Stronger, Smarter
Deck Stairs

The ideal stair stringers balance strength, durability, and ease of assembly

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The stairs attached to a raised deck involve a unique set of building challenges, and they face a different type of abuse than any interior staircase. In addition to having to follow stricter span tables, use code-required hardware, and negotiate potentially uneven surfaces where the stringers land at grade, deck stairs have to survive abuse from the elements—including dramatic swings in moisture content, the possibility of freeze/thaw cycling, and a daily dose of UV rays from the sun. At the same time, these challenges afford some opportunities for building stronger stairs that ease the installation of the guardrails, risers, treads, and trim.

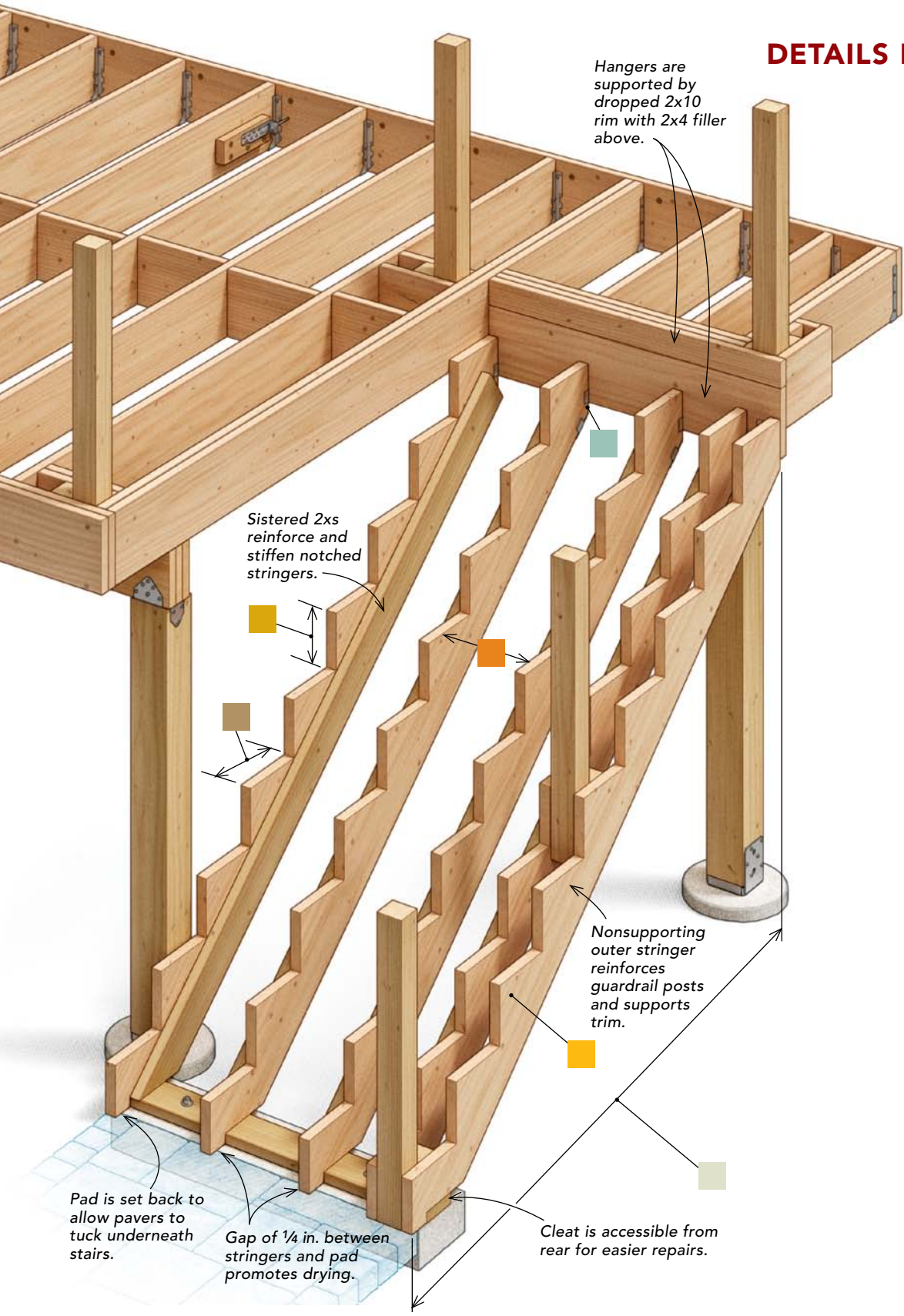
This doesn't require a radical change in the way you build deck stairs. In fact, our approach is mostly a combination of standard practices and best practices—with a few tricks thrown in for helping the job to run smoothly.

Layout should make life easier

When you're building a deck, you often have a variable that isn't present with interior staircases: a flexible landing point. When laying out a stringer between two fixed points, the rise and run of the cuts must add up to fit the available space between the header at the top and the floor at the bottom, while also complying with code minimums and maximums for riser height and tread width. With deck stairs, on the other hand, you can form and pour the pad after the stringers are cut and set. The math for calculating risers

Photos: Justin Fink. Drawing: Christopher Mills.

DETAILS FOR STURDY STAIRS



Better support

Hangers may need extra support. *Whether you're using sloped joist hangers or stringer hangers (shown), dropped staircases usually require additional lumber to provide full fastening for the hardware. Here, the 2x10 rim was furred down by the width of a 2x4 spacer so that all eight fasteners had backing.*

Fast measurements

Stringer sets the pad. *With the pattern stringer cut, held in position, and leveled, it's easy to measure down to determine the desired height of the concrete formwork that will be installed below.*

Know the code

Here are some of the most notable details to brush up on before framing your next set of deck stairs.

Stringers must be cut from a minimum of 2x12 stock.	Maximum span is 6 ft. for notched stringers (13 ft. for solid stringers).	Sloped joist hangers or stringer hangers are required at the upper end of the stringers.	Maximum width between stringers is 18 in.	Maximum riser height is 7¾ in.	Minimum tread width is 10 in.

Framed for strength

Sister to increase the span. *Notched 2x12 stringers have a maximum span of 6 ft. If approved by your inspector, however, this span can be extended by nailing 2x stiffeners to the uncut portion of each stringer.*

and treads then becomes much easier, and it takes a back seat to other priorities. As long as you stay within the code minimums and maximums, you're now free to lay out the riser height and tread width at whatever measurements feel comfortable, make the math simplest, combine to yield a stringer that fits in the rough space you're aiming to fill, or make the best use of the tread and riser material.

Strategies for strength

Although there are no provisions in the building code for interior stair-stringer spans and methods of attachment, deck stairs have guidelines (see "Know the code," p. 67).

It's not surprising that many builders get this wrong, because with notched stringers, the maximum span is only 6 ft. measured horizontally. If you're just over that distance (as we were on this project), check to see if your code official will allow additional stringers and/or sistering additional lumber to the conventional 2x12 stringers as a means of providing extra rigidity without adding midspan posts and footings.

Regardless of span issues, there are a couple of good reasons for cutting one or two extra stringers. The code-required hardware used to attach the upper end of a stringer to the deck has a minimum setback from the end of the dropped rim, which can be a problem when the stairs are at one end of the deck rather than someplace in the middle. We feel comfortable making the argument that only the walkable stringers need to be attached with code-compliant hangers. The extra outer stringer, then, can be thought of as support for stiffening the railing posts and as a provision for solid nailing when attaching the treads, risers, and trim.

Plan for repairs, and always promote drying

Traditionally, the 2x4 cleat at the bottom of a staircase nests into notches in the front edge of each stringer. The purpose of this cleat is to anchor the staircase to the landing or pad so that the stringers won't slide out of position. Although unconventional, moving the cleat to the back of the staircase has a couple of benefits. First, it leaves more room to attach the lowest guardrail post. Second, you have easy repair access if the cleat rots—a strong possibility when a piece of lumber, even a pressure-treated board, is in constant contact with concrete that has limited exposure to light and air.

If the cleat needs to be replaced, the work can be done from the back without removing risers and treads. Cut through the nails that hold the cleat to the stringers, and then cut the cleat into pieces to remove it from the wedge bolts.

One other detail that helps to prevent the exposed end grain of the stringers from sucking up moisture from the concrete is to provide them with a gap. To do this, cut the notch for the 1½-in.-thick cleat to a depth of

Subassembly

Prefab, then set. *If you cut the stringers carefully, you can assemble them, set them into the awaiting hangers as one unit, and know that the treads and risers will be aligned well.*

An accurate landing

Pad comes last. *After final plumbing and leveling are complete, shovel concrete into the pad formwork. Once the concrete has cured, strip the form and add wedge anchors through the cleat to anchor the base of the finished stairway.*

1¼ in., raising the vulnerable stringers ¼ in. above the surface of the concrete.

Hide the pad

Besides making the rise and run calculations easier, using the stringers to determine the location of the landing pad means that you can size the pad to be just big enough to support the stairs. Customers love this, because it means that a paver patio or other landscaping element can be installed right up to the first step rather than terminating against a visible and unattractive gray concrete pad.

To size the pad, we cut the first stringer, then hold it in place for a test fit. Once leveled, it's easy to measure down from the bottom edge of the stringer to determine where the top edge of the concrete formwork needs to land and also where to locate its front edge. We frame the pad form using 2xs and set it so that the outside face of the form is flush with the front edge of the stringer. This way, after the concrete pad has been poured and the form stripped away, the concrete is set back 1½ in. from the front face of the stringer. It's even farther out of sight once the bottom riser board is installed. □

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