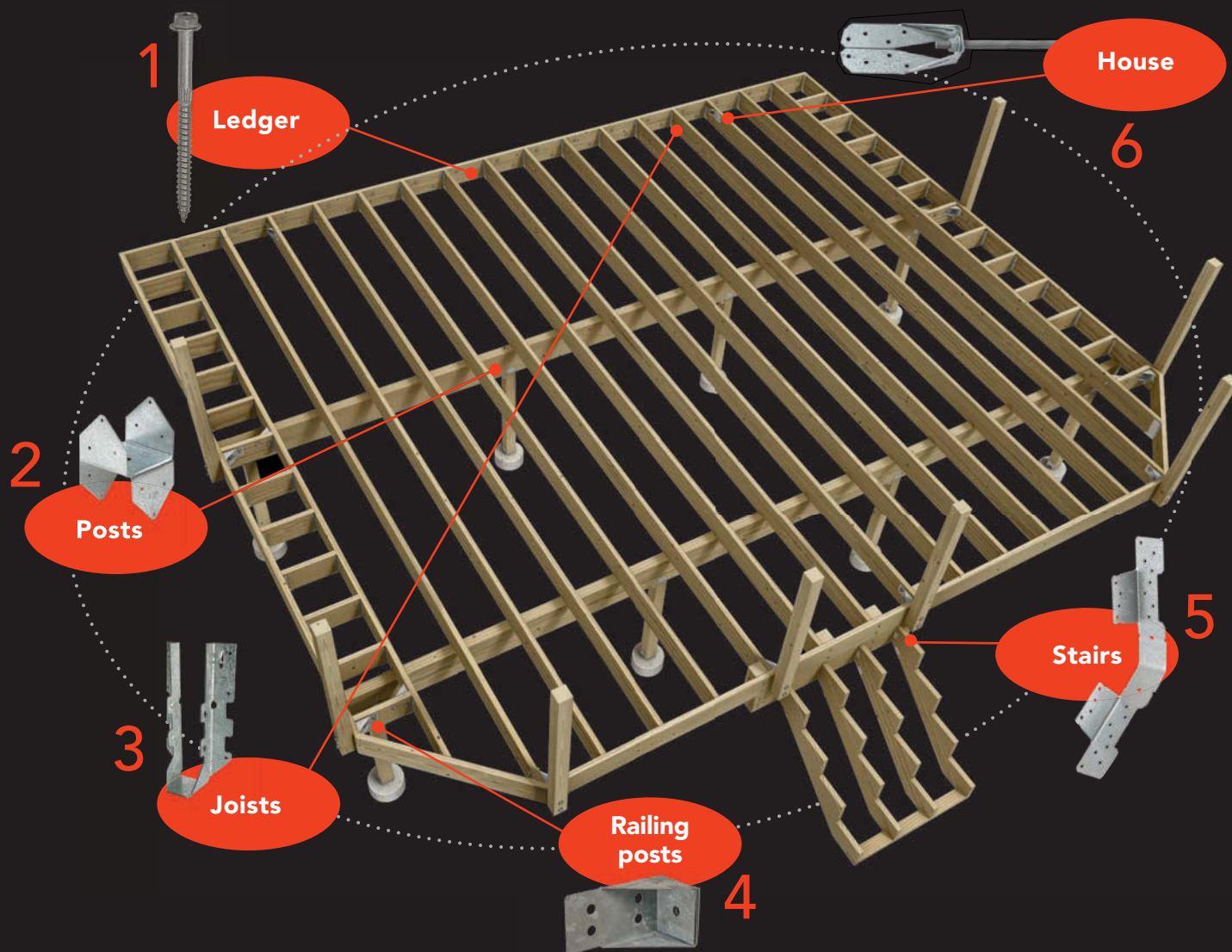


# Deck Hardware

Prevent failure at the six most critical connections with the right products

BY PATRICK McCOMBE



**I** used to hear people say, “It’s just a deck. Anyone can build a deck. What’s the big deal?” When the deck pulls off the side of a house or when the railing gives way, though, it is a big deal. People can get hurt; they can even be killed.

With tragic deck collapses mainstream news in towns all over the country, code writers and building inspectors have understandably made deck safety a priority. These deck collapses can generally be traced to failure at one of the six critical connections shown in the

drawing above. Not surprisingly, hardware makers have focused their products on these same six connections.

Fortunately, the innovative fasteners and steel connectors now available are straightforward to use. Some may even save you time. More important, though, they allow any deck builder, pro or novice, to satisfy code requirements and to build a safer deck.

Patrick McCombe is an associate editor.

# 1. LEDGER TO RIM JOIST

When a ledger isn't adequately fastened to the house's rim joist, it can break free from the house, resulting in a deck that crashes to the ground. The traditional way to fasten a ledger is with 1/2-in.-dia. (or larger) lag screws or through bolts long enough to penetrate the house's rim

joist. The number of fasteners needed depends on the length of the ledger and the anticipated load. Consult the code, your building official, or an engineer for the number of bolts or lags needed for your project. The drawing below shows proper placement.



## Structural screws

Self-drilling structural screws cost more than lag screws or through bolts but can save time, as they don't require pilot or clearance holes. Some manufacturers offer screw-spacing tables; others list only technical specs and leave it up to you to calculate the spacing.



**FASTENMASTER LEDGERLOK** fastenmaster.com

**Length:** 3 5/8 in. and 5 in.  
**Material:** Coated steel  
**Price per screw:** 68¢ (3 5/8 in., box of 50; can be used with LSL rim board)



**GRK RSS** grkfasteners.com

**Length:** Many sizes  
**Material:** Stainless steel and zinc-coated steel  
**Price per screw:** 48¢ coated; 78¢ stainless (3/16 in. by 4 in., box of 100)

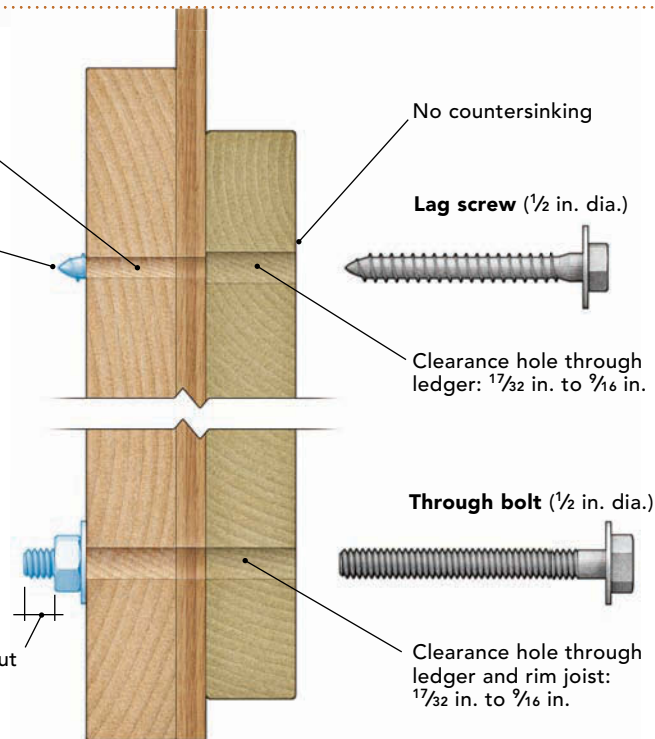


**STRONG-DRIVE SDS** strongtie.com

**Length:** 3 1/2 in., 4 1/2 in., and 5 in. (1/4 in. dia.)  
**Material:** Coated steel and stainless steel  
**Price per screw:** 50¢ coated; \$1.33 stainless steel (1/4 in. by 4 1/2 in., boxes of 50 to 100)

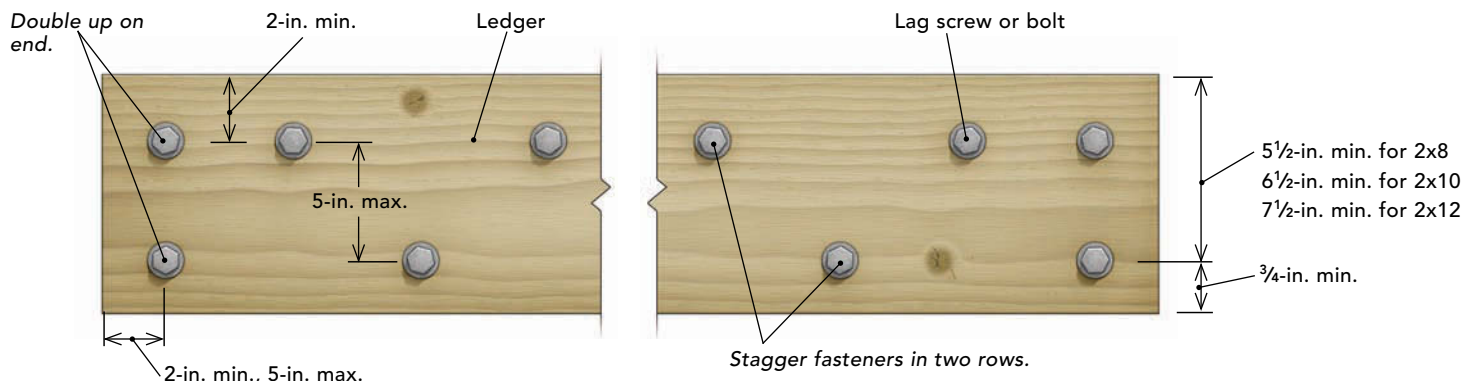
Pilot holes (1 3/64 in. to 1 1/32 in.) are drilled through the rim joist and wall sheathing. Boring them at 5/16 in. prevents splitting the rim joist and maintains thread holding power.

Lag screw should extend beyond the rim joist by at least 1/2 in.



## Pilot and clearance holes

The code doesn't specify how to drill holes for ledger fasteners, but here are the best practices and guidelines, based on the American Wood Council's *National Design Specification (NDS) for Wood Construction*.



## 2. POSTS TO FOOTING AND FRAMING

If gravity were the only force conspiring against your deck, the posts might be fine just resting on their footings. But there's also uplift from winds, and shaking from people and from seismic activity. Building codes require mechanical connections at the bottom of the deck post where it meets the footing and at the top of the post to tie into the framing.

### Post caps

Available in both T- and L-shapes, post caps are used to tie support posts to the framing above. Two-piece caps like Simpson's AC4Z can be used for new work and retrofits. One-piece caps are primarily for new work.



**USP C44-TZ**  
(\$8.44) [uspconnectors.com](http://uspconnectors.com)



**SIMPSON AC4Z**  
(\$6.33)  
[strongtie.com](http://strongtie.com)

**SIMPSON ABA44Z**  
(\$12) [strongtie.com](http://strongtie.com)



### Post bases

Some post bases have slotted bolt holes to allow for slight adjustments in position; others, like USP's WE44-TZ, are designed to be set into wet concrete. (Simpson's EPB series is height adjustable.) Although 4x4, 4x6, and 6x6 post bases are easy to find, larger sizes likely require a special order. Both wedge anchors and wet-set anchor bolts are suitable for fastening post bases to footings.



**USP WE44-TZ**  
(\$11) [uspconnectors.com](http://uspconnectors.com)



**USP PAU44-TZ**  
(\$21) [uspconnectors.com](http://uspconnectors.com)

### 3. JOISTS TO LEDGER AND BEAMS

When deck joists aren't adequately fastened to the ledger, the joists can pull away, leading to a collapse with the ledger still attached to the house. Use joist hangers to connect joists securely to the ledger and rim beams, when necessary.



**SIMPSON LUS210Z**  
(\$1.52) strongtie.com

#### Single hanger

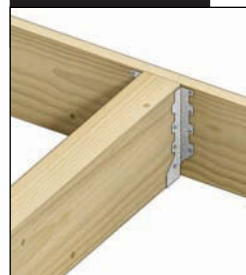


Available for 2x4s to 2x12s. Follow the manufacturer's nailing schedule to achieve the designed load values.



**SIMPSON LUS210-2Z**  
(\$4.41)  
strongtie.com

#### Double hanger



Used with double- and triple-ply joists. Use wide-flange, heavy-duty versions (with specified fasteners) for beams and heavy loads.



**SIMPSON SUL210Z**  
(\$14) strongtie.com

#### Skewed hanger



Skewed hangers solve a tricky connection easily. Most suppliers stock 45° hangers; other angles can be special-ordered.

#### Concealed hanger



With internal flanges, these hangers are ideal for end joists. They also work well for solving clearance problems with lateral ties (see p. 69).



**SIMPSON LUC26Z**  
(\$1.78)  
strongtie.com

### Connector nailers

A typical deck requires hundreds of connector nails. Many nails are located in tight spaces that provide little room to swing a hammer. Make driving all those nails easier with a metal-connector nailer such as the MCN150 Strapshot from Bostitch (\$200) or a palm nailer such as the Ridgid R350PNA (\$70).

Bostitch MCN150 Strapshot



Ridgid R350PNA

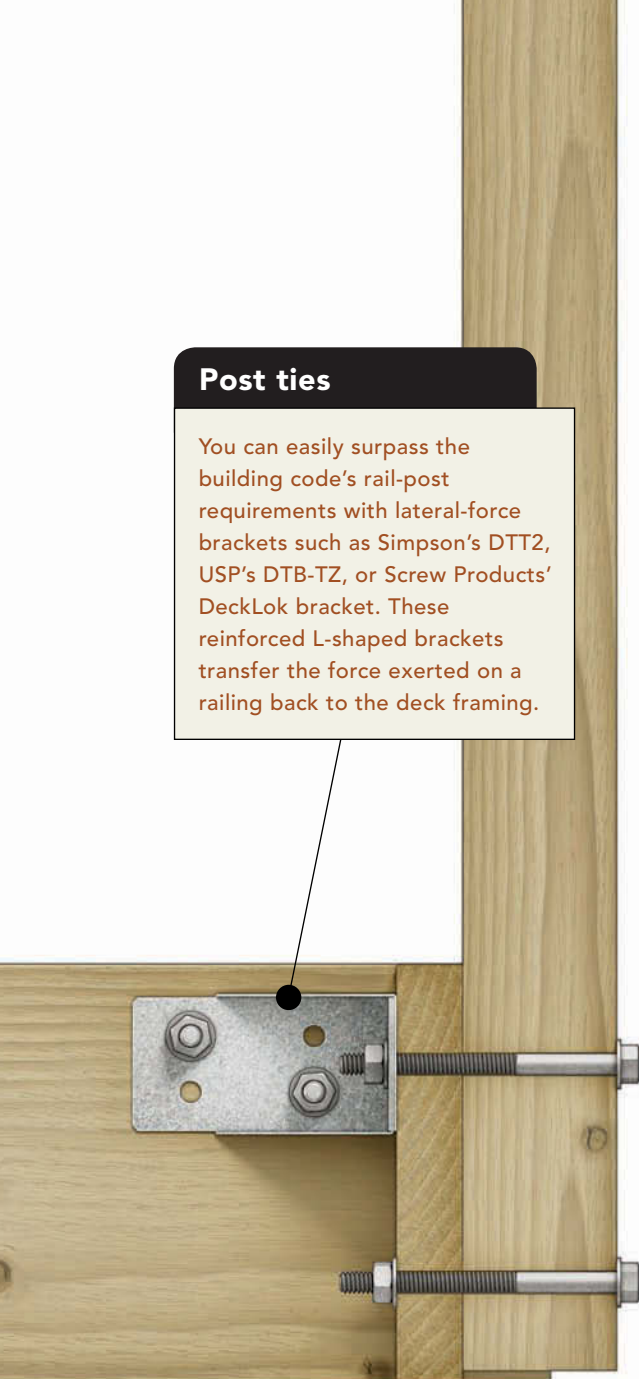


## 4. RAILING POSTS TO FRAMING

The levering action of railing posts can exert extreme force on the deck framing and connectors below. Testing has shown that bolts and lag screws alone aren't enough to withstand the 500-lb. force that's required by code.

### Post ties

You can easily surpass the building code's rail-post requirements with lateral-force brackets such as Simpson's DTT2, USP's DTB-TZ, or Screw Products' DeckLok bracket. These reinforced L-shaped brackets transfer the force exerted on a railing back to the deck framing.



**SCREW PRODUCTS  
DECKLOK BRACKET G185**  
(\$11) [deck-lok.com](http://deck-lok.com)

**SCREW PRODUCTS  
DECKLOK BRACKET**  
(stainless steel)  
(\$22) [deck-lok.com](http://deck-lok.com)



**SIMPSON DTT2Z**  
(\$16 per pair) [strongtie.com](http://strongtie.com)



**USP DTB-TZ**  
(\$9) [uspconnectors.com](http://uspconnectors.com)



## Do fasteners need protection?

Shortly after the phaseout of CCA-based treatments for lumber in 2003, builders noticed that the new pressure-treating formulas were causing increased corrosion of galvanized connectors. Manufacturers responded with thicker zinc layers on their

connectors, and some builders started wrapping their pressure-treated lumber to prevent contact between the treated lumber and the metal connectors. But does wrapping the lumber really help to reduce galvanic corrosion? The answer: sometimes.

## 5. STAIRS TO HEADER

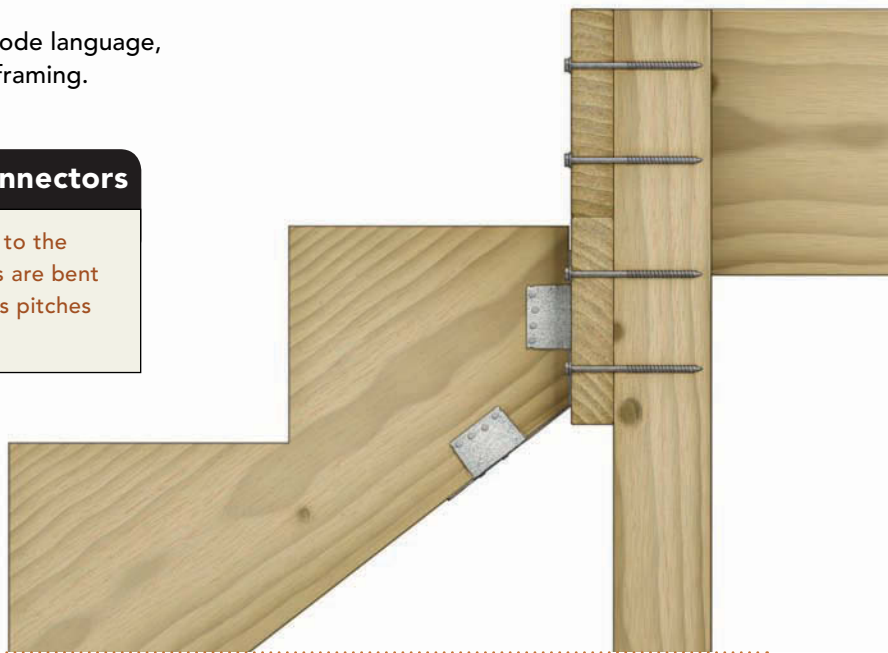
Code now prohibits the timeworn practice of toenails, or in code language, “nails subject to withdrawal,” to fasten stair stringers to the framing.



### Stringer connectors

Used to connect stair stringers to the deck framing, these connectors are bent in the field to match the various pitches of stair stringers.

**SIMPSON LSCZ**  
(\$1.78) [strongtie.com](http://strongtie.com)



## 6. DECK TO HOUSE

Lateral loads can pull the deck—ledger and all—away from the house. The solution is to connect the deck joists to the house’s floor joists. When used in pairs, the lateral-force brackets from Simpson Strong-Tie and USP (facing page) can be used to satisfy the lateral-load attachment detail in the current code.



### Lateral tie

Hot-dipped galvanized threaded rod (sold separately) connects these L-shaped brackets to tie the house and deck together.



**SIMPSON DTT2Z** (\$16 per pair) [strongtie.com](http://strongtie.com)

In November 2008, Simpson Strong-Tie, attempting to validate research done by W.R. Grace, maker of Vycor Deck Protector ([graceconstruction.com](http://graceconstruction.com)), concluded that barriers can help in certain environments (see *Simpson Technical Bulletin: Barrier Membranes and Preservative-*

*Treated Wood*; [strongtie.com](http://strongtie.com)). Any benefit assumes hot-dipped galvanized fasteners are used and that the membrane is installed correctly. Keep in mind that the research tested only Vycor Deck Protector, so other membranes may or may not help. *FHB* editorial adviser Mike

Guertin thinks that wrapping pressure-treated lumber with membrane and using G185 connectors is a reasonable alternative to stainless-steel connectors in most locations, but he recommends stainless-steel hardware for decks on the coast.