



Replacing a 'Deck House' Deck

Engineered wood beams were used to help restore a
Midcentury Modern-style deck to its former sleek aesthetic

by Kyle Diamond

A few years ago, I was contacted by a couple from New York City who wanted to remodel their Midcentury Modern “deck house” in the Hudson Valley. They had recently purchased the home to use as a get-away retreat from the city on weekends.

Built from prefabricated components circa 1970, their kit home had been manufactured by Deck Homes (a precursor to Acorn Deck House Co. out of Acton, Mass.). Typical of a deck house, it featured an exposed post-and-beam structure, a tongue-and-groove ceiling, and vast expanses of glass via sliding doors and casement windows. A large lot with trees in the front and side yards and a

large meadow in the back contributed to the signature meld-with-nature aesthetic.

Job Scope

The remodeling work mostly centered around the interior. We did a complete kitchen upgrade, installing a new skylight to add more natural light to the room and removing a partition wall with a narrow swinging door between the kitchen and living-dining areas to improve traffic flow (though deck houses are known for open-floor plans, this one had a congested feel to the main-level common areas). Also included was a planned new master bedroom suite added above an attached garage.

Outside, a deck running the length of the house’s rear elevation needed to be replaced. The decking sagged and felt soft in places, while the perimeter guard-rail with integral seating was rotted and unsafe. Also, new sliding glass doors leading out to the deck needed to be installed. The slider thresholds showed signs of water damage, and, more pointedly, they were awkwardly high. To walk onto the deck (and vice-versa into the home), you had step up and over an 8-inch-high rise.

We began demolition in early 2019 and after a few fits and starts, we managed to wrap up the deck and kitchen just before COVID heavily hit New York in 2020. The homeowners ended up living in the home

Replacing a 'Deck House' Deck



Figure 1. While removing the existing decking (A), crew members discovered the home's original 4x12 fir beams were encased in pressure-treated stock, not flashed, and severely deteriorated (B, C). The steel column connections that helped support the cantilevered ends of the beams had sunk into the rotted Douglas fir (B, inset).



Figure 2. Years of water infiltration had damaged the raised thresholds under the sliding doors (A). From the interior, the 4x12 fir beams that span the width of the home look intact (B), and it was assumed (wrongly) that the 14-foot "cantilevered" lengths of fir (which supported the cantilevered floor and original deck) had been removed when the original deck was replaced.

through the worst of the pandemic, so we held off work on the new master bedroom suite until the threat had subsided, finally completing our work this year.

In this story, I'm doing to focus on work related to the deck. The goal was to restore the deck with an in-kind replacement, staying true to the home's Midcentury Modern style.

Deck Restoration

The existing deck was built from pressure-treated stock, so we assumed it had completely replaced the original (PT wood wasn't commonly used in 1970).

The deck's 8-foot-wide by 50-foot-long surface was supported by seven 4x12

Douglas fir beams, which spanned the width of the house and extended 14 feet beyond the grade-level wall at the back of the house. Placed 8 feet on-center, these "cantilevered" beams carried the home's main-level floor (which projected out from the lower, grade-level wall roughly 6 feet), as well as the deck (which projected out another 8 feet from the main level's exterior wall). They were supported by 3-inch-diameter steel columns set back 4 feet from the deck edge, which helped with the illusion that the deck was cantilevered (see inset photo on page 11).

The six joist bays between the beams were framed with 2x6 PT joists running parallel to the beams. They were

flush-framed into PT ledger beams at the main-level wall running perpendicular to the built-up beams. At the outer edge of the deck, the joists were hung from rim beams that were also run perpendicular and flush-framed into the main beams.

A deck collapse waiting to happen.

When we started removing the PT decking, we discovered the exterior portion of the home's original fir beams had been left in place when work was done on the deck and were severely deteriorated. The previous builder had sandwiched the original 4x12s between two PT 2x12s (through-bolting them together) and ran a PT 2x4 on the bottom, encasing the fir



Figure 3. An ill-suited sunroom, not in keeping with the home's style, that had been built on the deck (A) was removed (B), as well as the bump-up transition on the main roof. During the project, workers posted up the cantilevered floor and roof as necessary (C).



Figure 4. The cantilevered main-level floor and replacement deck are supported by seven 4x12 parallams, then flush-framed with 2-by pressure-treated stock (matching the previous deck's framing layout) (A, B). The existing steel columns were reused to support the ends of the parallams, while the new beams were cap-flashed to prevent rotting (C).

in a pressure-treated “U.” In addition, the builder omitted cap flashing, allowing years of moisture to rot the Doug fir into something verging on compost. This was particularly dangerous because the saddle connections welded to the steel columns were “secured” to the rotted ends of the fir beams. It wasn’t out of the realm of possibility that—loaded with partygoers—the 8-by-50-foot deck could have collapsed (**Figure 1**).

At the other end of the beam supporting the home’s cantilevered main-level floor, the rot hadn’t migrated under the conditioned space and compromised the structural integrity of the home, let alone damaged the floor assembly. Even so, the raised thresholds under the slid-

ers were heavily damaged from years of water infiltration (**Figure 2**).

Starting from scratch. We demoed the four easier deck bays (on the right) first, posting up the deck and roof as necessary. An enclosed sunroom had been built on top of two of the joist bays on the left side, and included an ugly pop-up roof on the main house that accommodated the sunroom’s roof slope. We demoed the sunroom and pop-up and began the deck replacement from scratch (**Figure 3**).

Starting out, we installed seven 4x12 preservative-treated Parallam Plus PSLs to support the cantilevered 6-foot portion of main-level floor and the 8-foot-wide replacement deck. We inserted the PSLs in the pockets vacated by the demoed

fir beams at the grade-level wall at one end and set them in the existing saddles welded to the steel columns at the other. For cap flashing, we installed aluminum coil stock with a brown finish to make it less visible between the new deck boards.

Between the Parallams, we matched the flush-framed layout of the previous deck. We installed double PT 2x8s perpendicular to the 4x12s at the main-level wall and at the deck’s outer edge, then infilled with 2x6 joists 16 inches on-center parallel to the main beams (**Figure 4**).

To support the edge of the cantilevered floor and the new doors, we installed steel angles between the Parallams, bolting them to the back of the doubled-up 2-by ledger beams and the underside

Replacing a 'Deck House' Deck



Figure 5. At the sliding doors, workers removed the 8-inch-high rise that accommodated hydronic baseboard (A) and replaced the three existing sliders with two Marvin Ultimate sliding patio doors flanking a fixed glazed center panel (B). Crew members installed a stainless steel cable-railing system (C), shown here before the ipe top rail was installed.



Figure 6. Shown here is the finished living-dining area with the replacement deck beyond (A). Signature “deck house” features such as exposed beams, a tongue-and-groove ceiling, an open floor plan, and lots of glass help connect the home to its scenic backyard, both from the interior and from outside the home’s front elevation (B).

of the exposed tongue-and-groove floor. The floor “system” consisted of just 2½-inch-thick tongue-and-groove planking (which spanned over the home’s 8-foot-on-center, exposed beam layout) and oak strip flooring.

Eliminating the step. Next, we installed the mahogany decking, which gave us a work platform as we replaced the sliders and removed the awkward step at the thresholds. We secured the 5/4x6 mahogany with Tiger Claw hidden fastening clips (fastenmaster.com), being careful to avoid fastening through the cap flashing covering the new Parallam beams.

The 8-inch-high rise had been needed to accommodate hydronic baseboard run under the length of the glazed wall. We removed roughly 20 feet of finned tube baseboard and cut the raised threshold down to the tongue-and-groove deck, then installed a trim piece to infill the remaining void. The hardwood trim lipped onto the existing oak strip flooring and was rabbeted so we could run the hydronic loop underneath. The infilled repair resulted in a threshold slightly higher than normal, but it was a much improved egress experience (Figure 5).

Finishing up. We trimmed off the

deck with ¾-inch mahogany, covering all exposed pressure-treated framing and the ends of the Parallams. In a departure from restoring the deck with an “in-kind” replacement, we installed a stainless steel cable railing system with a 4-inch-wide ipe top rail (atlantisrail.com). Its sleek design was in keeping with home’s modern aesthetic and offered unfettered views of the property’s expansive backyard. (Figure 6). ❖

Kyle Diamond co-owns New Dimension Construction in Millbrook, N.Y. with his father, Dale Diamond.