

Bang Without

Using timber-frame elements selectively is a more affordable way to add strength and beauty to a conventionally framed home

BY WILL BEEMER

When I first started timber-framing, I was caught up in the excitement and tradition of an exposed handcrafted structure, and I still am. I used to think it sacrilege to build any other way than the way old-timers raised a full timber frame, but now my enthusiasm for the traditional has been tempered by the realities of modern building. Timber-framing sometimes limits the architectural possibilities that stick-framing might afford. However, the development of SIPs (structural insulated panels) contributed greatly to the timber-frame revival because they created a quick, efficient way to enclose and insulate a timber frame.

Because of high labor and material costs, though, building a timber frame can be expensive. As a result, more timber framers find themselves building hybrids. Most often, these hybrids fall into one of two categories: a timber roof or ceiling built over exterior walls built with SIPs, conventional framing lumber, logs, or masonry; or a fully timbered part of the house, such as a great room, porch, or addition that's attached to a more conventional main structure. Separate timber-frame portions of a house also can



Exposed timbers on a flat ceiling can define or unify a space

A timber-frame ceiling incorporated into a conventionally framed house sets a strong tone for the space and is often used as a visual connection between rooms in a home's public area. In the simplest form, the ceiling's timbers span between the exterior walls. They can be used to support the floor above, or they can be installed decoratively below the structural floor joists. In larger rooms, posts and horizontal support beams might be necessary to carry the span. Infill between the timbers commonly consists of drywall or tongue-and-groove boards. (Projects here by the South Mountain Co., West Tisbury, Mass.)

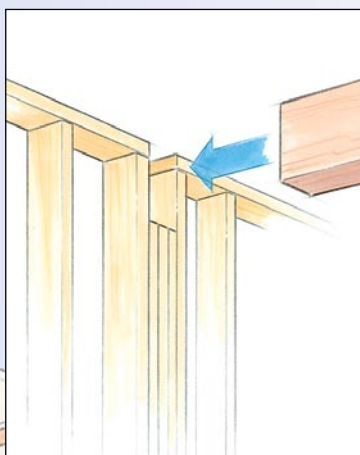
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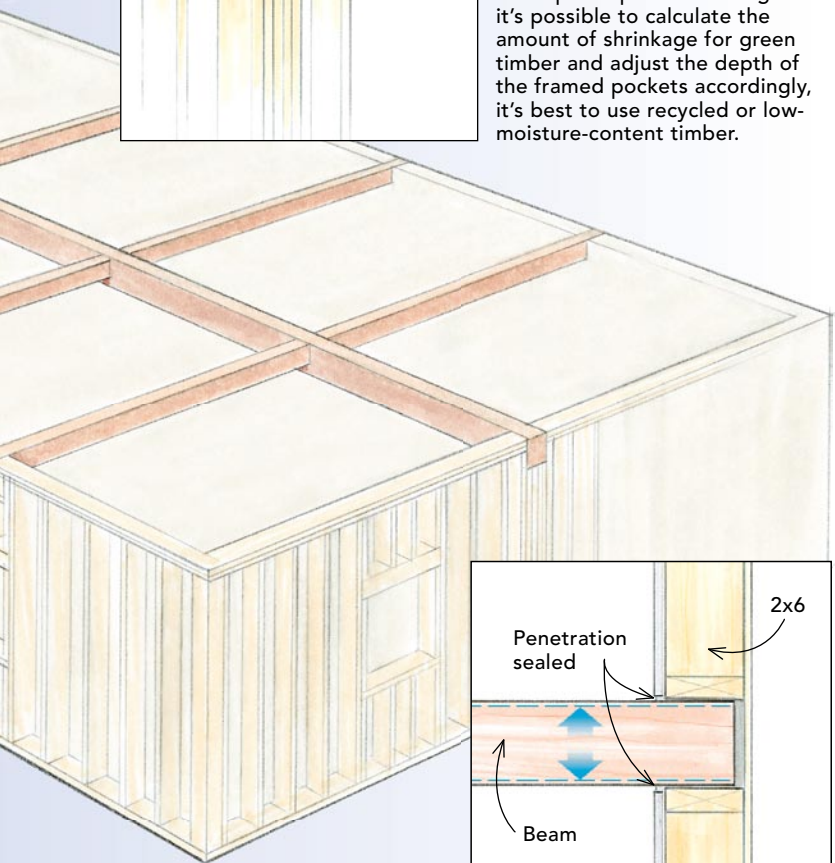
THE BASICS: INCORPORATING TIMBER IN A STICK-FRAME HOUSE

Timbers can be added to conventionally framed homes as a structural element or simply as decoration. In either case, it is important to keep in mind that framing lumber and larger timbers behave differently and that any time you disturb the building envelope, you must pay special attention to flashing and air-sealing.



Anticipate shrinkage

During the building process, green timber often dries and shrinks more than the adjoining structure. As a result, structural intersections of timbers and stick frames have to compensate for potential dimensional loss. Consequently, it's preferable to have the beams sit in pockets in the framing rather than bear on the top wall plates. Although it's possible to calculate the amount of shrinkage for green timber and adjust the depth of the framed pockets accordingly, it's best to use recycled or low-moisture-content timber.



Seal penetrations

Shrinking beam ends can create air leaks in the envelope. To avoid air infiltration, use backer rod, flashing tape, gaskets, or flexible caulk to seal pockets where timbers penetrate the interior sides of the building envelope.

be connected with simpler systems. Integrating two timber frames at an odd angle, for example, can pose joinery problems. Joining them with stick-framing provides an easier, flexible solution.

Use specialized labor and expensive materials sparingly

Timber-framing is a specialized skill that might not be part of the local labor pool. It also requires high-quality timber that isn't available down the road at the lumberyard. Conventionally framed exterior walls are usually better suited to the skills and resources at hand locally. Plumbing, electrical, insulation, and drywall can be installed as usual without requiring special skills or timing in the construction sequence.

I support using local materials as much as possible as a fundamental principle of green building. If you can't get timbers locally, you should use them judiciously. I live in western Massachusetts, where pine timbers are relatively plentiful and less expensive by volume than 2x framing at the lumberyard. Buying the pine supports the local sawyers as well, so I timber-frame more often than I would if I lived in an area with no local timber. For most of the country, high-quality timber is becoming increasingly scarce and must be trucked in over long distances, making it expensive and worthy of careful use.

Get the look you want, where you want it

In light of the timber's expense, it makes sense to use the wood where it's most visible, dramatically emphasizing the structure of the building in ceiling joists, posts, and roof framing. Replacing interior bearing walls with beams and roof trusses can create open spaces that benefit from the aesthetics of the joinery and the warmth of wood. Smaller spaces such as a pantry or a bedroom don't typically warrant a timber upgrade.

A flat ceiling with exposed timber joists might be the simplest way to introduce timber-framing to a project and can carry the theme throughout the house's main living spaces without too many complications. Supported by the exterior walls and an interior beam, the joists typically need no additional vertical support. This works especially well in kitchens, where posts and braces can pose problems by taking up precious space. They also can interfere with the installation of countertops, cabinets, and appliances.





Great or modest, rooms benefit from the drama of timber



One of the most dramatic uses of a hybrid system is to incorporate timbers in a vaulted ceiling. Here, a two-story living room is ringed by scissors trusses (photo left). Above, exposed rafters and beadboard add warmth to the high vaulted ceiling. Built in a temperate climate, the rafter system continues out over the exterior walls to support deep overhangs. (Project left by the South Mountain Co.; project above by Cascade Joinery, Bellingham, Wash.)

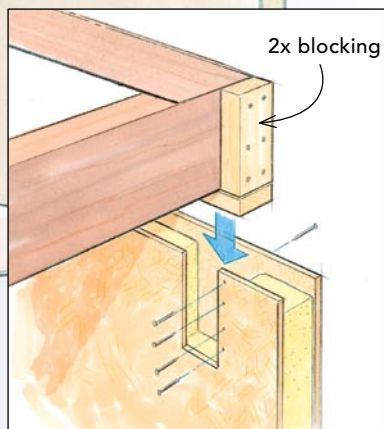
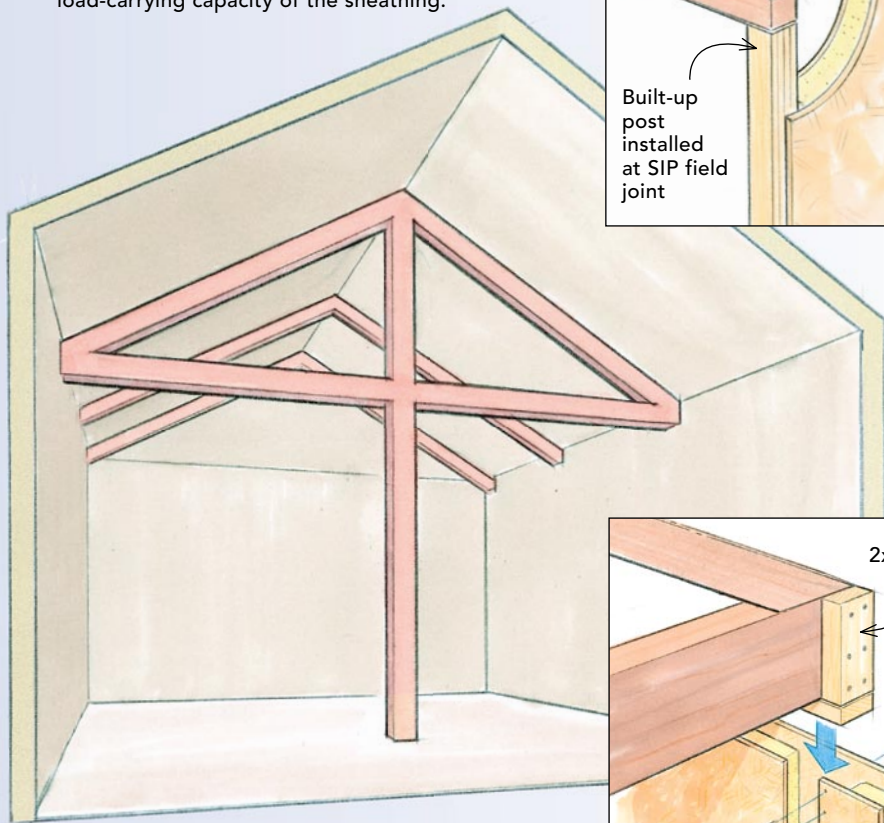
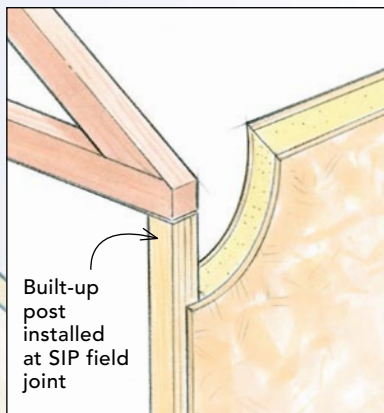


THE BASICS: ADDING TIMBERS TO A SIP HOME

Timbers are a common way to add strength and style to homes built with structural insulated panels (SIPs). However, when SIPs are modified in the field to integrate the timbers, it is important that you don't compromise the panels' structural integrity.

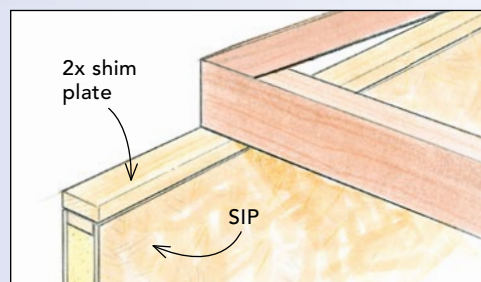
Support heavy loads with a post

SIPs can carry loads transferred by beams weighing up to a few thousand pounds; any timber transferring more than that requires a built-up post (drawing right) that is most often installed in the field. Any timber landing above a door or window opening requires a header because the opening has compromised the load-carrying capacity of the sheathing.



Use blocking to support pockets

To detail load-bearing pockets in SIPs, 2x blocking is attached to the sides of the timbers, then fastened to both SIP skins around the pocket. The timbers must run all the way through the panel. Doubling up on the blocking around the timber can increase the load-carrying capacity of the panel. This technique can be used for attaching interior rafters or joists, or for securing the beams of an exterior timber-frame entry.



Spread the load with a plate

If a pocket isn't practical, a beam can be supported on top of a SIP with the addition of a shim plate that spans both sides of the sheathing along the length of the panel.

Often, I build a timber ceiling over a kitchen and flank it with conventionally framed bays of 2x joists that I use as chases to run plumbing, lights, and vents. This strategy is also handy when there's a bathroom upstairs and I need to conceal traps. For larger rooms, additional beams and interior posts can carry the joists while still leaving the exterior walls free of timbers.

The most dramatic use of timbers is in a room with a vaulted ceiling. Trusses, tie beams, or exposed rafters sharpen the enclosed space and add a sense of history to an otherwise blank slate. Although timber ceilings are often structural, it's also possible to employ timbers more decoratively beneath a structural roof of SIPs.

Hybrids combine the strengths of different systems

Perhaps the most compelling reason to consider a hybrid is not aesthetic or economic but structural. Although timber frames have stood for hundreds of years, recent testing has shown that they have performance issues when subjected to lateral loads from wind and earthquakes. One way to buttress a fully timber-framed portion of the house is to attach it to another part of the house that can provide better resistance to those lateral loads. For example, rooms that are built with SIPs or conventionally sheathed walls can surround and support a timber-framed central great hall, or a timber-frame office or porch can be built and attached securely to an existing building.

Consult a structural engineer if you're in doubt whether the connection between the timbers and the rest of the hybrid can do the required work. For example, beams that tie stud walls or rafters and keep them from spreading could require connectors other than just nails; uplift on a roof frame resting on straw-bale or earthen walls requires some kind of hold-down mechanism. These types of interfaces are well established for homogeneous systems, but they have to be considered carefully in hybrid systems, which are unique and should be analyzed objectively. Often, a hybrid system will provide the structurally superior solution. □

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Even a small-scale timber-frame addition
can add style and space to your home



Part of the appeal of a hybrid timber frame is that it can be applied as an addition to an existing structure. A screened porch (photo left) becomes a great display of joinery and an evocative place where the homeowners can be outside and still escape summer pests. Smaller structures such as porches and entries also can gain shear strength by being secured to the exterior of a larger conventionally framed structure (photo above). Attachments are typically made by bolting the timber frame to the conventional framing. (Project by the South Mountain Co.)