To complete the curved detail on the top deck (A), a custom-fabricated steel girder (B) was required. Bolted to the deck framing and house (B, C), the girder doesn't require a support post (D).

A Curved Deck With a Hidden Framing Secret

by Jason Russell

In pre-COVID times, one of my largest and most challenging projects was a 2,500-square-foot deck and matching dock system, part of an extensive outdoor living project for a home on Lake Tapps, in Washington. For the deck's multiple levels across the home's lakeside elevation, one of the organizing design elements is a pair of stacked, semi-circular balcony-style projections extending from the home's central turret.

The framing for the second-story curved balcony was straightforward, with 2x12 pressure-treated (PT) hemlock joists cantilevered over the deck's 6-inch-by-24-inch dropped PT glulam beam. Forming the curve was a simple matter of swinging an arc across the cantilevered joists and cutting them to length. On the third story, however, the curve circles all the way back to the house. Figuring out how to frame this section—an unsupported 4-foot-deep curved cantilever—without installing another support post or interfering with the planned underdeck drainage system was a head-scratcher.

The solution that our engineer devised for this framing problem is my favorite feature on the deck, but one that is

PHOTOS BY JASON RUSSELL

After covering the girder with two layers of 3/4-inch marine plywood to provide a nail base for the decking fasteners (A), the author covered the plywood with a layer of self-adhering butyl roofing underlayment (B). Underdeck drainage systems on the upper and lower decks capture water in EPDM troughs hung between the joists, funneling it into gutters hung off the support beams (C). The hidden steel girder eliminates the need for an additional support post (D).

hidden from view: a 1,200-pound steel girder hidden inside the third-story deck framing. Fabricated primarily from 2-inch-by-10-inch and 6-inch-by-10-inch rectangular steel tube, the assembly is bolted to the deck framing, the dropped glulam beam, and an existing glulam rim joist inside the house framing.

With no crane available to lift the massive girder into place and only a two-man crew, installation required a bit of Egyptian-style ingenuity. I began by flipping the forks on my skid steer upside down and used those to carefully hoist the girder up onto the lower deck. From there, my helper and I leveraged the girder into position, then set up two Genie manual 650-pound-capacity lifts (one that I own and one that I rented for this project) and began cranking away.

After the girder was lifted into position and bolted to the deck and house framing, we installed two layers of 3/4-inch treated marine plywood over the steel to match the 11 1/2-inch height of the wood deck framing and provide a fastening base for the decking's hidden fasteners. On top of the plywood, we laid down sheets of Grace Ultra self-adhering roofing membrane.

Instead of trying to kerf PT lumber to create curved rim joists, I like to use composite deck boards, which conform to a curve more smoothly. On this project, I installed an upper and lower rim board, with a 1/2-inch gap between them so that they were flush with the tops and bottoms of the 11 1/2-inch-wide joists. Then I covered the rims with a two-piece fascia detail.

Under both the upper and lower decks, we installed site-built underdeck drainage systems using EPDM pond liner material. This creates a lot of usable outdoor living space, even in the rainy Pacific Northwest.

The entire structure rests on four engineered 4-foot-square footings and PT glulam posts specced by our engineer (standard 6x6 posts weren't quite strong enough). Most of the sawn framing is evenly spaced on 14-inch centers, but under the hot tub on the upper level, the joists are spaced 6 inches on-center. It took two of us about seven months to complete the project. ❖

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