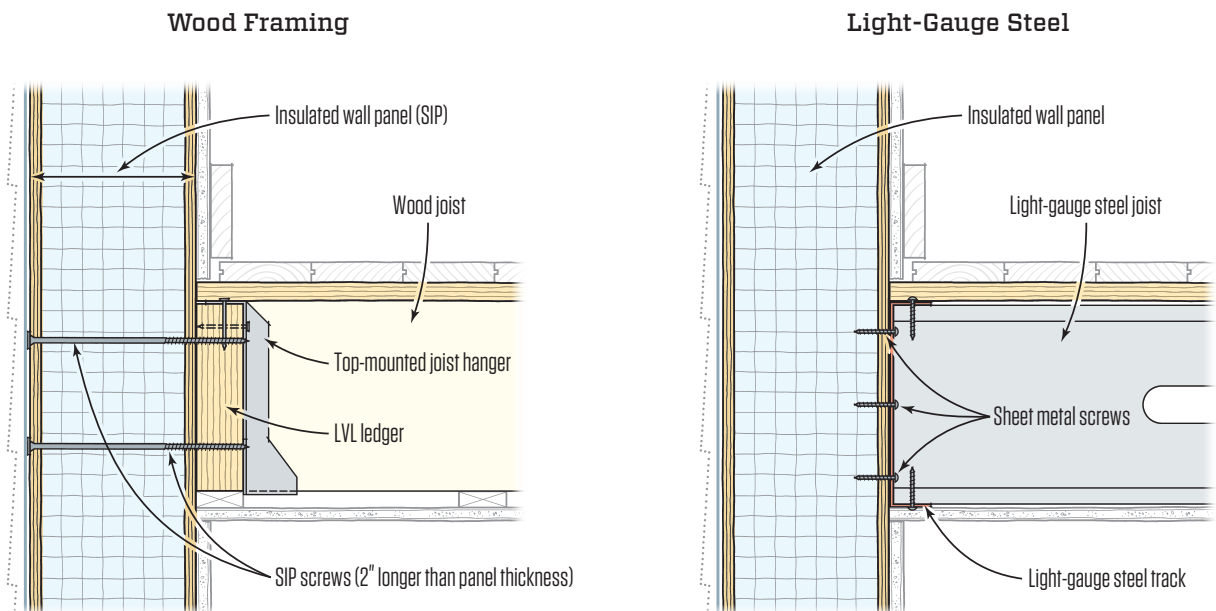


Q I'm interested in designing and building a two-story house using Structural Insulated Panels (SIPs). Which way should the panels be oriented, and what are my options for attaching the second floor to the walls?

Floor Attachment to Structural Insulated Panel (SIP)



A Bill Chaleff, an architect from Water Mill, N.Y., and a presenter at JLC Live, responds: If you are considering this type of construction, first I recommend that you build the exterior walls with “jumbo” 8-foot-wide panels, standing on end and running the full height of both stories, in balloon-frame fashion. I’ve been using this strategy successfully for more than 25 years.

BALLOON FRAMING THE WALLS

Balloon framing makes the best use of the panels’ most fundamental advantage: resistance to wind and air infiltration. With amazingly few joints and cracks, houses made with SIPs routinely deliver blower-door test results less than 2 ACH at 50 pascals, and there are many docu-

mented results of less than 1 ACH at 50 pascals.

Also, should your house design be a New England “half house,” the short second-floor walls will act as a cantilever when the walls are balloon-framed; the SIPs will be strong enough to resist both roof thrust and lateral wind loads.

Other advantages to balloon framing with SIPs include being able to weather-in a two-story house very quickly without having to first frame interior walls or the second-floor deck. Using SIPs in this fashion also eliminates all of the through-wall joints that come with platform framing, and it gives you the option of using light-gauge-steel framing on the inside—steel framing has the advantage of always being straight and true, without the warping, splitting, twisting, shrinking, or cracking that can occur with wood

framing members. Additionally, light-gauge-metal framing comes pre-punched for wiring, piping, and small ducts (in the joists).

After you've installed the wall SIPs and roof SIPs, and your house is weathered in, you'll be able to install all the deck framing in a protected indoor environment. At that point, there are basically two options for framing the floors: conventional wood joists or light-gauge-steel joists (see Floor Attachment to Structural Insulated Panel (SIP), previous page). Let's look at wood framing first.

Balloon framing with SIPs makes the best use of their most fundamental advantage: resistance to wind and air infiltration.

WOOD FLOOR FRAMING

Where the wood floor-framing members—whether they're composite joists or dimensional lumber—meet the exterior SIP walls, they should be attached to a ledger, flush-framed (meaning that the tops of the joist are flush with the top of the ledger) and hung on top-mounted joist hangers. The trouble with that strategy, however, is that the horizontal flange of the joist hanger that rests on the top edge of the ledger is usually more than 1½ inches deep. To eliminate this problem, we always specify that the ledger be an LVL.

The LVL ledger is fastened to the inner skin of the SIP by first tacking it in place with 3-inch screws. Then, specialized SIP screws are driven through the wall and into the ledger from the outside. These screws should be 2 inches longer than the nominal wall-SIP thickness, so for a 6-inch-thick SIP, use 8-inch SIP screws. Depending on the loads, the SIP screws may or may not require washers under the head. The spacing will vary according to your engineer's specifications, but I always recommend spacing the pairs of ledger-attachment screws no more than 12 inches on-center.

STEEL FLOOR FRAMING

Light-gauge-steel joists are flush-framed into a metal track. The track is screwed to the inner skin of the SIP with No. 12 by 1⅝-inch sheet-metal screws, with the spacing and number of screws being a function of the load calculations—but again, the spacing should be no greater than a pair of screws every 12 inches. Be sure your engineer or architect uses the correct shear value for the screws based on 7/16-inch-thick OSB, (the inner skin of a SIP). We use 140 pounds for the sheet-metal screws and 600 pounds for the SIP screws.