



# Post and Beam Shed



Modern hardware takes the place of traditional, time-consuming timber-frame joinery

BY JOSEPH TRUINI

Unlike in a traditional post-and-beam structure, there's not a single scarf joint or mortise-and-tenon joint in this whole shed. Built on a conventional 2x6 floor, the frame is assembled with metal fasteners called T-Rex connectors. Each connector's flange is screwed to a supporting member, and its leg slides into a post or beam with a slot cut to receive it. These joints are held together with aluminum pins. This modern construction method might not impress timber-frame purists, but it does provide a quick and strong way to build a beautiful post-and-beam structure. While it's attractive on the outside, what makes this build truly special is what's visible on the inside: an exposed frame of large white-pine timbers that would warm the heart of any barn builder. □

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# THE TIMBER FRAME

This spacious 14-ft. by 20-ft. post-and-beam shed melds traditional architecture with modern building methods, resulting in a timber-frame building that goes up surprisingly fast. The floor is framed fairly conventionally with 2x lumber (see inset), and topped by a frame of rough-sawn, full-dimension 6x6 posts, 6x10 beams, and 4x8 rafters, with a few other sizes mixed in for girts, plates, and bracing. The walls are braced with diagonal 4x5s, and the window and door openings are framed with 4x4s and 4x5s. All of the timbers are white pine, sourced from a local sawmill. Other species of wood can work just as well, although most are heavier.

## BUY-AND-BUILD KIT

All the metal connectors, building plans, and jigs needed to erect a post-and-beam frame can be purchased through Connex Post and Beam ([ctpostandbeam.com](http://ctpostandbeam.com)). T-Rex connectors are available for various sizes of posts and beams, including both rough-sawn lumber and standard nominal lumber.



## THREE JIGS MAKE THE JOB EASY



**Slot the posts.** Cut six 6x6 posts to 84 in. long, then make a 1/4-in.-wide by 5-in.-deep slot in both ends of each post (done here with a Prazi Beam Cutter). To center the slots, make a plywood jig that guides the saw, and screw it to the post.

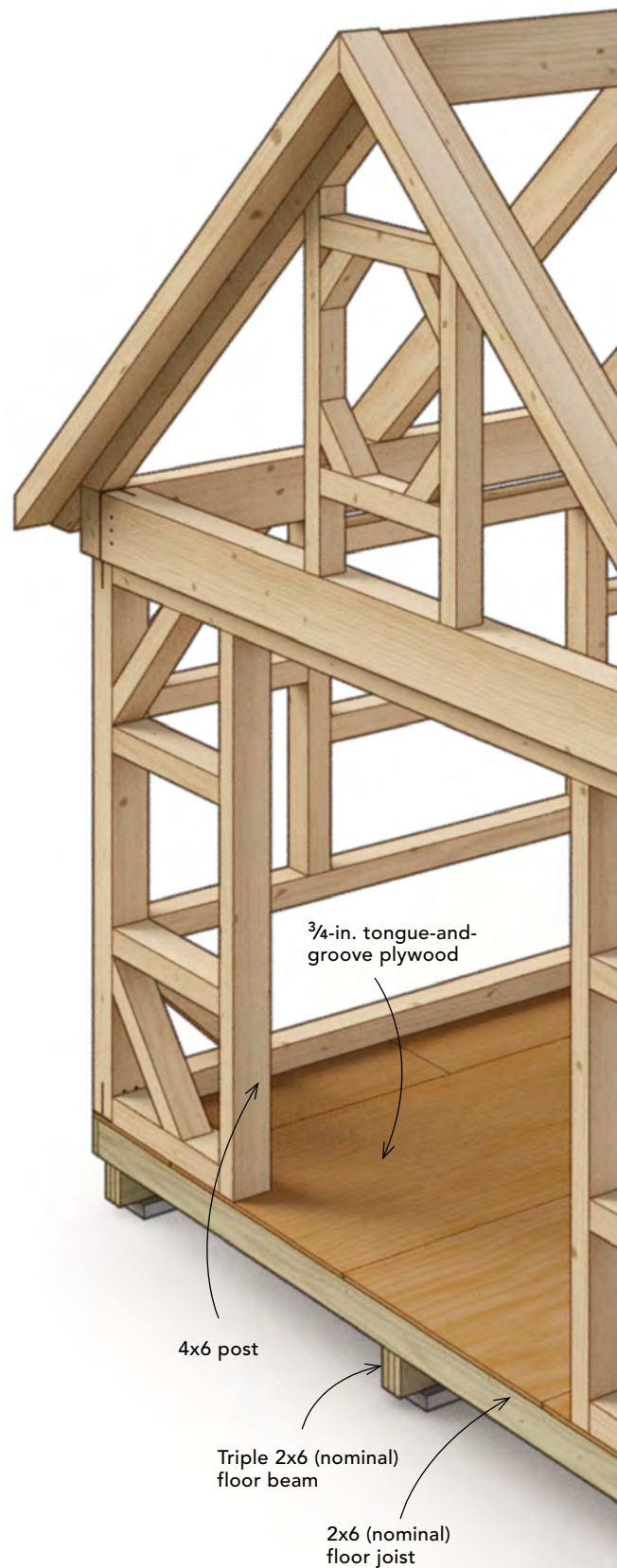


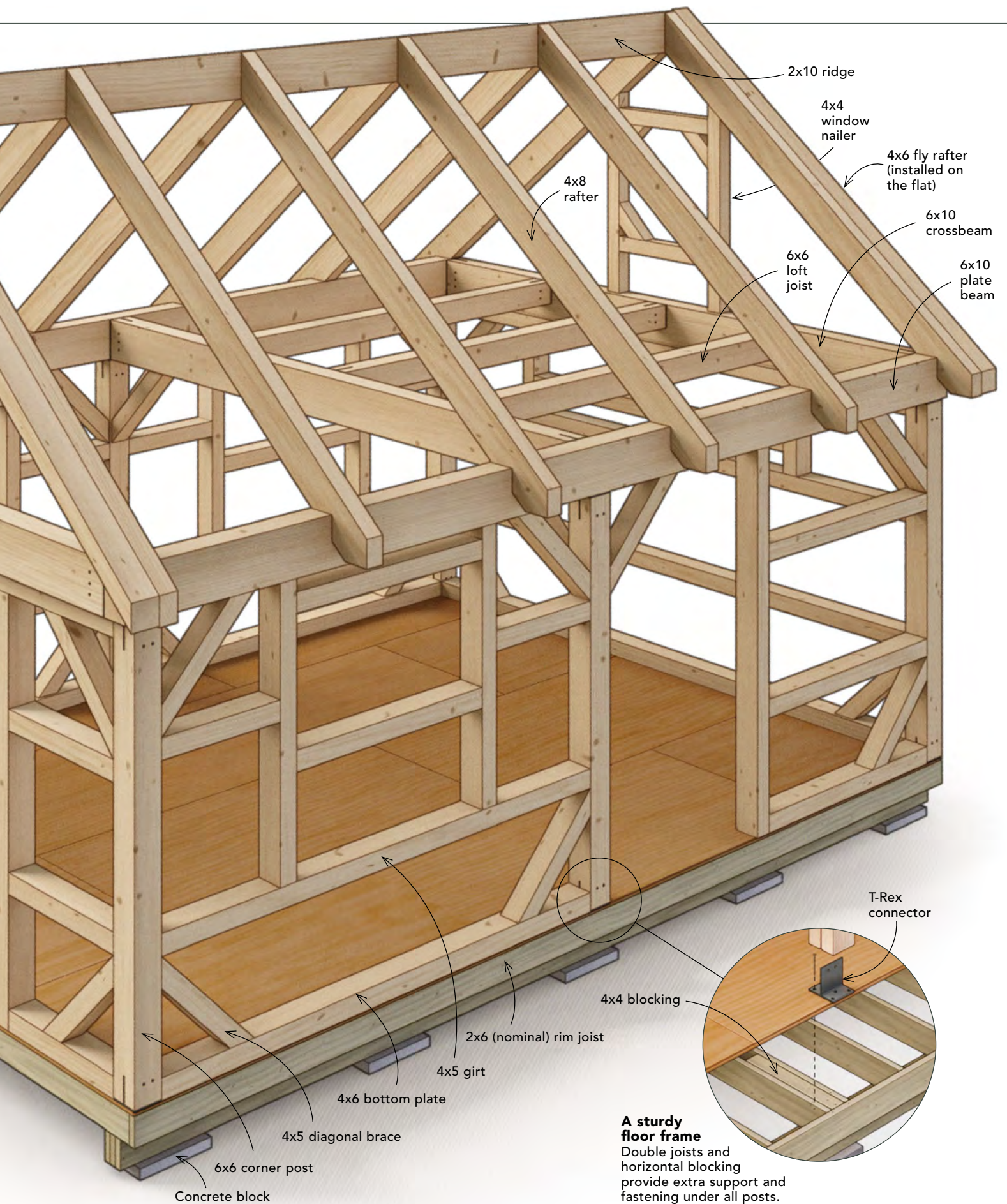
**Chamfer the slots.** A router fitted with a second plywood jig and a 45° chamfering bit eases the edges of the slots to allow the T-Rex connectors to sit flat against the post ends when inserted into each slot.



**Bore the holes.** Screwed to the post, a third jig made from scrapwood and two steel bushings provides an accurate way to drill holes for the aluminum pins that secure the posts to the connectors. Bore two holes clean through both the post and the connector with a 1/2-in. twist bit.

**Attach the connector.** With its edges flush with the edges of the plywood deck, fasten the connector to the floor and the blocking below with six 4-in.-long structural screws. Hammer a 1/2-in. by 6-in. aluminum pin through each hole to secure the posts.





2x10 ridge

4x4 window nailer

4x6 fly rafter (installed on the flat)

4x8 rafter

6x10 crossbeam

6x6 loft joist

6x10 plate beam

T-Rex connector

4x4 blocking

2x6 (nominal) rim joist

4x5 girt

4x6 bottom plate

4x5 diagonal brace

6x6 corner post

Concrete block

**A sturdy floor frame**

Double joists and horizontal blocking provide extra support and fastening under all posts.

# RAISE THE FRAME

The 6x6 posts attach directly to the floor framing, and support an overhead framework of horizontal timbers: two 6x10 plate beams that span the length of the barn (the ends of the plate beams overhang the end posts by 2 in.), three 6x10 crossbeams that run perpendicular to the plate beams, and three 6x6 joists that fit between two crossbeams to frame the loft. A dozen 4x8 rafters spaced 44 in. apart—flanked by 4x6 fly rafters on the gable ends—come together along with a 2x10 ridge to form the gable roof.



**Braces hold the posts plumb.** After securing all six posts (each with two pins), use a 4-ft. level and temporary 2x4 diagonal braces screwed to the posts to hold them plumb.



**Raise the beams.** If you set the plate beams manually rather than with a lift, it takes at least four people and some sturdy ladders. Fasten the connectors to the beams, lower each into the post slots, and secure them by driving two pins through the holes at each post.



**Crossbeam prep.** After setting the two long plate beams, fasten temporary 2x6 cleats to the posts, positioning them so their top edge is even with the bottoms of the beams. The cleats establish the height of the crossbeam connectors and hold up the crossbeams until you can drive in the aluminum pins.



**It takes two to raise rafters.** Working off a scaffold plank eases the task of setting rafters. Start by fastening the lower ends of the second and fifth pair of rafters to the plate beam with two 10-in. screws.



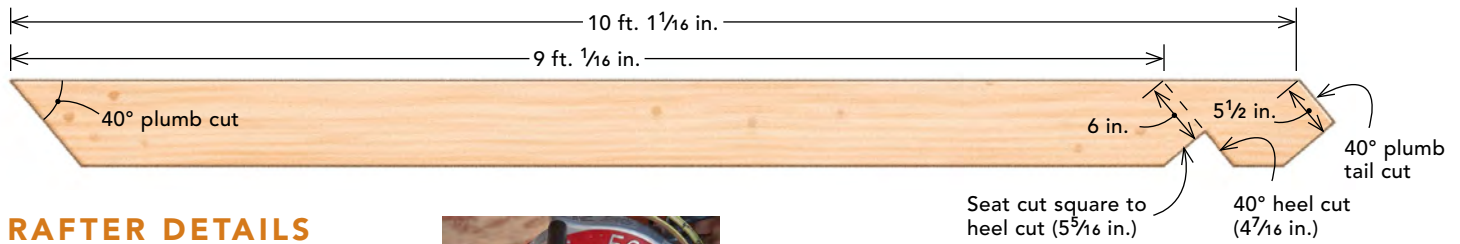
**Crossbeam placement.** Lower each crossbeam into place, fitting the connectors into the slots. Resting the crossbeam on the 2x6 cleats, hammer three aluminum pins through each end of the crossbeam.



**Install the 6x6 joists.** To support the overhead storage loft, install three 6x6 joists similarly to the crossbeams. Screw the connectors flush to the tops of the crossbeams before installing the 2x4 joist-support cleats. With the 6x6 joists in place, drive two pins through each end of each joist.



**Brace the frame.** With the beams in place, secure the 4x6 bottom plate and the 4x5 wall braces with 8-in. structural screws, drilling deep counterbores so the holes can be plugged for a clean look. Then add nailers and blocking for windows, doors, and siding.



## RAFTER DETAILS

Cut each rafter from a 12-ft. 4x8. The plumb cuts at the top and bottom of the rafter, as well as the heel cut of the bird's mouth, are 40° and so make a 10-in-12 roof slope.



**Cut the rafters with a big saw.** You also can use a standard 7 1/4-in. saw, but you'll have to either cut from both sides or finish the cut with a reciprocating saw or handsaw.



**Raise the ridge.** Like the plate beams, the 2x10 ridge is 20 ft. 4 in. long. After marking the rafter layout to match the plates, push the ridge up between the rafters, and secure each rafter to the ridge with two 6-in. screws. Install the remaining rafters.



**Add the four 4x6 fly rafters.** The fly rafters are the same length as the main rafters, but they have no bird's mouths. Hold them against the gable-end roof rafters with their top edges flush, and fasten them with 10-in. screws about 16 in. apart.

# SKIN THE FRAME

With the structure raised, work on the roof and walls can begin in any order, or simultaneously. The roof is sheathed with rough-sawn 1x8 pine boards, covered with plywood above to create a substrate for shingles. The barn's walls are sided with rough-sawn, 1x8 tongue-and-groove pine installed vertically in keeping with traditional barn architecture. Pine siding is readily available, affordable, and attractive, but it isn't very weather resistant and must be protected—and then maintained—with an exterior stain or paint. Siding the upper half of the gable ends first means that tools or ladders won't bang against and damage siding below. This heavy pine tends to bow and warp, which can pull regular nails free. Here we used 8d double-hot-dipped galvanized spiral-shank decking nails from Maze Nails.



**Sheathe the roof.** Work from scaffolding to install the first 4 ft. of 1x8 skip sheathing on the roof, using 10d nails to hold the 1x8s to each rafter. To create a more shingle-friendly substrate, add a layer of 1/2-in. CDX plywood.



**Shingles finish the roof.** After adding a drip edge, you can use a variety of roofing materials. Asphalt architectural shingles were used here.



**Start mid-gable.** Cut each piece longer than necessary, with the upper end cut at 40°. Face-nail the right-hand piece plumb, with its tongue to the right. Rip and glue a spline in the groove, and install the left piece with its tongue facing left. Side in both directions for symmetry.



**Trim the gable siding to length.** Snap a chalkline on the siding 1 in. below the bottom edge of the crossbeam. Cut along this line by screwing a 2x4 to the wall to guide a circular saw.

**Run the siding.**

The bottom siding on the gable ends butts to the overhanging crossbeam. The lengths should be consistent now, so you can cut a bunch of pieces assembly-line style.



**Persuading warped siding.**

Green, rough-sawn pine isn't known for its straightness. It can be levered tight to the previous piece by driving a chisel into the framing, prying the siding against the previous piece, and nailing.



**Keep the siding plumb.** Check every couple of feet to be sure the siding isn't sneaking out of plumb. It is particularly important to check when siding runs above and below a window opening.



**Notch boards as needed.** With a window or door opening, hold the siding piece in place temporarily, and mark the cut from the back. To notch around rafter tails, measure and draw lines with a square.



# WINDOWS AND DOORS FINISH THE BUILD

Along the sides are a fixed transom window and several barn-sash windows, which use a clever and traditional opening detail. These windows, made from rotproof cellular PVC, came from Connex Post and Beam, but wood units can be used as well. In contrast to the barn's straight lines and square architecture is a pair of 30-in.-dia. round windows set in the gable. The doors, a single sliding slab on the eave wall and strap-hinged double doors mounted to 2x4s on the gable, are all made in the traditional style, using tongue-and-groove pine fastened to cross battens.



**Trim the barn-sash opening with PVC.** Install the angled sill first, followed by the casing legs. The casing overlaps the opening by  $\frac{3}{4}$  in.



**Install the barn-sash keepers.** Screw foot-long pieces of 2-in.-thick pine, with  $\frac{3}{4}$ -in. dowels installed in them, to the inside of the posts. This provides a stop for the window sash when open.

## SIMPLE BARN SASH

There is no mechanism to these windows. Closed, they simply sit on the sloped sill, held by the overlapping exterior trim and a barrel bolt. Open, they lean inward against keepers.



**Set the sash.** The barn sashes simply slip into place. A small barrel bolt at the top of each sash keeps it closed.



**Cut the circle.** When framing the round window, space two posts slightly more than the window diameter apart, and fill in the corners with angled nailers. After the siding is up, attach a string to a screw in the opening's centerpoint, and tie a pencil to the other end. Use it to draw a 30-in.-dia. circle onto the siding, and then cut out the opening with a jigsaw.

**Set the round window.** Fasten the window through the flange and into the siding and timber frame with  $2\frac{1}{2}$ -in. exterior trim-head screws.



**Set the first door.** Attach the 91-in.-long mounting 2x4 to the door so that its top is even with that of the door. Use three 16-in. strap hinges to connect the two. Place the door in its opening.



**Finish up.** Secure the top of the mounting 2x4 with a 6-in. screw through the top counterbore, check the door for plumb, then screw the remaining counterbores. Hang the second door the same way.



## DOOR ASSEMBLY

Although the door can be installed with cross-bucks on the inside or outside, keeping them to the inside will make the doors better able to shed water and therefore last longer.

## THE FINAL DETAILS

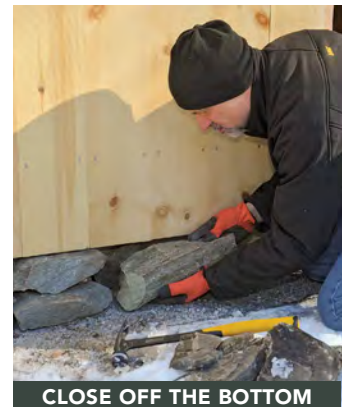
Because pine siding isn't rotproof, it has to be finished with paint or stain. The plank floor in the loft has to be installed as well, and stone dry-stacked below the barn's floor will complete the traditional look.



FLOOR THE LOFT



PAINT OR STAIN



CLOSE OFF THE BOTTOM