



# Retrofitting a Rooftop Deck to a Stucco Home

Removing an attic gave this California home more outdoor living space and better ocean views

by Edmund Bourke

Located midway between Los Angeles and San Diego, Dana Point is a mid-sized coastal community with million-dollar views of the Pacific Ocean and real estate prices to match. So our client's decision to remove a perfectly good clay-tile roof over an unused attic space on her home and replace it with a 450-square-foot rooftop deck to gain more outdoor living space and a better vantage point for viewing ocean sunsets made perfect sense.

Her 2,200-square-foot home is located on a small, pie-shaped lot in a gated community with strict wind, seismic, fire, and drainage requirements.

To meet those requirements, our work was done according to plans that were designed and engineered by Leo Burke Engineering of Dana Point. In addition to building the new deck, we replaced a pair of small windows with bi-folding patio doors, which allowed access to the deck from the two second-floor bedrooms, and installed a new outdoor gas fireplace. Also, to provide access to the deck from the existing patio and pool area, we built a seismically reinforced set of stairs. On the interior, the engineers specced a retrofitted shear wall tied to a new grade beam to seismically reinforce the home.

## Demo

The roof that was slated for demolition enclosed attic rather than living space, but there were still plenty of existing electrical and gas lines and AC ductwork running through the space that had to be rerouted. After carefully removing the clay tiles to save them for later repairs to the remaining roof, but before dismantling the sheathing and existing truss roof system, we installed temporary walls in the first-floor master bedroom and family room to support the drywall ceilings from below. Combined with weather protection from above, the walls would allow the homeowner and her constant

## Retrofitting a Rooftop Deck to a Stucco Home



**Figure 1.** With most of the truss roof dismantled except for the gable end, the Pacific Ocean begins to come into view (A). Workers dismantled the roof trusses from the top down, removing the bottom chords last in order to leave the ceiling drywall intact (B). Before hanging new 9¼-inch PSL ceiling joists, workers ripped V-shaped tapers along their top edge so that the flat-framed deck would slope toward drains installed in the center of the deck rather than toward the outside edge. While waiting for the waterproof deck membrane to be installed, workers tented the area with tarps to protect the living space below (C).

companions—a pair of large Labrador retrievers—to remain in the house during construction (**Figure 1**).

We left the bottom chords intact as we started disassembling the roof trusses, leaving the drywall ceiling fastened to the chords and the back of the drywall exposed. Then, as we removed what was left of the trusses, we were careful to minimize damage to the drywall. Though we had to pull the fasteners out through the back of the drywall, the process left the paper face fairly intact, which made patching the ceiling later on easier.

Then we stripped away the stucco finish from the wall to expose the framing so that we could fasten a 9¼-inch PSL ledger to the house with structural screws. We also installed a PSL rim joist on top of the existing wall plate, then hung 9¼-inch PSL ceiling joists from the ledger and rim joist 16 inches on-center,

fastening the joists to the ledger with joist hangers.

This rooftop deck was designed to drain to the center rather than along the outside edge. So before hanging the joists, we ripped V-shaped tapers along their top edges from both ends toward the middle so that the roof sheathing would slope away both from the house and from the edge of the deck toward the center. With a slope of ¼ inch per foot, these tapers still left plenty of material—about 7 inches—in the middle of the joists to support roof loads on the 14-foot-wide deck.

After the joists were in place, we reconnected the HVAC ducts to supply the existing registers and rerouted the electrical and gas lines as needed so that everything was buried within the ceiling framing. We also installed three pairs of 3-inch-diameter schedule 40 drainpipe

that would connect roof drains in the center of the deck to a 6-inch seamless aluminum gutter mounted on the fascia, allowing water to drain off the deck and down to the home's existing drainage system. After insulating the joist bays with fiberglass batts, we glued and nailed ¾-inch sheathing to the joists.

### Waterproof Roof Deck

Originally, the designer had determined that three 3-inch-diameter drains—one in the center and one at each end—would provide the necessary capacity to handle water flowing off the deck. We decided to play it safe and doubled up the drainage capacity by installing two drain lines instead of just one at each location, in case of a heavy rain event or a drain blockage from debris. The drains exit through the rim joist and empty into a gutter.

We installed the six flanged drain





**Figure 2.** The roof deck was finished with a three-coat stucco finish over diamond lath stapled to the sheathing, followed by a Silcor liquid-applied waterproofing membrane system (A). Water drains through three pairs of roof drains oriented along the centerline of the deck (B). Once the new deck was watertight, workers reframed the wall to install two new bi-fold doors to match the doors on the first floor (C).

bodies when we installed the sheathing, and subcontracted the roof deck waterproofing to another company. Those workers taped the joints in the sheathing, applied a primer/sealer, and flashed around the perimeter of the deck. Next, they stapled diamond lath to the sheathing and applied a three-coat stucco finish (**Figure 2**).

To waterproof the deck, the crew rolled on Silcor 575 liquid-applied polyurethane waterproofing membrane (th.gcpat.com)

over the stucco finish. Then they applied a rolled-on coat of Silcor Top Coat 80 finish, followed by a sprayed-on texture coat. Later, the deck surface was spray-painted to match the finishes on the rest of the house.

### Exterior Details

With the roof deck installed and the living space below fully protected from weather, our next task was to strip back the remaining stucco on the gable end

wall and prep the framing for the new bi-fold patio doors to replace the small windows in each upstairs bedroom. In addition to framing the new rough openings for the doors, we installed T-straps and other metal hardware to reinforce the wall. At the same time, we stripped the stucco from the lower level so we could access the wall framing to let in diagonal bracing, part of the package of seismic retrofits included in the project.

To make room for a new direct-vent gas fireplace for the rooftop deck, we reconfigured an existing chimney chase, which contained the vent for a gas fireplace in the living room. Instead of being oriented vertically, the new chase is framed as a low wall, providing the deck with a little bit of visual separation from the neighbors.

The new LaCantina bi-fold doors (lacantinadoors.com) were spec'd to match the home's existing doors on the ground floor and were installed by the window and door supplier. After the doors were fitted and flashed, our crew returned to insulate the wall cavities, staple up a double layer of building paper integrated with the door flashings and other wall flashings, install the metal lath, and apply a traditional three-coat stucco finish to the walls and chimney chase.

The original plans called for a spiral staircase for access from the ground level to the upper deck, but the city building department asked for a more robust, seismically reinforced design. Our solution was to install a grade beam at the lower landing as well as a pier foundation for the upper landing, frame the landing like a moment frame, and connect the lower and upper landings with stringers cut from four 4x14 treated Douglas fir beams. After we installed plywood treads and risers, the stairs received the same stucco and Silcor finish as the roof deck, creating a dry space for storage underneath (**Figure 3**).



## Retrofitting a Rooftop Deck to a Stucco Home



**Figure 3.** To seismically reinforce the stairs, workers connected a grade beam at the lower landing to the moment-framed upper landing with stringers cut from 4x14 treated Douglas fir beams (A). The chimney was reconfigured to make room for a new direct-vent gas fireplace for the rooftop deck and reframed as a low privacy wall (B).



**Figure 4.** The stairs received the same stucco and Silcor finish as the roof deck, followed by a fire-retardant paint, creating a dry, nonflammable space for storage underneath (A). The stairs were fitted with a wrought iron railing, while the deck's custom-fabricated glass-panel guard system preserves the views of the Pacific Ocean (B).

### Finishing Touches

Because the home is located in an area that the city of Dana Point has designated a Very High Fire Hazard Severity Zone (VHFHSZ), certain construction elements applied to the project. While a retrofitted sprinkler system wasn't required, the deck surface had to qualify as an ignition-resistant or noncombustible

material per SFM Standard 12-7A-4 and 12-7A-5 in the California Building Code. We supplemented the three-coat stucco walking surface and new stucco wall surfaces with a fire-retardant paint (**Figure 4**).

To avoid obscuring the ocean views in any way, we installed a custom-fabricated glass-panel guardrail system, which is

supported by fascia-mounted brackets. On the stairs, we installed a custom-fabricated wrought iron railing to match the home's existing gates and fences. Lastly, we installed the new direct-vent fireplace. ♦

*Edmund Bourke has owned Bourke Construction in Orange County, Calif., since 1996.*