

Timber Ceilings in Stick-Built Houses

by David Lindeman and Ken Wilson

Many customers want to live with the old-world look of a timber frame, but are not willing to pay the extra \$5 to \$20 per square foot that a complete timber frame typically adds to the price of a house. So we have tried to meet this need by “hybridizing” timber and stick framing — designing stick-framed houses that contain one room that is timber framed. The timber framing usually goes in a “public” area, such as the living room, dining room, kitchen, or sunroom. In this article we’ll show you the methods we’ve developed for building a commonly requested feature: the exposed timber ceiling.

Hybrid Advantages

A conventional timber-frame ceiling has a floor above it that is usually no more than 2¼ inches thick. This leaves no room for ductwork or electricals. It also means that the finished floor above has to be strong enough to limit deflection over the timber joists, which are often spaced 32 or 48 inches apart.

One common solution to this problem is to use 2x6 tongue-and-groove planks for the ceiling. A wood ceiling can be dark, though, and can shrink, leaving unsightly gaps. Also, if the T&G planks function as both finish floor and finish ceiling, dust from the rooms above can work its way through the joints.

The hybrid ceiling we’ve developed sandwiches the finish ceiling, usually pre-painted white drywall, between a mortise-and-tenoned timber framework below and a bay of sleeper joists (typically 2x6s or 2x8s) above (see illustration). The 2x8s allow room for recessed lighting, as well as hvac, plumbing, and electricals. We space the joists 16 inches on-center so they will carry a good part of the load of the floor above and reduce deflection in the timber joists.

Combining the sleepers with the ceiling timbers produces a somewhat overbuilt floor/ceiling assembly, but that’s not unusual in timber-frame structures. The white drywall ceiling increases reflective light and makes a nice contrast to the wood timbers.

Timber-Frame Layout

A typical timber-frame ceiling consists of a main girt, summer beams, and joists. The drawing on page 47 shows the construction details for a hybrid ceiling in a 14 x 28-foot “great room” that we recently built in a two-story Colonial (see photo, right). The white pine timber-frame ceiling is supported by the exterior 2x6 walls on three sides. On the fourth side, it rests on a two-piece 28-foot-long 8x10 girt that is supported by three 8x8 interior posts.

From the girt, three 8x10 summer beams run to the exterior wall opposite, with 6x6 timber joists 24 inches on-center running between the summer beams.

In planning a timber layout, we make sure to account for window and door openings, since you can’t rest a girt or summer beam on a header. The main carrying timbers must have posts underneath. We rest girts and summer beams directly on posts made up of five 2x6s nailed together. In some cases we use a solid 6x8 post for the supports and leave 2 inches of the post exposed on the inside of the wall. But whether you use a solid or a built-up post, be sure to provide good bearing below the floor, all the way to the sill.

The spacing of the timber joists depends on their size and what they’re carrying. Structurally, a 32-inch, or even a 48-inch, spacing will work, but a 24-inch joist spacing makes it a lot easier to install the finish ceiling. We’re able to simply lay the pre-painted drywall facedown on the timbers instead of having to fasten the drywall to the sleeper

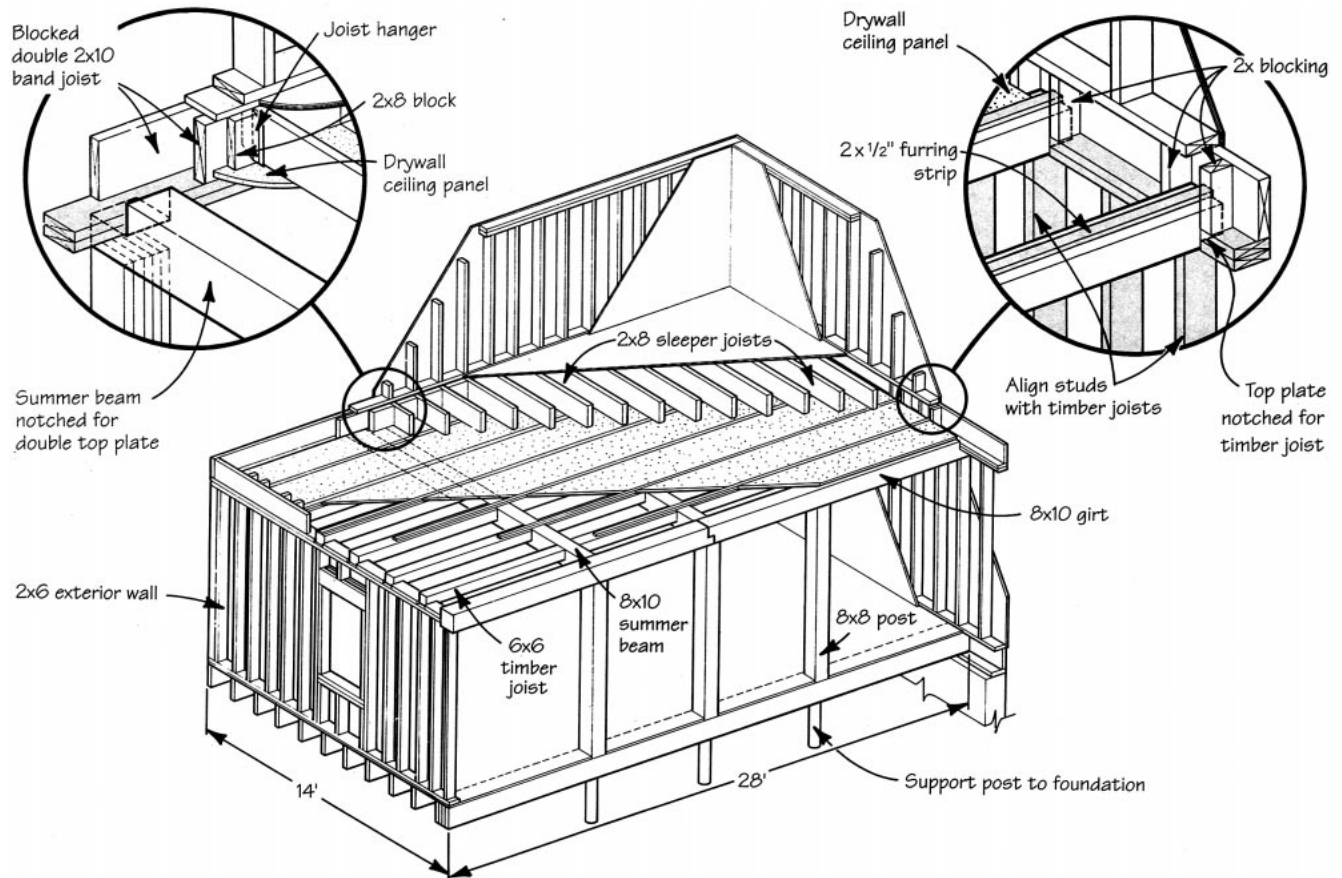
This exposed timber ceiling looks handsome and leaves ample room for wiring and plumbing



A traditional timber-frame ceiling and 8x8 posts adorn the “great room” of an otherwise conventionally-framed house.

John Patriquin

A Hybrid Timber-Frame Ceiling



The authors' hybrid ceiling plan allows for all the stud walls of the house to be framed at the same height, speeding the work of the framing crew. The timber framers then tie the timber ceiling into the stick-framed walls, accommodating the different height timbers by notching them. The finish drywall ceiling installs quickly, laying facedown on top of the timber joists in 22-inch-wide strips (photo, at right). Two-inch-wide furring strips nailed along the top centerline of the timber joists support the 2x8 sleeper joists that bring the floor/ceiling assembly up to the same level as the rest of the second floor.



Second-story framing halts until the timber-frame ceiling is completed. The 14x28-foot timber ceiling added one week to overall production time for the house.

joists from underneath. (This saves us from having to finish screw holes in the face of the drywall ceiling.)

An important consideration in designing a hybrid ceiling is the elevation of the timbers relative to the rest of the second floor. We frame all the exterior walls of the house at the same height — often 8 feet, though occasionally we go 8½ or 9 feet if the client wants more headroom. We notch the main girts and summer beams for the 2x6 double top plates, and notch the top 2x6 plate for the joists. Take care that you don't lose too much headroom where the timber ceiling forms part of a stairwell.

Construction Process

Once the first-floor deck is framed and sheathed, the stick framers can start raising walls and setting second-floor joists on the conventionally framed parts of the house.

While that is going on, the timber crew is planing timbers and cutting mortises and tenons in the girt, summer beams, and joists (see "Working With Green Timbers," page 49). It's easier to cut the mortises and tenons square, but dovetails help pull things tightly together, as well as help resist the twisting of the timbers as they dry out. Still, if a timber really wants

Working With Green Timbers

When buying timbers, you need to make an important first decision — whether to choose green or commercially dried stock. There are numerous advantages and disadvantages to each. Dry stock is more expensive and the selection is often poor, mainly because high-grade logs are more valuable when sawn into boards. The inevitable shrinking, checking, and twisting that occur as large timbers dry make it difficult for a supplier to keep a good supply of straight stock on hand.

Green, locally sawn stock has its disadvantages, too. Green timbers are heavy, can be difficult to plane and sand, and can shrink dramatically. With green timbers, the contractor must prepare the homeowner for the large checks, open joints, and shrinkage at adjacent surfaces such as drywall. Also, if a dark stain is applied to the surface of a partially dried timber, the contractor may be called back and asked to apply stain inside the checks. (For the most part, we use a clear finish with no stain.)

Given the pros and cons of dry vs. green timbers, we use green. Having logs sawn to our specs allows us to request the grade and sawing technique (boxed heart) that produces a straighter timber, and one that shrinks more uniformly as it dries in place. Typically, if the timbers are sawn in the winter while the humidity level is low, they can dry substantially before we use them in the summer. If we are forced to have timbers sawn during the hot, humid summer months, the trees are cut, sawn, and rough-planed in about three days. This helps control the mold staining that occurs when logs or timbers are stored green for even a short time in high temperatures and humidity levels.

Handling

Since the goal is to construct an attractive ceiling free of major defects, handling timbers carefully on site is extremely important. Besides the obvious care you take to avoid dents and dings, how you store the timbers is critical. Timbers must be stored on cribs well above the ground, preferably on a deck or in a dry, ventilated area (see Figure A). If you don't do this, you may be shocked one morning to find your once-beautiful stock hopelessly stained from mold, and good for nothing more than firewood. In no case should you store green timbers in a newly poured cellar or on a portion of the site with loam or lawn. Simi-

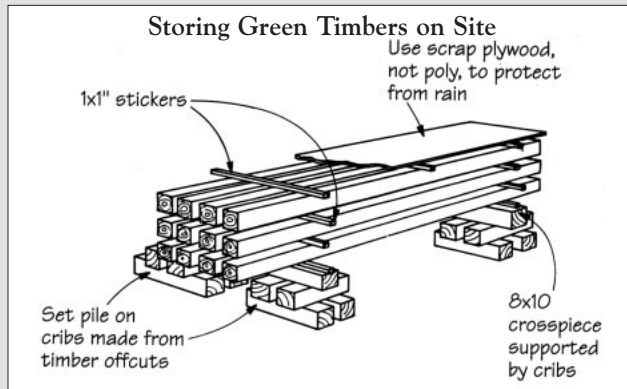


Figure A. Green timbers must be carefully stored on site to prevent mold staining. The pile is set up on cribs made from offcuts so that air can circulate underneath. One-by-one-inch stickers, set in about a quarter-length from the end, separate the timbers from one another. This allows ventilation on all sides of the timber and enables the crew to get their hands underneath for lifting.

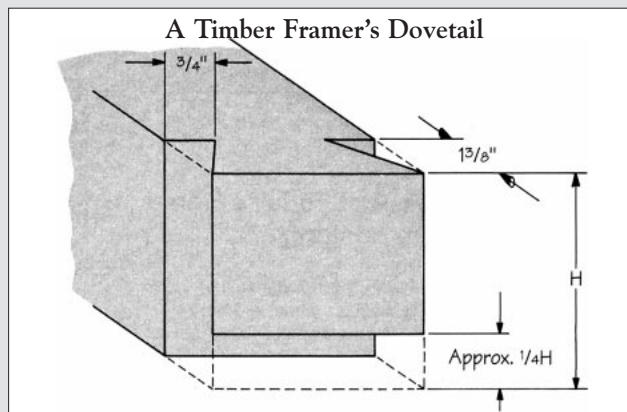


Figure B. Use this simple dovetail to connect summer beams to girts and joists to summer beams. Square tenons also work, but do not pull the joint tight.

larly, avoid direct sun for long periods of time because differential drying will warp the timbers on top of the pile. Cover the pile with some scrap lumber (plywood, etc.), but don't wrap it with poly. Wrapping green timbers tightly with plastic produces the most amazing colors of blue, green, red, and brown mold.

Preparation and Joinery

Locally sawn green timbers planed by a large stationary planer will typically have noticeable chatter marks and a "fuzzy" appearance. To remove these, we go over the surface slowly with a 6-inch Makita hand power plane. This produces a glossy surface. We then oil the timbers with two coats of a boiled linseed oil/turpentine mixture to give the timbers a temporary coating that will repel water-born dirt, rust stains from metal tools left in contact with the wood, fingerprints, footprints, and dog prints from the neighbor's pooch that loves to take in the view from the top of the drying wood pile. If necessary,

you can sand off this coating after the structure is closed in and apply a new coat to give the timbers a fresh finish.

After the timbers are planed and oiled, we lay out and cut the mortise-and-tenon joints, using ordinary carpentry tools for the most part. We have 16-inch circular saws and sharp chisels, but no plunge routers, special jigs, or chain mortisers. Green Eastern white pine cuts like butter. Simple square mortises and tenons with occasional simple dovetails (see Figure B) are adequate for most joist-to-summer beam connections because the "sleeper" framing holds the joints in place. A few well-placed "steel pegs" (20d spikes) also help.

In our most recent hybrid frames, we've been using a router with a 3/16-inch roundover bit to ease the exposed edges of the timbers, including the joints. This produces a joint with a soft shadow line that helps hide the cracks that inevitably occur at joints as the timbers dry in place.

— D. L. & K. W.

to twist, it will.

With all the first-floor exterior walls up, we set the built-up 2x6 posts in place. The first timber to go up is the main girt, which is notched at the ends to slip under the double top plate. The two-piece girt shown in the drawing is joined with a lap joint placed directly above the middle 8x8 post.

Next, the summer beams are cut to length and notched. Each summer beam joins the girt with a shouldered dovetail and rests on a built-up 2x6 post at the exterior wall. This is also the time to fit the curved knee braces if you are using them. We usually make the braces out of oak.

Now the timber joists are cut to length, notched, and set in place. Each joist that meets an exterior wall should rest directly above a stud. If the joist layout is in synch with the wall stud layout, as it ought to be, only a couple of additional studs are needed to support the joist ends.

At this point we install the 2x10 band joist, blocking it out so that the second-story walls and roof can be built before the drywall and sleeper joists are installed. We also add blocking on either side of the timber joists for nailing the drywall on the walls below. It's important to fasten the blocking accurately and securely around the joist ends — this will help prevent a twisting joist from buckling the drywall.

When the roof is nearly complete, we glue and screw a 2-inch-wide furring strip of 1/2-inch plywood to the top centerline of each timber joist. The sleepers rest on these strips so that the drywall is not load-bearing. The pre-painted 1/2-inch drywall ceiling panels go in next, between the furring strips. We nail the drywall to the tops of the joists. Before you install these, you can, if you think you may be repainting the ceiling panels or restraining the beams, tape a strip of brown masking paper to the top of the beams before installing the drywall. This can later be cut away with a sharp utility knife.

We then install the 2x8 sleeper joists running perpendicular to the timber joists, hanging them flush with the top of the blocked-out 2x10 band joist, and toenailing them into the timber joists where they cross the furring strip.

One final tip is to use masking tape around the beam and joist ends where they intersect the wall. This keeps the drywall mud off them and allows for a tight taping job. The timbers may shrink and twist with time, but the gaps can later be filled and repainted. ■

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