Box-Framed Curved Deck Stairs

by Jason Russell


A


B


C


D


E


F

A fun and challenging project that I've been working on lately is a new elevated deck, which features the set of curved stairs shown here. Instead of framing the stairs with cut stringers, I built a series of tapered boxes out of incised pressure-treated hemlock, standard exterior framing lumber here on the West Coast. The boxes are all 6 feet long and taper 5 1/2 inches in width from one side to other. Stacked on top of each other, the boxes form the framework for the stair's treads and risers **(A)**.

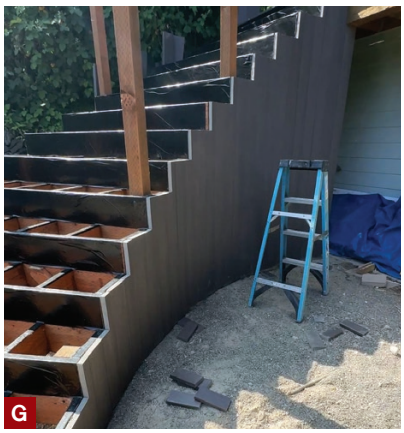
Tread boxes. I started framing the stairs from the top and worked my way down, one box at a time **(B)**. At this stage of the project, I was working solo, so I supported the cumbersome boxes on stepladders as I roughed in the stairs, screwing the first box to the deck framing, and subsequent boxes to each other. After each box was in place, I screwed a pair of temporary 2x4 support posts to either side that extended all the way to the ground **(C)**.

I waited to pour the concrete landing pad until all of the tread boxes had been installed, and I knew exactly where the pad should be located. To compact the mix and remove air bubbles, I used a concrete vibrator before applying a smooth finish to the surface, then waited three days before installing Simpson Strong-Tie ML24Z angle brackets to fasten the tread box to the pad. I added a 1/2-inch-thick PVC shim to the base of the tread box so that it wouldn't wick moisture, then fastened the angle brackets through the PVC and into the concrete pad with SST Titen HD screw anchors **(D)**.

Support. The pair of guard posts at the bottom of the stairs were fastened to the tread box with structural screws reinforced with blocking. All of the stair's intermediate 4x4 guard posts were installed on metal post bases bolted to concrete footings, which I located and poured after the stairs were framed.

Between those posts, I installed 4x6 beams to support the tread boxes, first cutting them to length and fastening them to the posts with structural screws, then installing SST LS50 skewable brackets to reinforce the post-to-beam connections.

PHOTOS BY JASON RUSSELL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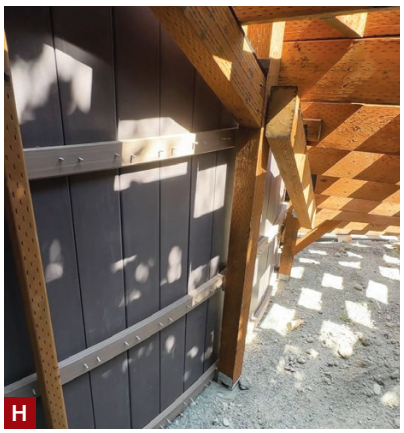
H


I


J


K


L

Then I locked each box to the beam with 4-inch FastenMaster TimberLok screws and flashed the tops of the beams with self-adhering flashing tape **(E)**.

Along the inside radius of the stairs in the center sections, I had to set the beams inside the posts instead of between them. Otherwise, the beams would have stuck out too far and disrupted the skirting detail. While the lowest beam section fit between the posts, I had to notch out the skirt rail to fit around the beam and bracket. The cuts for all the beams that support the tread boxes were complex, so I started with a template to find the angles for the cuts and help me find the finish lengths for the beams.

Skirting. I used a Stabila LAX 600 G multi-line laser to identify elevations on the reverse curve for the skirting framing, then used them for reference when bending in the horizontal rails that support the skirting **(F)**. I used TimberTech deck boards for the skirt rails, shimming them as needed to match the plane of the tread boxes and adding an extra vertical post for additional support **(G)**. Then I installed TimberTech dark hickory decking as the skirting, covering both the inside and outside faces of the stairs but not the back so that I would have access to install the riser lights **(H)**.

I was able to cold-bend the fascia boards in place **(I)**. While the inside fascia measured less than 20 feet and thus could be done with a single board, the outside fascia measured more than 20 feet and required a splice joint. This reflects the unequal pitch of the inside—33 degrees—and outside—26 degrees—stringers, which had to be accounted for when fabricating the railing.

Treads. Neither the left nor the right sides of the 6-foot-wide treads are square, but had to be custom cut to different angles to fit the curved fascia. I used a cutoff as a template to make the cut on one end, then find the length and mark the cut on the other end. After installing the two full-width treads, I used a track saw to cut the inner pie-shaped tread.

Before installing the first tread, I had to install the riser first in order to have access to the back of the riser for wiring the riser light.

Railings. Finally, I enlisted the homeowner's help to fabricate the custom-curved TimberTech Radiance railings. I heated the rails with heat blankets, then clamped them to a form that I had set up on a work table that matched the curve of each section of stair **(J)**. After checking the individual rails for fit **(K)**, I assembled the balustrade for each section and installed the railing as a unit **(L)**. ❖

Jason Russell owns Dr. Decks (drdecks.com), in Tacoma, Wash. Follow him on Instagram and on YouTube at @drdecks.