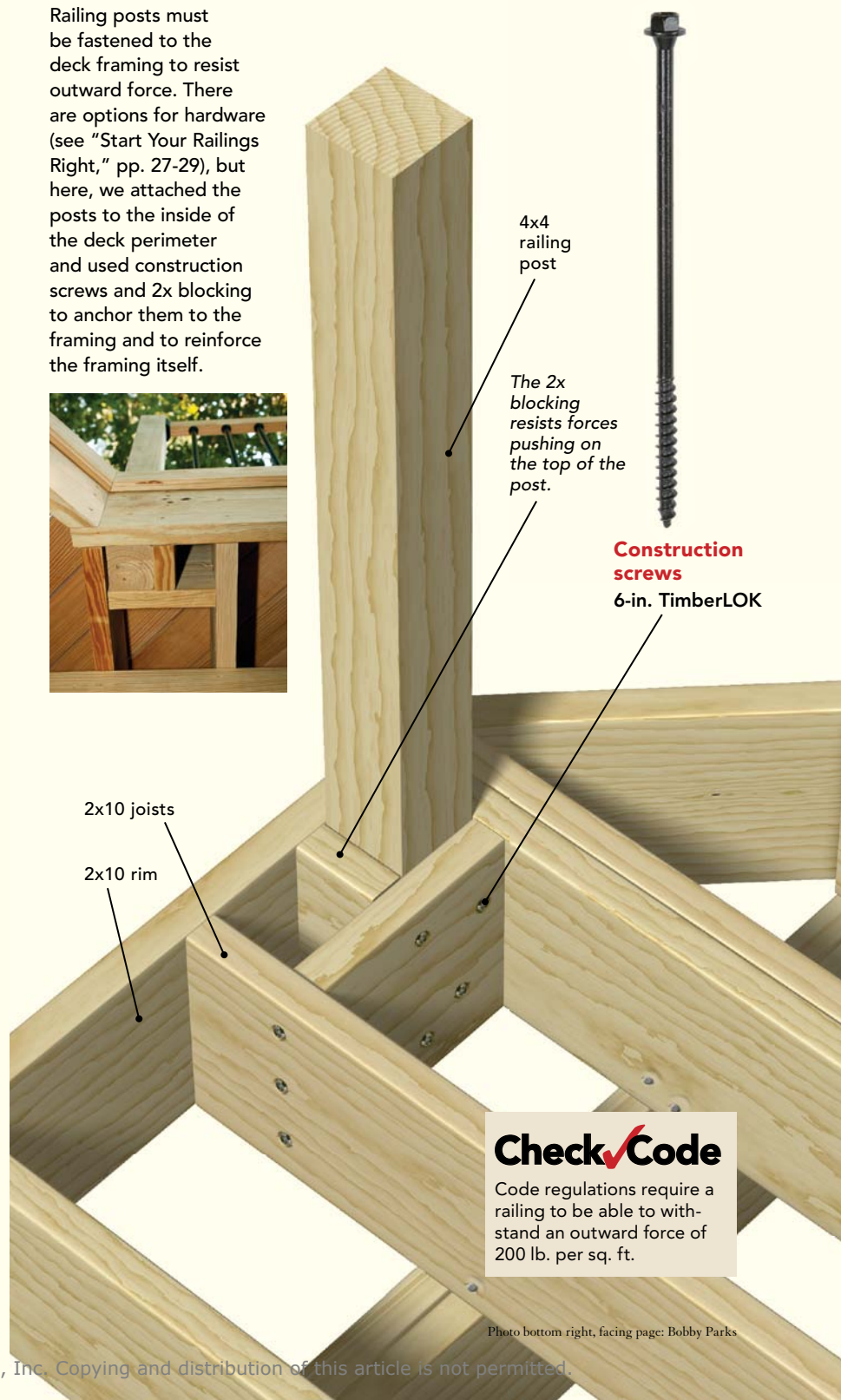
Cut the hole. Drill pilot holes at the corners of the outline, and cut out the post hole with a jigsaw.



Attach the posts. After plumbing up the posts in the hole, tack them in place, and then attach blocking with 6-in. construction screws.

STRENGTHEN RAILING POSTS WITH EXTRA BLOCKING

Railing posts must be fastened to the deck framing to resist outward force. There are options for hardware (see "Start Your Railings Right," pp. 27-29), but here, we attached the posts to the inside of the deck perimeter and used construction screws and 2x blocking to anchor them to the framing and to reinforce the framing itself.



CheckCode
Code regulations require a railing to be able to withstand an outward force of 200 lb. per sq. ft.



Check✓Code
 The IRC dictates that guardrails 36 in. or higher be installed on all decks that are 30 in. or more off the ground and that the space between balusters be less than 4 in.



Center the baluster cups. Screw down the cups to the rails in pairs so that the balusters have the same spacing on the top and on the bottom.



Connect railings to posts with brackets. After the balustrade is assembled, screw brackets onto the railing ends. Then screw the brackets from the opposite side onto the posts to attach the assembly.

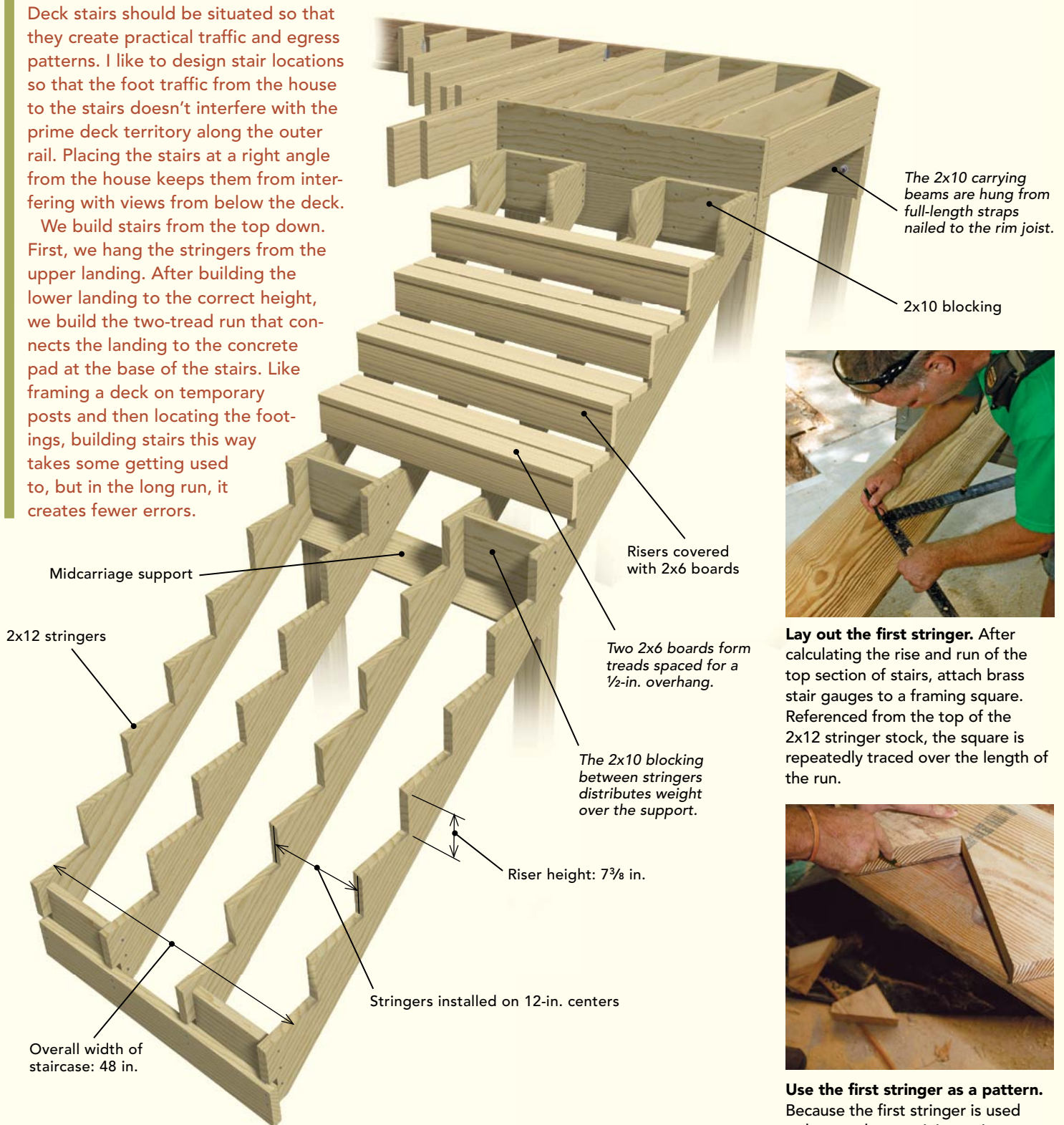


Tie everything together. Railing caps made from 2x6s connect each of the posts and add strength to the balustrade. An ogee profile routed onto the edges gives the rail a finished look.

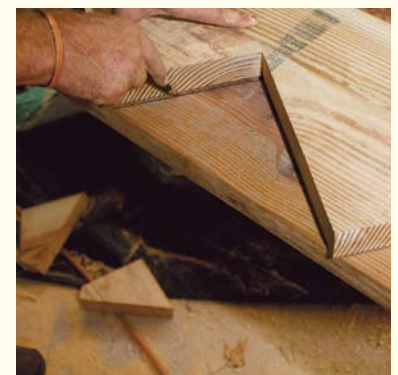
FRAME THE STAIRS: UPPER SECTION

Deck stairs should be situated so that they create practical traffic and egress patterns. I like to design stair locations so that the foot traffic from the house to the stairs doesn't interfere with the prime deck territory along the outer rail. Placing the stairs at a right angle from the house keeps them from interfering with views from below the deck.

We build stairs from the top down. First, we hang the stringers from the upper landing. After building the lower landing to the correct height, we build the two-tread run that connects the landing to the concrete pad at the base of the stairs. Like framing a deck on temporary posts and then locating the footings, building stairs this way takes some getting used to, but in the long run, it creates fewer errors.



Lay out the first stringer. After calculating the rise and run of the top section of stairs, attach brass stair gauges to a framing square. Referenced from the top of the 2x12 stringer stock, the square is repeatedly traced over the length of the run.



Use the first stringer as a pattern. Because the first stringer is used to lay out the remaining stringers, the cuts should be accurate. With a circular saw, cut to the intersection of the tread and riser lines, then finish the cut with a jigsaw or a reciprocating saw.

CheckCode

The maximum recommended height for deck-stair risers is $7\frac{3}{4}$ in., according to the IRC, which dictates other limits as well with regard to deck-stair construction. Be sure to consult the code or your local code official before designing stairs.



Hang the first stringer.
After marking a level line on the upper header, toenail the first stringer into place, and tack it to a temporary post at midspan to keep it at the correct elevation.



Tie the lower ends.
After attaching the two outside stringers, connect their lower ends with a 2x8, then add the middle stringers. The 2x8 forms one side of the lower landing.

Keep things in place.
Although the next step is to frame the lower landing, it's a good idea to install a couple of treads and risers at the bottom of the run to keep the stringers from twisting. Note the space left for decking above the 2x8 cleat.



FRAME THE STAIRS: LOWER SECTION

When the upper portion of the stairs has been framed and braced, we locate, dig, and pour the lower landing's post footings. Placed on the footings, short 6x6 posts are notched to support doubled 2x8 beams that in turn support the landing's frame. After the landing is framed, we know the exact position and height of the concrete pad that anchors the last stair carriage. Once the pad is set, we can complete the stairs.

Establish the lower landing.

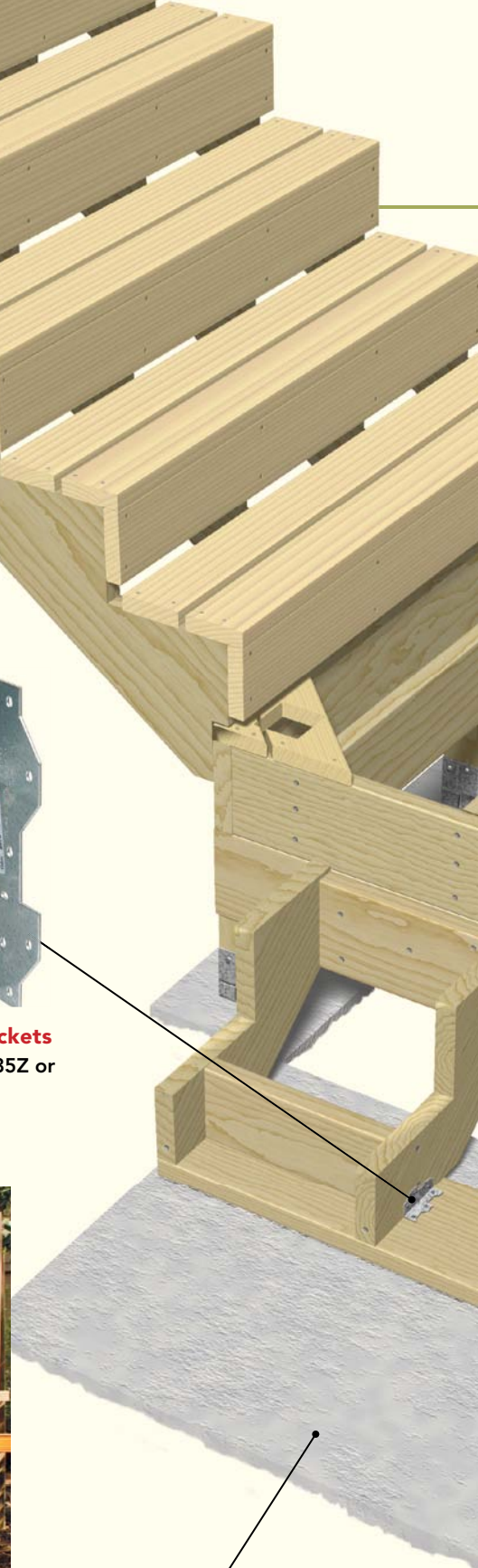
When the upper stair run has been leveled and plumbed, locate and pour pads for four 6x6 posts. Notch each pair of posts for a doubled 2x8 carrying beam, which will support the landing frame.



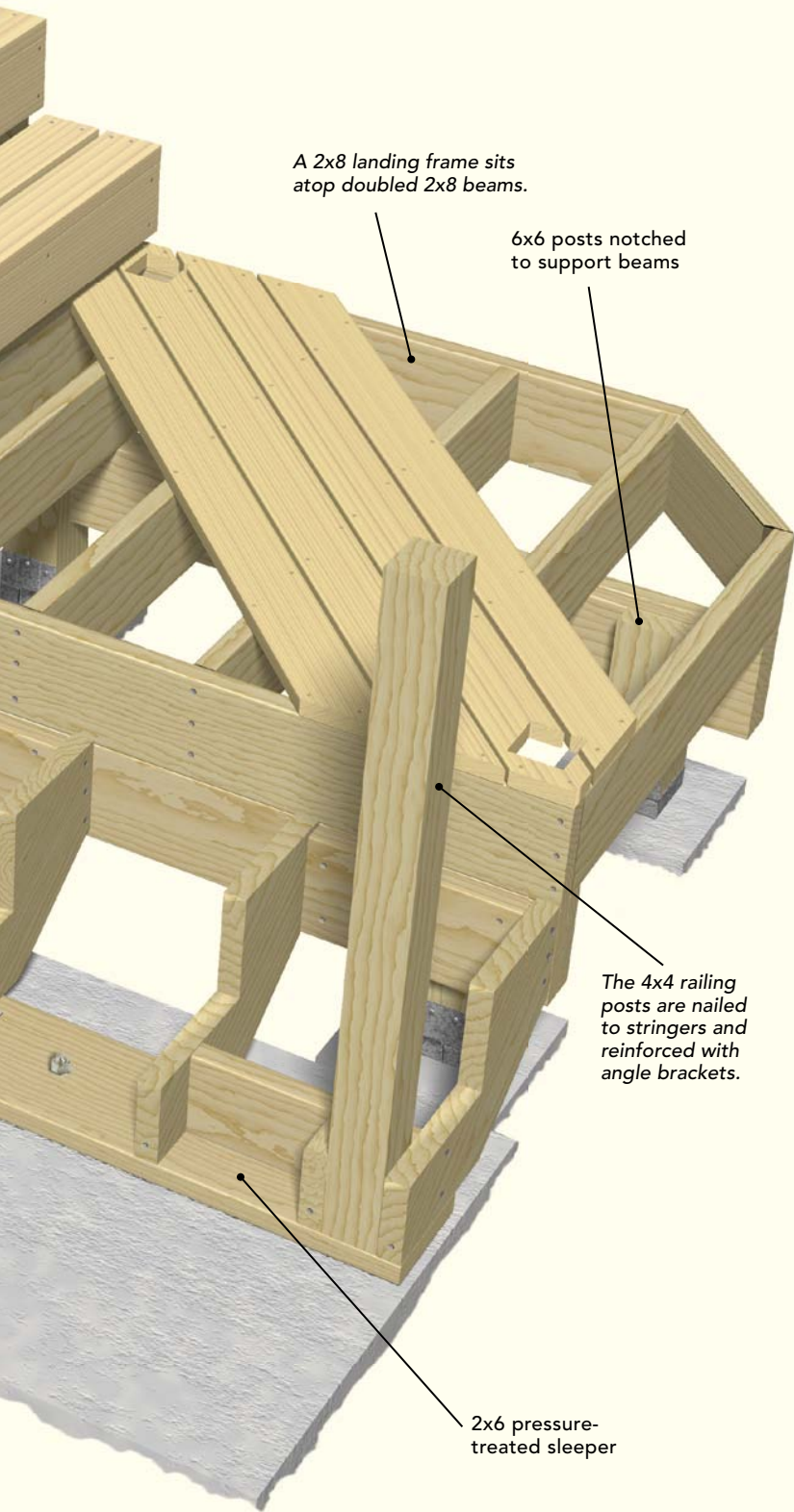
Angle brackets
Simpson A35Z or similar

Build the landing in place.

With a pair of carrying beams in place, the landing box can be framed. Note the clipped corner detail and 12-in.-on-center framing. Like the deck above, the landings are decked with a diagonal pattern.



Concrete pad



A 2x8 landing frame sits atop doubled 2x8 beams.

6x6 posts notched to support beams

The 4x4 railing posts are nailed to stringers and reinforced with angle brackets.

2x6 pressure-treated sleeper



Complete the box. After the lower stair landing's perimeter is complete, it's a good time to install the interior blocking that supports the railing posts at each corner.



A level form is critical. A concrete pad is formed to terminate the two-tread run from the landing above. After setting and filling the form, screed the concrete flush with the top of the form, and trowel it smooth.



Frame the stairs. Once the pad has cured, the stairs from the landing can be built. Attach the short stringers to a 2x nailer bolted to the pad. Blocking between the outer stringers supports the posts.