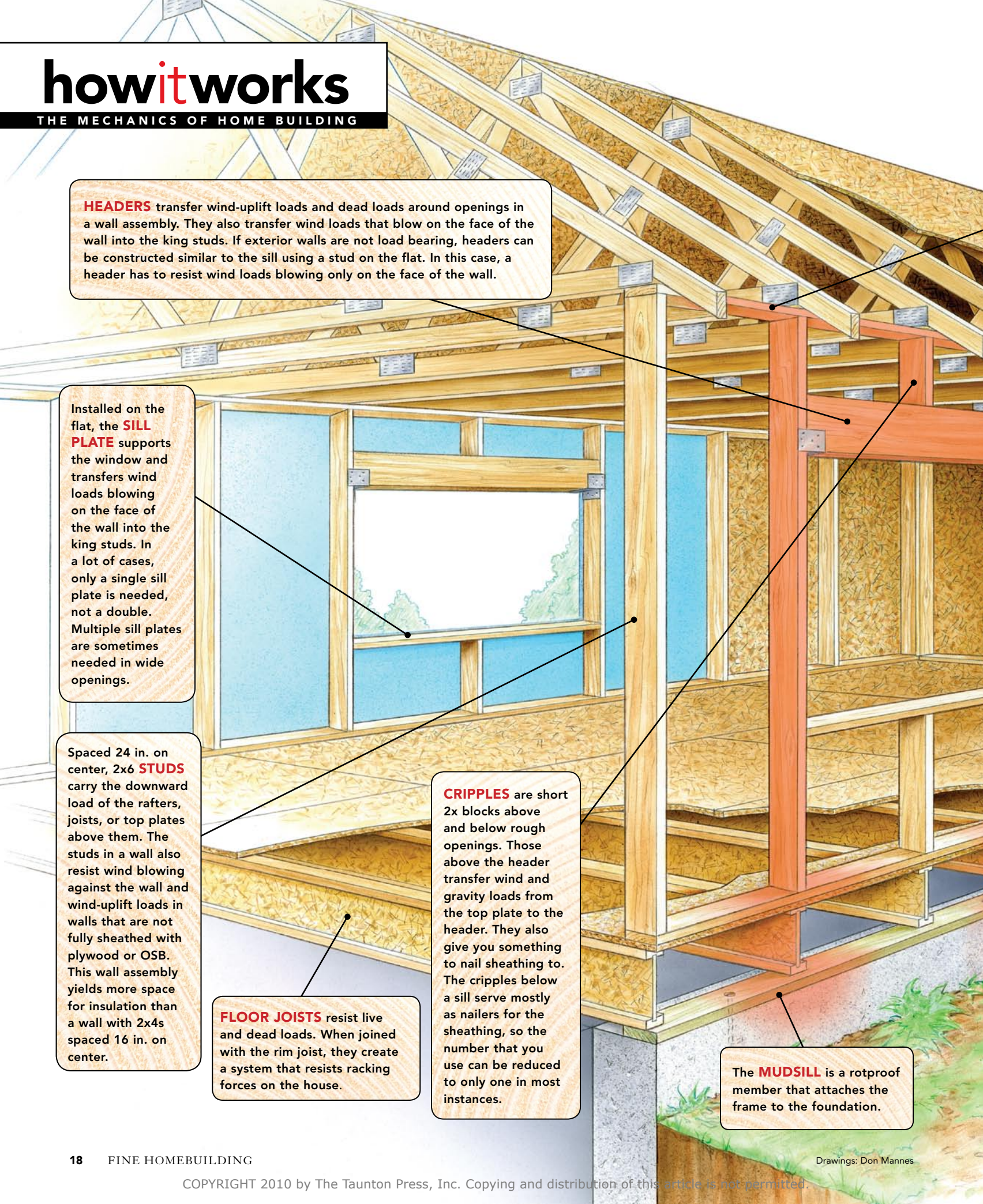
howitworks

THE MECHANICS OF HOME BUILDING



HEADERS transfer wind-uplift loads and dead loads around openings in a wall assembly. They also transfer wind loads that blow on the face of the wall into the king studs. If exterior walls are not load bearing, headers can be constructed similar to the sill using a stud on the flat. In this case, a header has to resist wind loads blowing only on the face of the wall.

Installed on the flat, the **SILL PLATE** supports the window and transfers wind loads blowing on the face of the wall into the king studs. In a lot of cases, only a single sill plate is needed, not a double. Multiple sill plates are sometimes needed in wide openings.

Spaced 24 in. on center, 2x6 **STUDS** carry the downward load of the rafters, joists, or top plates above them. The studs in a wall also resist wind blowing against the wall and wind-uplift loads in walls that are not fully sheathed with plywood or OSB. This wall assembly yields more space for insulation than a wall with 2x4s spaced 16 in. on center.

FLOOR JOISTS resist live and dead loads. When joined with the rim joist, they create a system that resists racking forces on the house.

CRIPPLES are short 2x blocks above and below rough openings. Those above the header transfer wind and gravity loads from the top plate to the header. They also give you something to nail sheathing to. The cripples below a sill serve mostly as nailers for the sheathing, so the number that you use can be reduced to only one in most instances.

The **MUDSILL** is a rotproof member that attaches the frame to the foundation.

Drawings: Don Mannes

Wall framing

BY ROB MUNACH

In *Fine Homebuilding* #212, I wrote about building loads, how they work, and how they affect a house. When constructed correctly, a house's frame resists a variety of loads, such as wind and snow. When built poorly, the frame will fail. When overbuilt, it can lead to energy losses through thermal bridging (see "How It Works," *FHB* #210 and online at Fine Homebuilding.com).

To be a successful framer, you should have a comprehensive understanding of wall assemblies and employ advanced-framing techniques—including those illustrated here—when appropriate. Keep in mind that while advanced framing reduces energy losses, resource consumption, and construction costs by using significantly less lumber than the typically framed house, it lacks the redundancy to stand up to extreme loads like a falling tree. So use advanced-framing techniques sensibly.

By looking at the components of a wall assembly and the role each component plays within a wall, you can begin to understand how a wall functions as a system. That's critical information, whether you're following standard building practices or advanced techniques. Here's how it works.

Rob Munach, P.E., operates Excel Engineering in Carrboro, N.C.