

I'd like to add a landing for a set of stairs leading up to the second floor of an older balloon-framed house. Is there a method for attaching a ledger for a deck or porch to the studs, rather than to a sawn rim joist or sill assembly, that is structurally sound and will satisfy the inspector?

**A** Mike Guertin (on Instagram @mike\_guertin), a builder and remodeler in East Greenwich, R.I., and a presenter at JLC Live, responds: Yes, it's technically possible to fasten a deck ledger to the narrow faces of 2-by studs rather than to a solid rim joist. Unfortunately, there's no prescriptive approach in the IRC that you can follow to make the connection between the ledger and the studs. But—if your local building official approves—there is an approach you can employ that uses proprietary structural screws.

Simpson Strong-Tie's *Fastening Systems Technical Guide* includes a section called "Ledger Structural Fastening Applications" (on pages 45 to 51 of the *Guide*, which can be found at [strongtie.com/resources/literature/fastening-systems-technical-supplement](http://strongtie.com/resources/literature/fastening-systems-technical-supplement)) that provides information on how to fasten a ledger to studs using the company's Strong-Drive SDWS timber screws. It's possible that other manufacturers of structural screws may offer similar installation details, but I was unable to find this information on any of their websites.

The Simpson Strong-Tie illustrations show different sized ledgers fastened directly to nominal 2-by framing, as well as installed over drywall—think of a landing in an interior stairwell. But the detail can also be applied to an exterior deck ledger. Included along with the detail is a table listing the allowable shear loads for the SDWS screws attaching a 2x6, a 2x8, and a 2x10 ledger to 2-by studs of common lumber species, along with a list of installation details and alternative conditions. For exam-

ple, note #3 states that we can use 70% of the load in the table for lumber with moisture content greater than 19%, as one would expect for an exterior deck. Note #5 states that the ledger can be installed over a maximum 1/2-inch-thick wall sheathing.

To determine what the deck load is on the ledger board, you will need to do a tributary load calculation, and then divide that by the number of studs the ledger will be attached to.

For example, for a 20-foot-long deck with joists spanning 12 feet to a beam and a standard total load of 50 pounds per square foot (10 psf dead + 40 psf live), you would multiply 20 feet by 6 feet (half the distance between the beam and ledger) by 50 psf to arrive at a tributary load of 6,000 pounds.

If the studs are framed at 16 inches on-center, a 20-foot ledger would cross 14 studs, so the next step is to divide 6,000 pounds by 14. The resulting load per stud is 429 pounds.

The shear load table is divided into columns of lumber species. Select the lowest-value species of the ledger lumber and the stud lumber. Let's say you are using a hem-fir ledger and the wall studs are Doug fir; you'd use the SPF/HF column since the hem-fir ledger has a lower value than the Doug fir studs in the assembly. A 2x10 ledger with four screws per stud has an allowable load of 675 pounds before the wet-service reduction of 0.70 (from note #3) is applied. Multiply the 675-pound allowable load by 0.70 to find the reduced load value of 472 pounds. The example tributary load per stud is 429 pounds, which is less than the 472-pound adjusted value, so it will work.

You would also have to follow the other installation details outlined in the table notes—like screw penetration into the studs and screw spacing—and account for any nonbearing studs in the wall (often there are no structural headers over windows in balloon-framed walls, for example). And be aware that the old plank sheathing in balloon-framed houses is usually thicker than 1/2 inch, so that may throw salt on this solution.

It's ultimately up to the local building official to approve the use of structural screws to attach a deck ledger to the studs. I suggest you have a plan review meeting with the building official to explain the ledger attachment system, and you bring along a printout of the SST technical bulletin. The official may require that an engineer review the attachment and sign off on the design.