

Building a Deck Above an A/C Unit

Q A client wants to enlarge her existing deck, but a whole-house air-conditioning unit is located directly beneath the proposed addition. There seems to be plenty of clearance, so is it okay to build the deck above it?

A Glenn Mathewson, a building plans analyst in Westminster, Colo., responds: An air-conditioning unit contains both a compressor—a hefty motor that draws a lot of amps—and a condenser, which cools the refrigerant and exhausts warm air. So there are a couple of issues to consider.

With any piece of electrical equipment, you should always start with the installation instructions (this is actually a code requirement: 2012 IRC E4101.2). If they aren't with the unit or the owner, they're usually easy to find on the Internet using the make and model number found on the equipment nameplate. You need to build the deck in compliance with the manufacturer's requirements for clearance around the equipment.

To illustrate, here is an excerpt from Carrier's installation instructions for an Infinity Series A/C unit:

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 24 in. (610 mm) clearance to service end of

unit and 48 in. (1219.2 mm) above unit. For proper airflow, a 6 in. (152.4 mm) clearance on 1 side of unit and 12 in. (304.8 mm) on all remaining sides must be maintained. Maintain a distance of 24 inches (609.6 mm) between units. Position so water, snow, or ice from roof or eaves cannot fall directly on unit.

For this unit (and probably many others), providing at least 12 inches of clearance around the sides and 48 inches above it should be sufficient to allow it to function properly.

But clearances for maintenance and worker safety—governed by electrical codes—also need to be considered. For example, code often requires a minimum 30-inch by 30-inch level working space on the service side of electrical equipment (generally the side with a removable panel). Other provisions for equipment under floors are primarily intended for the inside of buildings (in crawlspaces). However, an inspector may deem it appropriate to enforce all “under floor” provisions of the IRC and require, for instance, a path to the equipment that is no longer than 20 feet (unless head clearance is more than 6 feet), as well as a light (with a switch at the start of the path) and an electrical outlet near the equipment.

Another thing to keep in mind is the location of the means for disconnecting the unit. This could be the overcurrent



An A/C unit can be located beneath a deck as long as there is enough clearance to safely service it and to allow air to circulate around it.

protection at the main panel, or it could be a supplemental device located adjacent to the unit. To avoid a detailed explanation of electrical code provisions, I'll just give some general advice: Working back from the A/C unit, find the first means of disconnecting the power. Whatever it is (switch, fuse, breaker) and wherever it is, don't build a deck, or skirt the sides of a deck, in any way that would block the line of sight between that switch and the equipment. This code provision is intended to prevent anyone from restoring power to the unit while someone else is working on it.

Lateral Bracing for a Second-Story Deck

Q I need to replace a second-floor deck and would like to avoid opening the finished ceiling inside the house to install lateral-load anchors. In Jim Finlay's article about lateral bracing (see “Lateral Bracing Alternatives,” Jan/Feb 2014), the author describes different methods for anchoring a deck to a foundation, but none of them are an option on a second-floor deck. Do you have any suggestions that would allow me to avoid installing threaded rod into the house on each end of the deck?

A Jim Finlay, owner of Archadeck of Suburban Boston, in Burlington, Mass., responds: At a second floor you have no foundation, but you do have the house frame. Presuming the house is not balloon-framed, there will be a second-floor rim joist available; in fact, the

QUESTION & ANSWER



existing deck's ledger is probably attached to that rim joist. In this situation, we typically would install what in my article I call "house-frame brackets," which are custom-fabricated $\frac{1}{4}$ -inch-thick by 3-inch-wide galvanized steel L-brackets with 9-inch-long legs (see photo, left). The brackets should be installed horizontally rather than vertically, using the same LedgerLok or lag screws used to fasten the deck ledger through the sheathing and into the rim joist.

Another way to enhance the lateral stability of a deck is by running the decking diagonally so that it crosses the joists at a 45° angle, and screwing the decking to the joists (grooved decking fastened with hidden clips does not provide as strong of an attachment). The many triangles you create with the ledger, joists, and deck boards will add tremendous rigidity to your deck, but always discuss whatever plan you choose with your building inspector, who may still require anchors.

On a second-story deck, a building inspector may accept galvanized L-brackets fabricated from $\frac{1}{4}$ -inch steel and attached to the deck framing and house framing with structural screws as shown, in lieu of the threaded-rod hold-down anchors contained in the IRC.



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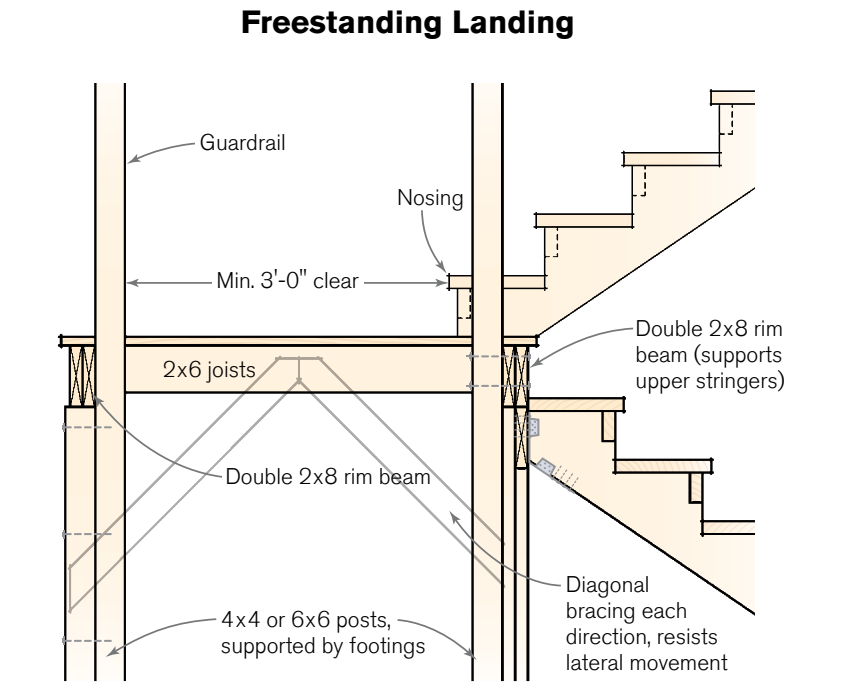
Q I'm planning on framing a landing to break up a long stairway that runs from grade to an upper-level deck. How should the landing be designed—as a separate deck or as part of the stairway?

A Mike Guertin, a builder and remodeler in East Greenwich, R.I., and the “Deck Workshop” presenter at JLC Live (jllive.com), responds: I treat a landing as I would a small deck. I design it to handle regular live and dead loads (40 pounds and 10 pounds per square foot, respectively) as well as the concentrated loads imposed by the stairs that attach to it. Just like a deck, a landing needs to have footings, posts, beams, and joists.

Some building officials may consider the landing to be part of the stairway, however, in which case there's a secondary load requirement (IRC Table R301.5, Minimum Uniformly Distributed Live Loads). It applies to stair treads, but a building official could consider the decking on a landing to be the equivalent of a tread. If so, one of two load requirements would apply: a 40-psf live load or a 300-pound concentrated load acting on an area of 4 square inches—whichever produces the greater stress. Four square inches (2 inches by 2 inches) is a pretty small area. I suppose the 300-pound load occurs where the foot of someone walking on a set of stairs presses on a tread.

If wood-plastic decking is used on the landing, then the landing joists should be spaced at the same distance that the decking's manufacturer requires for stringer spacing. That distance is product- and brand-specific for composite decking materials.

The minimum size for a landing is 3 feet by 3 feet or the width of the stair sections meeting at the landing—which-



A stair landing should be framed like a small deck capable of supporting 40-psf live loads and 10-psf dead loads. Some inspectors may also require the landing to support 300-pound concentrated loads, like a stair tread.

ever is greater. As shown in the illustration above, the minimum depth is measured from the nosing—not the riser—of the stair. Also, because the bottom of the upper set of stairs will rest on it, the landing must be large enough to fully support the heel of the stringers.

I double up the rim joists to serve as beams because placing separate beams beneath the landing would look too bulky. Then I install 4x4 or 6x6 posts beneath the ends of the rim beam and down to footings, which must reach frost depth if either the landing or the main deck are attached to the house. Diagonal bracing between the posts and the landing frame is needed to resist lateral movement.

I use 2x8s rather than 2x6s for the rim beams and joists. The 2x8 rim beams can usually handle the extra load of stair

sections up to 4 feet wide. The only time that this changes is on a landing for a U-shaped stairway, when both sets of stairs bear on one side of the landing. In that case, I install an extra post and footing at the middle of the rim beam to reduce the span.

Posts for the guardrail are attached to the landing frame just as they would be on a deck.

Finally, when designing the landing height and position, keep in mind that the riser and tread cuts don't need to be equal between the two stair sections. The landing breaks a user's stride, so the difference doesn't cause a trip hazard. ❖

This is a revised version of an article that originally appeared in The Journal of Light Construction (jllonline.com).