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Cover photo: Rodney Diaz

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Find all the extras for the articles in this issue, including SketchUp models, step-by-step videos, materials lists, and project plans, at FineHomebuilding.com/sheds.



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Fine Homebuilding: (ISSN: 1096-360X) is published bimonthly, with a special 7th issue in the spring and a special 8th issue in the fall, by The Taunton Press, Inc., Newtown, CT 06470-5506. Telephone: 203-426-8171. Periodicals postage paid at Newtown, CT 06470 and at additional mailing offices. GST paid registration #123210981.

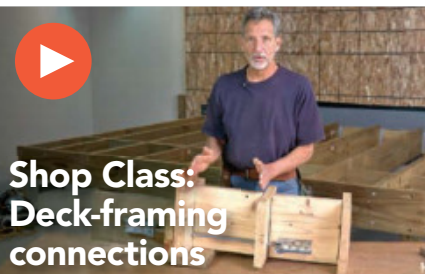
Subscription Rates: U.S., \$37.95 for one year, \$65.95 for two years, \$93.95 for three years. Canada, \$40.95 for one year, \$71.95 for two years, \$102.95 for three years (GST included, payable in U.S. funds). Outside the U.S./Canada: \$55 for one year, \$98 for two years, \$141 for three years (payable in U.S. funds). Single copy U.S., \$7.99. Single copy Canada, \$8.99.

Postmaster: Send all UAA to CFS. (See DMM 707.4.12.5)

Non-postal and Military Facilities: Send address corrections to Fine Homebuilding, PO Box 37610, Boone, IA 50037-0610

Canada Post: Return undeliverable Canadian addresses to Fine Homebuilding c/o Worldwide Mailers, Inc., 2835 Kew Drive, Windsor, ON N8T 3B7.

Printed in the USA



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Housewrap, hybrid timber frames, and more

The *Fine Homebuilding* editors dig into the details of their own building projects, including the complicated roof framing on a new garden shed.



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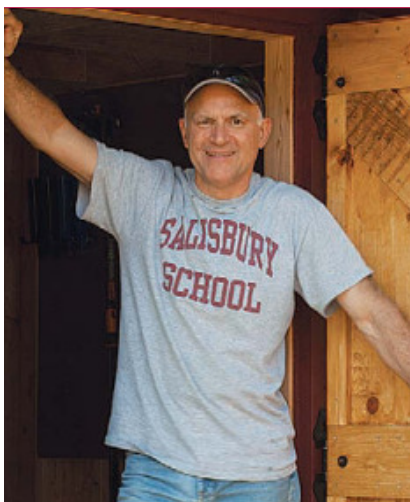
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contributors

THE VOICES OF EXPERIENCE



JOSEPH TRUINI is a former remodeling contractor, cabinetmaker, and union carpenter who writes extensively about do-it-yourself home remodeling and repair, woodworking projects, and tools and techniques. His work has appeared in several national magazines, including *Today's Homeowner*, *This Old House*, and *Popular Mechanics*. He is the author of *Installing Floors* (The Taunton Press, 2010), *Tiling: A Homeowner's Guide* (The Taunton Press, 2015), and *Building Sheds* (The Taunton Press, 2016), which is excerpted on pp. 74-83.

JOHN MICHAEL DAVIS ("A Small, Stylish Shed," pp. 42-43) has worked as a carpenter for more than 40 years. After roaming the country for much of the 1970s and '80s, he settled in New Orleans; there, he specializes in restoration carpentry, trying his best to keep that city's architectural gems from succumbing to the forces of rot and Formosan termites. The city's climate has taught him valuable lessons about how to build strong structures that survive in tough conditions.



Fine Homebuilding's digital brand manager **ROB WOTZAK** could be called a jack of all trades with the long list of crafts he's worked in over the past 25 years—blacksmithing, upholstery, and set building, to name a few—but residential construction has been the primary focus of the latter half of his career. After completing hundreds of jobs big and small, Rob has realized his favorite projects are always ones that he can build quickly and that demand a creative solution to a problem, such as the woodshed featured on pp. 62-67.

write an article

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Shed over heels

To me, nothing is more fun to build than a shed. Of course, it helps that you're working outside in the fresh air, and have lots of room to spread out your tools and materials, but it's more than that. Building a shed is fun because you get to do a little bit of everything—framing, trim, siding, windows and doors, and roofing—but not enough of any of those things to get bored. Plus, it's an ideal sandbox for practicing building skills and processes that you might be too reluctant to

try on your main house, or somebody else's house, for fear of making a mess of things. After all, if a shed's roof leaks, it's not exactly a crisis.

But don't mistake an opportunity to hone your skills as an excuse to do subpar work, use inferior materials, or mangle it in on the design. I truly believe that anything worth building is worth building well, and building your own shed or outdoor project gives you an opportunity to spare the world from one more shoddy, prefabricated, store-bought alternative. That's why we put this special issue together, and included dozens of projects to browse, plans to follow, and trusted step-by-step guidance. I hope you enjoy what you find here, and if you do, that you'll consider everything else that *Fine Homebuilding* has to offer, including a membership that includes access to all of our building advice, tool reviews, step-by-step projects, and much, much more.

Happy building,

A handwritten signature in red ink, which appears to read "Justin Fink".

—JUSTIN FINK, editorial director

Traditional sheds

The first structure I ever built, not counting tree houses, was a shed. It served its function but was too small, oddly tall, and narrow, and I never put it on a proper base, so it heaved every winter.

Later, as a self-employed carpenter, the first new structure I was hired to design and build was a garden shed, and I made sure this one was larger and had better proportions and details. Since then, I have designed many more sheds, refining my approach along the way.

Size and location

When designing your own shed, consider your needs above all else. A shed used to

store garden tools is different from one used to store a riding lawnmower. When in doubt, a larger building is more flexible. The International Residential Code (IRC) doesn't require a building permit if you stay below 200 sq. ft., and many municipalities allow reduced setbacks for outbuildings smaller than 100 sq. ft., so place your shed where it will be convenient. Choose deliberately between keeping the shed out of sight or making it a focal point.

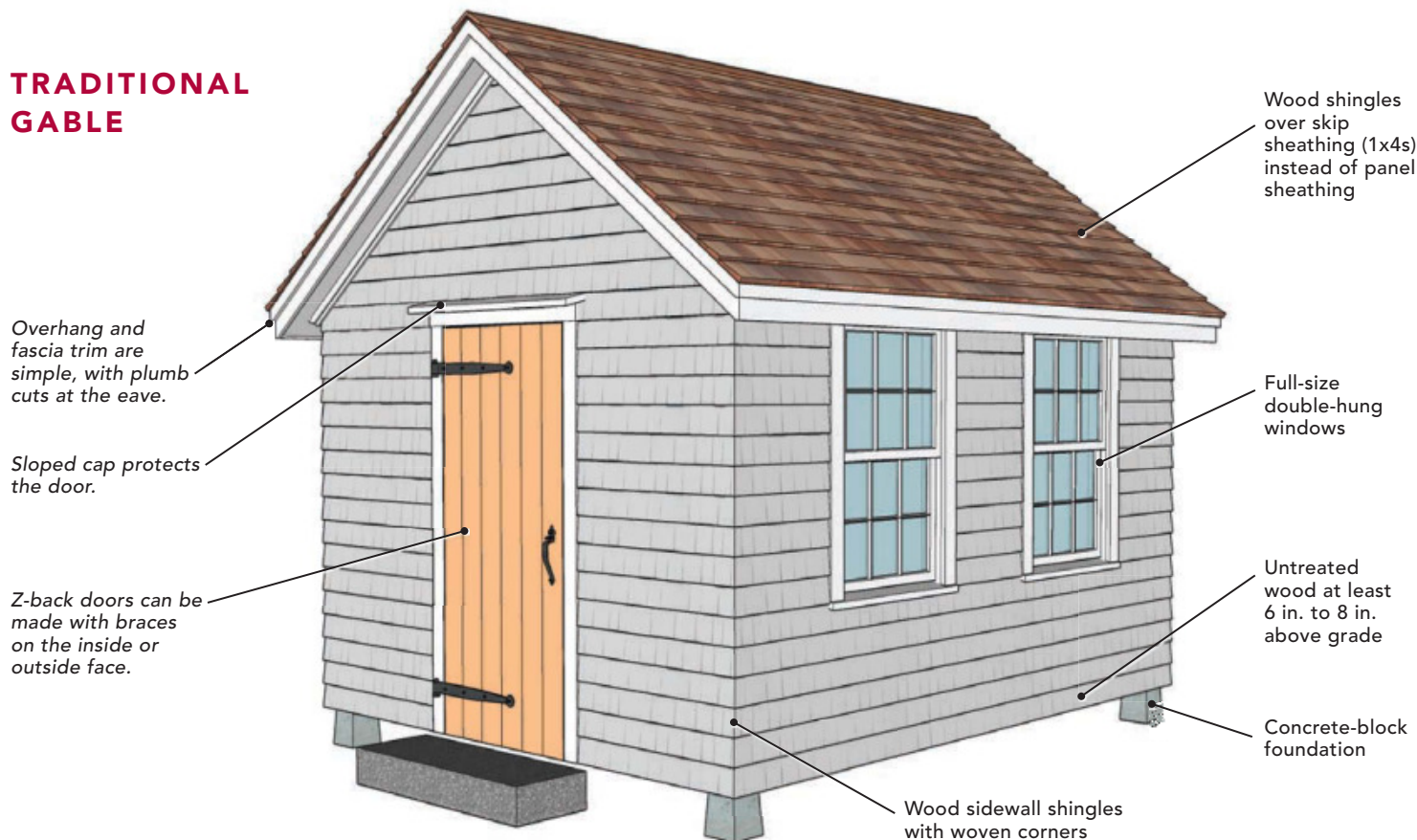
Style

The safest approach is to style the shed to match the house, but any home can accommodate a more whimsical shed. Keep

trim elements the same scale as you would use on a house, or scale them down just slightly. Don't make the shed a scale model of the house, with proportionately reduced elements. This common mistake yields a shed that looks more like a dollhouse. It is good, however, to put some effort and detail into the trim, especially along the rooflines, where it will be closer to ground level and therefore more visible than on a house.

The sure sign of a flimsy, mass-produced shed is an extremely low roof pitch. Use a roof that is at least as steep as the house roof (especially for traditional designs), and don't be a slave to symmetry; saltbox-style roofs can work well. The roof material can match

TRADITIONAL GABLE



TRADITIONAL SALTBOX

Steep, asymmetrical saltbox roof with metal roofing

Sloped flat stock (aka poor man's crown) instead of roof overhang

Siding options include rot-resistant wood left to age naturally, and wood painted or stained in historical colors. Consider either a monochromatic look or a tone-on-tone scheme (two colors apart on a fan deck).

Foundation is made of stacked 4x4s on uniform-size crushed stone, backfilled with more stone, and floored with concrete or stone pavers.

Ramps can be wood or gravel, and 1-in-4 to 1-in-6 are the most comfortable slopes.

Eaves cut square (angled 90° to the roof)

the house, or you can use the opportunity to introduce a different material into your property, such as reclaimed slate or hand-split wood shakes.

Windows and doors

Use normal-size windows and doors when possible, and consider salvaged units. Windows can take up a large fraction of usable wall space, so size and location are key. On the other hand, big windows with low sills bring in lots of light, look good from the outside, and provide views from the interior if the space is used for more than just storage. If you are short on wall space, then either limit windows to one or two walls, or try awning, hopper, or fixed windows instead of double-hungs.

A 30-in.-wide door provides just enough room to walk through with a wheelbarrow or push mower. Bump up to 34 in. or 36 in.

for a person with a wheelchair or walker, and provide at least 36 in. for a large garden cart. An even wider door or double doors are necessary for a riding mower or other larger equipment. If they can be accommodated in your design, opt for outswing or sliding doors to preserve as much usable indoor space as possible.

Construction

Modern platform framing with sheet goods such as plywood or OSB is fast, strong, and easy, but a shed is also a fun place to try your hand at timber framing, pole-barn methods, or other less common framing techniques. The small scale of a shed also makes all-natural materials a good fit. They age more gracefully under the kind of abuse a shed might see (dirty lawnmowers, etc.).

Use pressure-treated or otherwise rot-resistant lumber for any wood framing that

sits on concrete or masonry, or that is within 8 in. of the ground. Avoid using doubled flooring—for example, floor boards over a sheet-good subfloor—if the floor will see much water, because drying will be an issue. Anything used for decking makes a good shed floor, and in insect-prone regions, it pays to lay window screening over the joists before installing the floor. Concrete and paver floors are also good options if your budget allows them.

Uninsulated buildings are somewhat forgiving of damage from water and moisture, but it's still important to use good water-management strategies. Because a shed is usually drafty enough on its own, you don't need to worry about ridge vents, and air-sealing is not necessary.

Michael Maines is a designer in Palermo, Maine. Drawings by the author.

Budget-Friendly Shed

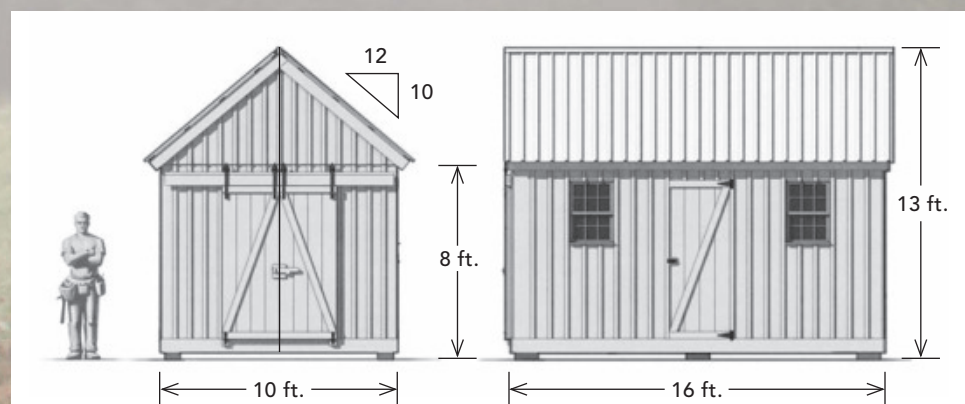
Get ample storage and traditional styling on a budget of just \$2000

BY JUSTIN FINK

Call me a building snob if you want, but I think most sheds are ugly. The response when I say this to people is usually, “Yeah, but who cares what it looks like if it gets the job done?”

In some ways, I agree. I have no problem with an ultracheap or even downright homely storage shed that is being built just to keep tools and equipment out of the weather. But why settle for an oddly proportioned, poorly built shed that isn’t durable, is adorned with appliques that don’t match the main house (or even the region of the country the shed is located in), and doesn’t offer enough storage space or the right type of access to suit its purpose—especially when even the smallest of these lackluster factory-built sheds cost thousands of dollars?

I challenged myself to design a shed that provides lots of storage but that can be built for a low price. To meet the needs of most homeowners, a shed must be bigger than 8x10 or even 10x12, so I set my sights on a 10x16 structure. For the budget, I set a goal of \$2000,



Proper proportions A bit of planning and some measured drawings are crucial to ensuring that you don’t end up with an oddly proportioned backyard eyesore. I like to design using SketchUp (a free design program available online), which makes it easy to draw a basic shape and to adjust the height and width of walls, the height and pitch of the roof, the depth of overhangs, and the size and placement of doors and windows. Whether you use a design program or just some graph paper, you can experiment with changes to work out problems before you put on your tool belt.



Explore the shed in SketchUp

Download a full-scale SketchUp model of this shed at FineHomebuilding.com/sheds.



A durable roof Metal panels last long and look traditional, and although they required a special order from my local big-box store, they were nearly the same price as architectural shingles. They made it possible for me to use skip sheathing on the roof rather than continuous sheathing. As an added benefit, I was able to install the corrugated panels faster than I would have been able to lay shingles.

Lots of access A big door on the gable end accommodates a lawn tractor and other wheeled items. A smaller door on the eave wall offers access when I need hand tools and other items. This setup alleviates the common problem of having to move multiple items to reach the one you want.

Wood windows Single-pane, true divided-lite wood windows not only look better than vinyl products, but they are about the same price. If you can't find such windows at a local yard sale, recycling station, salvage yard, or building-supply store, or if repurposing isn't your thing, try betterbarns.com for affordable options. Here, I repurposed some old sashes.

Traditional board-and-batten siding

Here, I used full 1x8 spruce for the boards, and rip cuts from the same stock as battens to pin the board edges and allow for expansion. To keep the bottom ends of the battens from wicking ground moisture and from rotting prematurely, I had them land on a skirtboard rather than running all the way to the bottom edge of the building.

which I knew would be difficult to meet. The final challenge: The shed had to look better than the low-pitched, cheaply clad, cookie-cutter models being sold at most big-box stores and shed retailers.

“Look better” is, of course, subjective. My personal taste leans toward a traditional style, so I took cues from tobacco barns and other New England farm-style outbuildings in my area while relying on as few obviously modern building materials as possible. It may sound crazy, but I wanted to enjoy the interior of my shed as much as the exterior, and as long as it would keep out rain and snow, I didn’t mind it being leaky enough to let in streaks of sunlight. To that end, I decided to forgo the convenience and strength of sheet goods and used rough-sawn, knotty, 1x8 spruce boards for many parts of this shed, leaving them unfinished so that they eventually would weather to a pleasant gray. If you want to streamline the process and aren’t concerned about achieving a true old-fashioned look, then by all means go for OSB or plywood. It probably will save you money compared to the solid-wood alternatives I sourced, not to mention that it will simplify the wall bracing. Some panel goods, such as T1-11, even double as finished siding.

Speaking of simplicity, it’s good to set reasonable expectations for a project like this. Every project boils down to a balance between time, money, and quality. This build will save you some money, but you won’t be able to crank it out in a couple of days. I wasn’t trying to turn a profit here, so when I could shave off a few bucks by putting in some extra legwork and using slightly warped or otherwise wonky materials (such as the 1x8s), I was perfectly willing. Likewise, if I could have fun making my own barn-door hardware to save \$50, that was a win-win. In fact, aside from the windows that I picked up years ago from the side of the road (many affordable options also can be found online), I built this entire project using materials from my local big-box store. □

Justin Fink is editorial director.

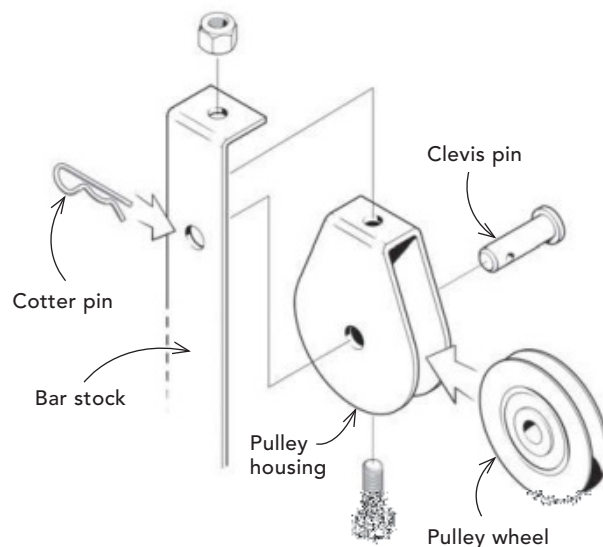
A HYBRID FRAME FOR A CLASSIC LOOK

In many ways, this shed is built like a standard house, with dimensional-lumber framing for the floor, walls, and roof. But because the design uses boards where panel sheathing normally would be, it was necessary to incorporate some traditional bracing to strengthen the frame and to provide solid nailing for the siding and the roof panels.



Budget boards The heroes of this build are the inexpensive rough-sawn spruce 1x8s used for floor sheathing, siding boards, and door panels, and ripped into narrower strips for girts, battens, bracing, and trim.

Bracing strategy Ideally, the diagonal bracing would be continuous on both eave walls of the shed, but even though it's interrupted by window openings, it still does its job. If your interior storage plans don't include using the space between studs, consider notching the bracing into the studs for an even stronger frame and faster girt installation.



Homemade door hardware

I made the roller hardware for this shed's barn doors myself, using a variety of locally purchased components. The savings were marginal compared to prefab farm-grade track hardware (about \$85), but much greater compared to barn-door hardware with the type of traditional look I wanted.

For the wheels, I chose 3-in. swivel pulleys and cut off the swivel portion of the pulley assembly. I bent and hammered a piece of $\frac{1}{4}$ -in. bar stock into an L-shape, then drilled and painted it. Finally, I attached the wheel and housing to the bar with a bolt and a long clevis pin. The wheel and strap assemblies ride along the edge of the track, which is just a piece of $\frac{1}{4}$ -in. by $1\frac{1}{2}$ -in. steel angle. To keep the bottom of the door from swinging outward, I used a type of fence catch meant to accommodate a 2x4 door bar, furring it off the building so that it would fit the thicker door (not shown).

A 2-ft. grid Walls are laid out on a rough 2-ft. grid, with studs and horizontal girts spaced 24 in. on center to provide nailing for the siding. Most of the girts are ripped from the 1x8 rough-sawn spruce, but the upper parts of each gable have 2x girts so that the upper siding can lap easily over the lower siding.

Heirloom Garden Shed

Sheds are popular do-it-yourself projects. They're quick to build, and they offer a taste of everything from framing to finish. Not surprisingly, there's no shortage of information on building sheds, and a lot of it uses a predictable list of materials: 2x4s, panel siding, tiny windows, and asphalt shingles. When our colleagues at *Fine Gardening* asked us to design and build a shed for them, however, we decided to make something a bit different.

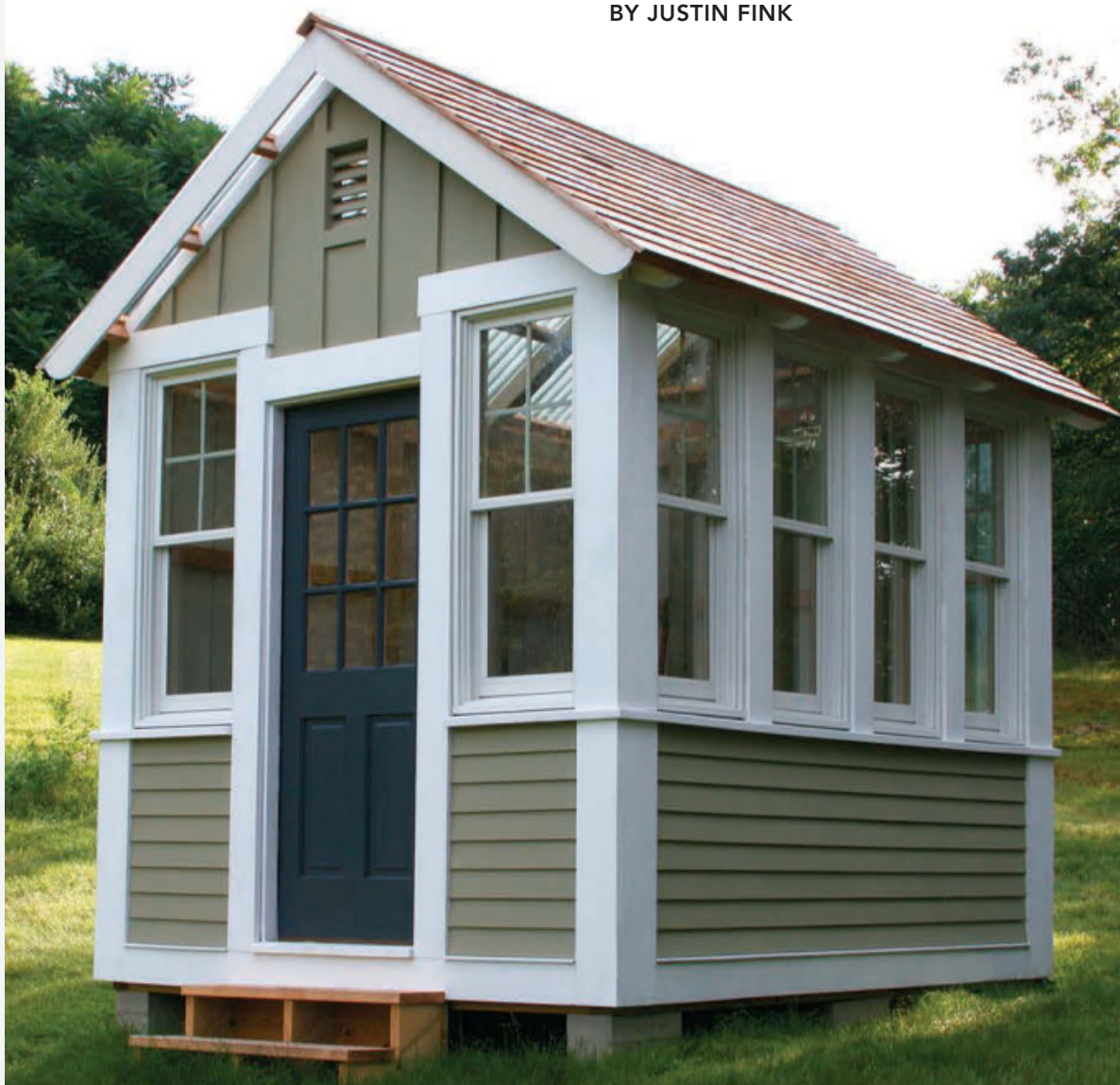
We wanted to give our project the kind of classic feel you get from a timber-frame outbuilding, but without the expensive materials and required skill. We ended up designing the structure with pressure-treated 4x4 lumber as sort of a hybrid timber frame. Wanting to let that style influence the rest of the project as well, we chose a solid-plank floor rather than one made of plywood or OSB, and wood clapboards and board-and-batten siding rather than T1-11 panel siding. Instead of asphalt shingles, we chose cedar shingles for one side of the roof and polycarbonate panels to let light in on the other side.

Our shed took longer to make than a standard outbuilding, but the payoff was well worth the effort. □

Justin Fink is editorial director.
Shed design by Rodney Diaz.

Anything but typical, this handsome outbuilding can be built by one person in about a week

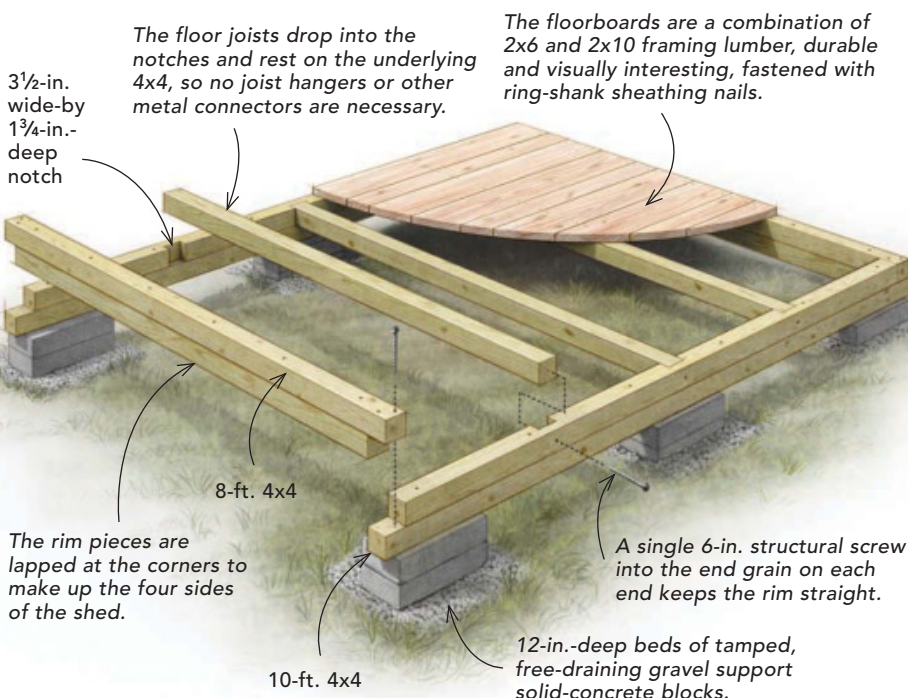
BY JUSTIN FINK



For a video series about how to execute every detail of this custom shed, visit FineHomebuilding.com/sheds.

DAY 1 FOUNDATION AND FLOOR

Building a shed atop stacked concrete blocks that rest on pads of compacted gravel has several advantages over other methods: The materials are inexpensive, the method is simple, and there's no waiting for concrete to cure, which means you can start building the floor frame sooner. If your site is hilly or requires stacking more than a few blocks to get the foundation level, you'll need either to do some preliminary site work to level the area, or consider poured-concrete piers instead.



Level the footings



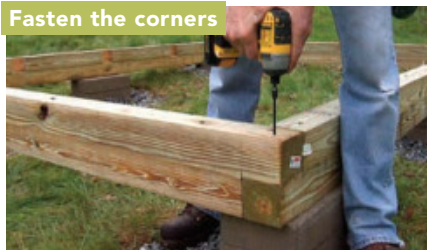
Using the highest corner as a benchmark, level the other corners with the help of a long board and a box-beam level. For fine adjustments, add or remove gravel from the pad.

Square the frame



Before fastening the corners of the frame, take diagonal measurements to check for square. They should be within $\frac{1}{8}$ in. of each other. If not, persuade the frame a bit with a hammer and a block.

Fasten the corners



The connections in the frame of this shed are fastened with structural screws. They're available in several lengths and head styles, are weather resistant, and zip into wood without pilot holes.

Trim the floor flush



Install the floorboards tight to one edge of the floor frame, then trim any overhang on the opposite end with a circular saw.



Half-lapped 4x4s create a timber-frame look

Because many pieces of this shed frame are similar, you can gang up parts to create the notches where they will join together. The basic technique for cutting the notches is shown below.

Lay out with a template.

Lumber varies in width depending on how wet it is, so when laying out the notches, use a 4x4 cutoff as a template to help ensure that the cutouts will be wide enough to accept the posts.



Follow the line, then hog out the waste.

The first two cuts establish the shoulders of the notch, and the rest of the passes kerf the lumber so that it can be removed easily. Aim for no more than $\frac{1}{4}$ in. between cuts.



Finish with a hammer and chisel.

Remove the bulk of the waste with a hammer. Then clean up the notches with a wide chisel, leaving the joints reasonably flat and free of high spots.



DAY 2 WALL FRAMING

The wall assembly consists of 4x4 top and bottom plates, 4x6 corner posts, and 4x4 wall posts. As with the floor, gang as many common parts together as possible, cut them to length, and notch them according to the layout.



Start at the corners

Unlike a traditional stud wall built on the floor and lifted into place, these walls are built in place, starting with bottom plates and corner posts.



Lower girts are next

The 2x4 girts, which will later act as the windowsills, provide bracing between corners and make handy scaffolding for reaching the top plates.



Gable plates, then eaves

Place the gable-side top plates first, and then drop in the eave pieces between, resting them on the remaining lip of the 4x6 corner posts.



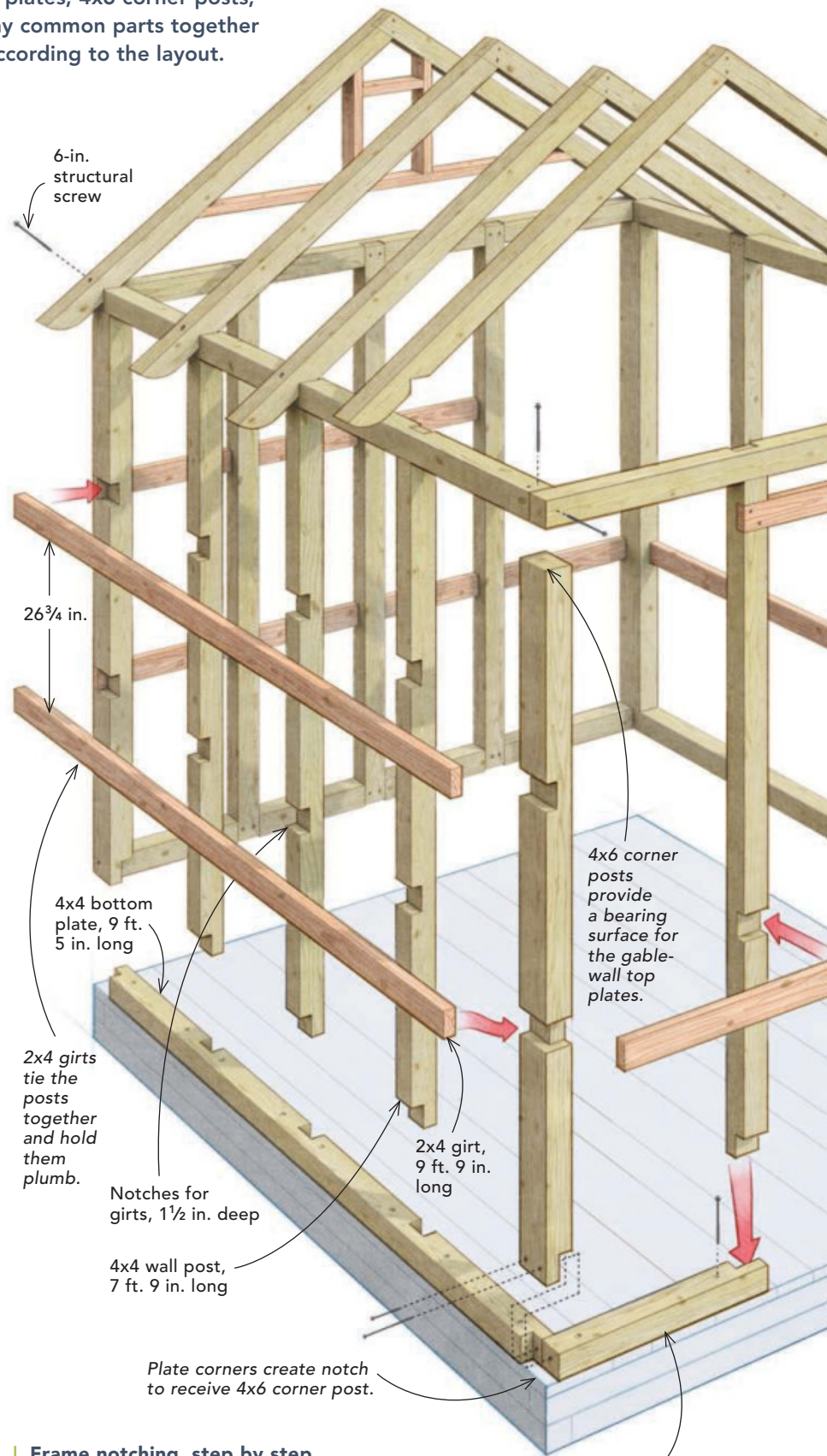
Fill in the wall posts

Pay careful attention to the placement and orientation of wall posts; their notches correspond to the upper girts and window locations.



Upper girts are last

The girt above the door goes in next, but leave the lower girt across the door opening to brace the walls. It can be removed later.



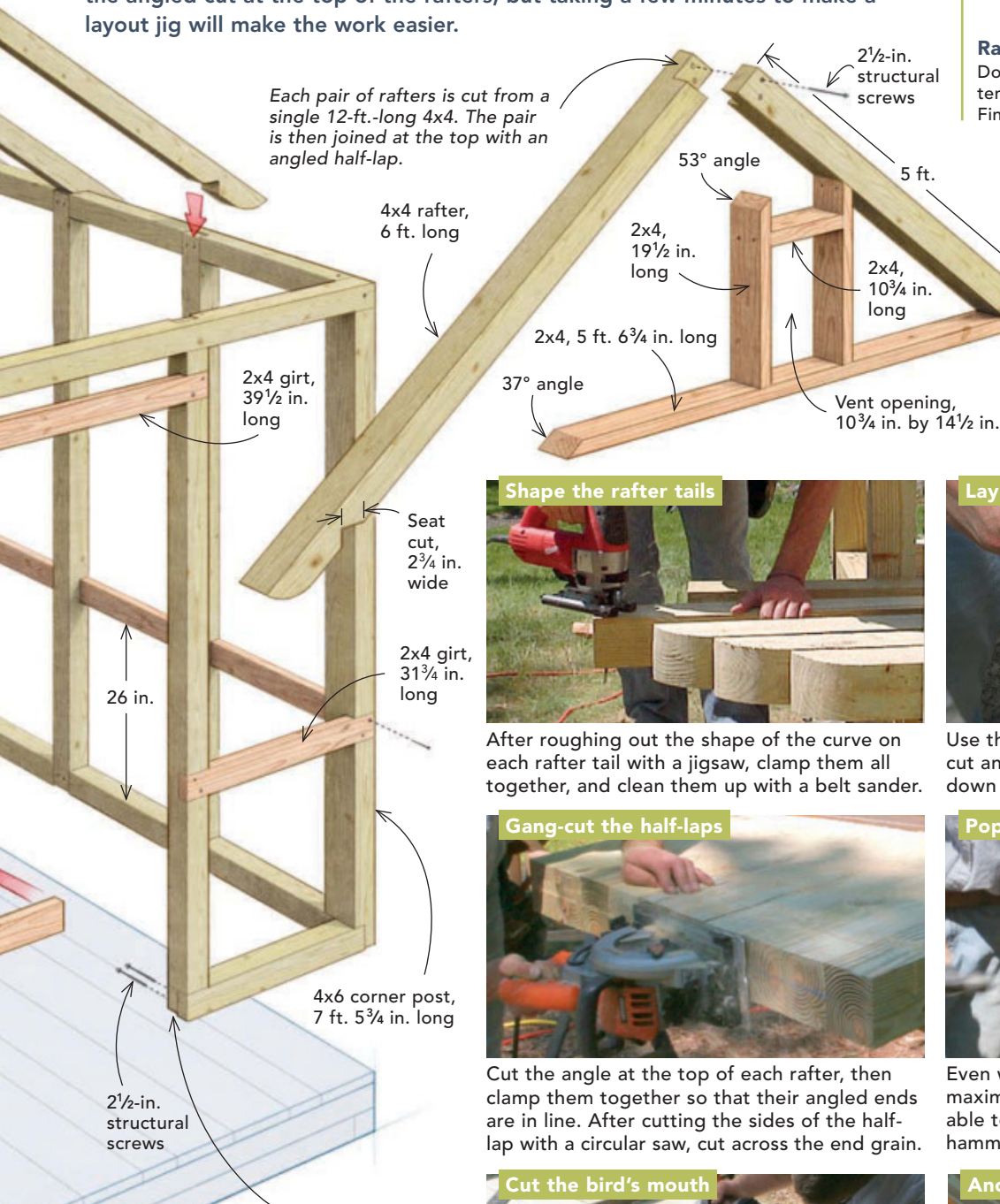
Frame notching, step by step

For a detailed gang-cutting sequence of the half-lap joinery, check out the illustrated plans at FineHomebuilding.com/sheds.

Bottom plates are installed flush to the outside face of the floor frame with 6-in. structural screws.

DAY 3 ROOF FRAMING

The half-laps at the top of the roof rafters are basically the same as the half-laps used for the floor and walls, but they are set on an angle, which makes the layout and cutting a bit more challenging. You can use a rafter square to mark the angled cut at the top of the rafters, but taking a few minutes to make a layout jig will make the work easier.



Each pair of rafters is cut from a single 12-ft.-long 4x4. The pair is then joined at the top with an angled half-lap.

4x4 rafter,
6 ft. long

2x4 girt,
39 1/2 in.
long

Seat cut,
2 3/4 in.
wide

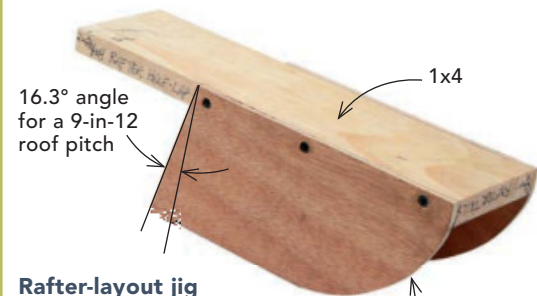
2x4 girt,
31 3/4 in.
long

4x6 corner post,
7 ft. 5 3/4 in. long

26 in.

2 1/2-in.
structural
screws

The half-laps on the posts are cut 1/4 in. short at each end to leave room for the top and bottom plates to shrink.



Rafter-layout jig

Download a full-size template of this jig at FineHomebuilding.com/sheds.

4 3/4-in. radius for rafter tails

All of the rafters are the same, so grab two, flip one over, and join them together with screws so that they can be lifted already assembled.

Shape the rafter tails



After roughing out the shape of the curve on each rafter tail with a jigsaw, clamp them all together, and clean them up with a belt sander.

Gang-cut the half-laps



Cut the angle at the top of each rafter, then clamp them together so that their angled ends are in line. After cutting the sides of the half-lap with a circular saw, cut across the end grain.

Cut the bird's mouth



Clamp the rafters together so that the curved ends are flush, and cut the bird's mouth in two passes—first the seat cut, then the plumb cut.

Lay out the angled half-laps



Use the jig shown above to mark the through-cut angle at the top of each rafter, then slide it down to mark the shoulder of the overlap.

Pop 'em with a chisel



Even with the 7 1/4-in. circular saw set to its maximum depth of cut, the blade won't be able to finish the half-lap. Use a chisel and a hammer to pop off the waste.

Anchor with screws



After aligning the rafters to their layout marks, drive a single structural screw through each rafter's bird's mouth and into the top plate.

DAY 4 ROOF TRIM

Overhangs help to take an ordinary roofline from blah to beautiful, and fly rafters with trim are pretty simple to build, especially on a small structure like this. The key here is to do the fussy work while you're on the ground, then to lift the pieces into place on the shed. Once the fly rafters are up, the building is ready for roofing.

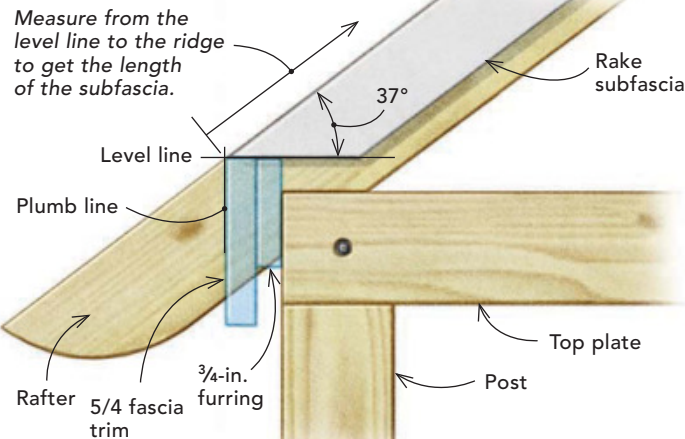
Plumb the rafters



After marking the overhangs and rafter layout on a piece of skip sheathing, nail it to one of the gable rafters a few inches down from the ridge. Next, clamp a level to the framing and tweak this first rafter into plumb. Work your way down the roof, aligning and nailing the rafters to the marked skip sheathing.

Measure for the subfascia

Measure out from the eave wall the thickness of a 3/4-in. furring strip and the 5/4 trim board, and mark the rafter with a plumb line. Draw a level line out from the point where the plumb line meets the top of the rafter. This level line represents the bottom of the rake subfascia.



Secure the subfascia



After nailing the 2x3 blocking to each half of the rake subfascia, clamp the halves together at the peak, and drive a couple of exterior screws through the miter to hold it tight.

Install the subfascia



Fasten the rake-subfascia assembly over the furring strips, making sure the bottom of the subfascia lines up with the top of the 5/4 fascia trim that comes later (see drawing above).

Screw the rake trim

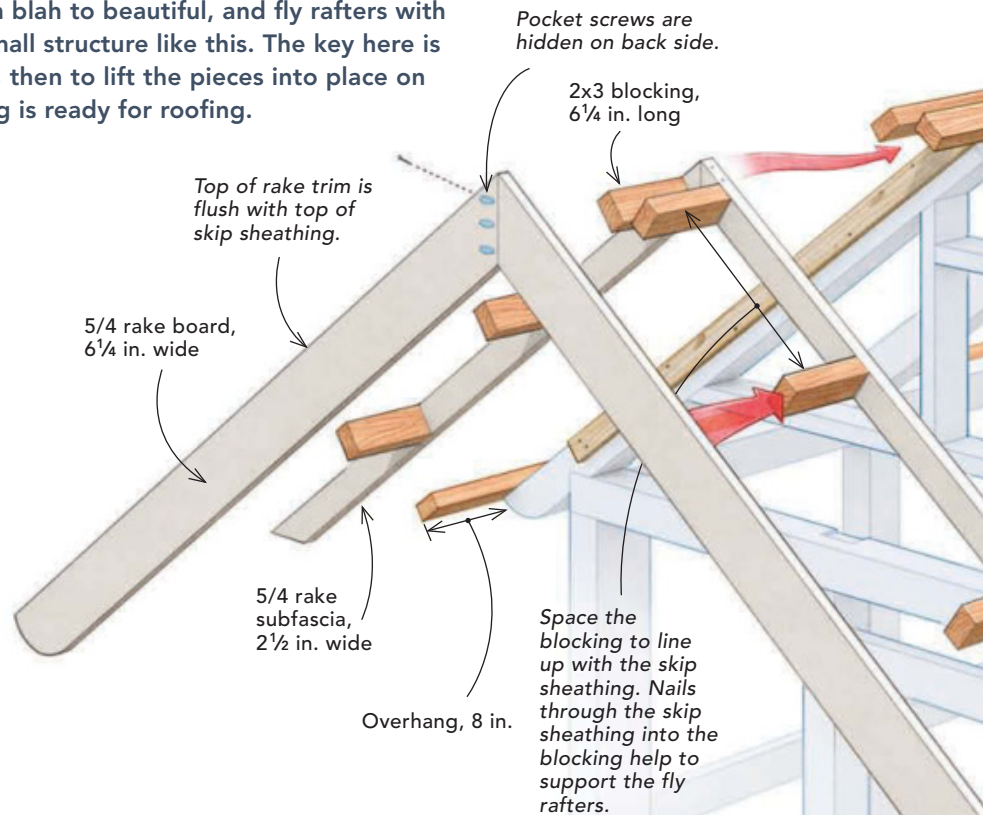


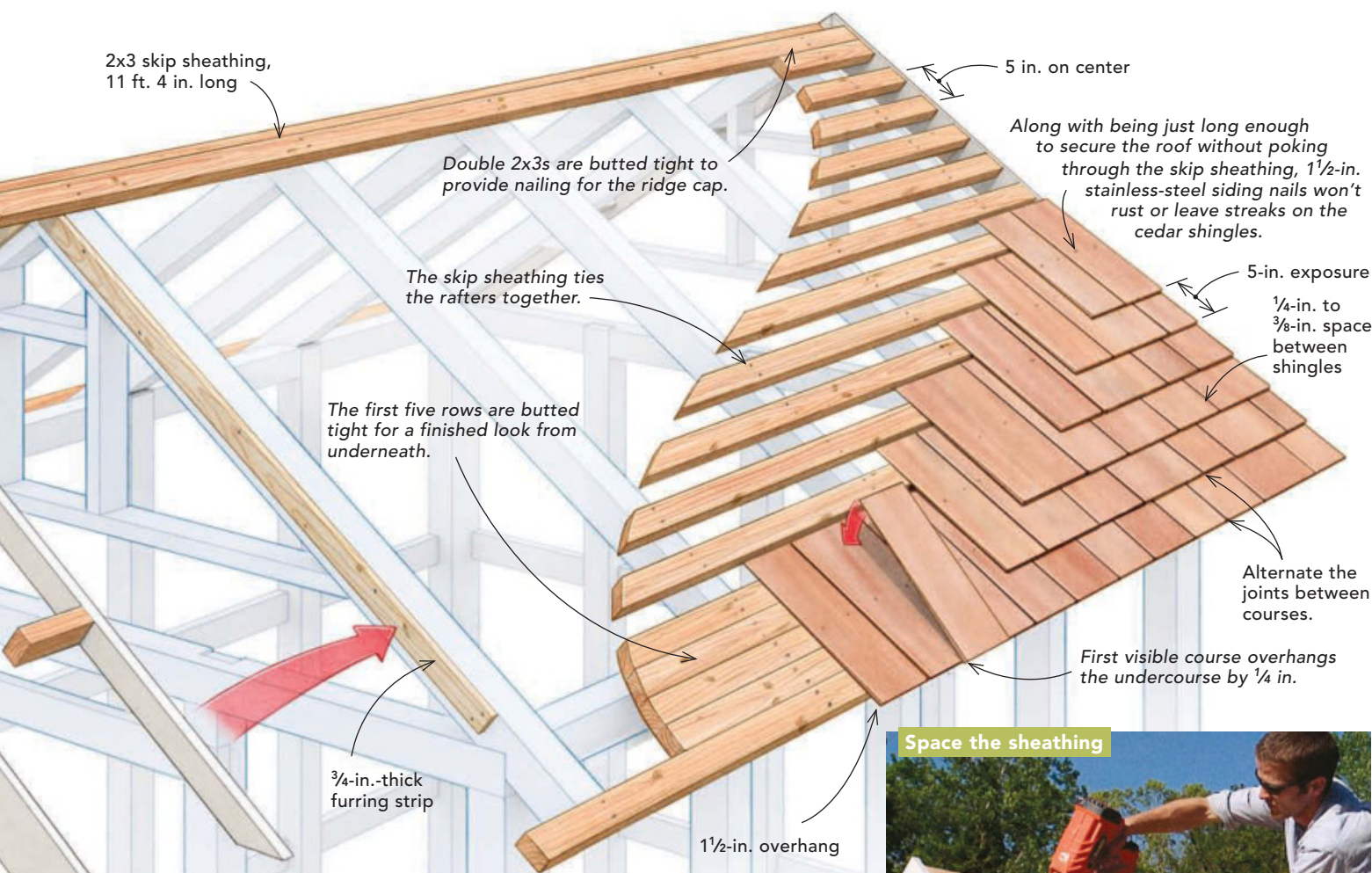
The rake trim will be the outermost part of the roofline, so use pocket screws on the back of the trim to pull the two halves of the miter together and to ensure they never open.

Install the rake trim



Nail the rake trim to the blocking and skip sheathing, keeping it flush with the top of the skip sheathing. Finish the lower ends of the rake with the same curve as the rafter tails.





DAY 5 CEDAR SHINGLES

Although it costs more and takes a bit of extra work to install, the cedar roof on this shed offers a big payoff. Not only is it one of the most fun parts of the project, but it also looks great and is durable.

Space the sheathing



The cedar shingles will be installed with a 5-in. exposure, so the 2x3 skip sheathing must be 5 in. on center. This seems fussy to lay out, but because 2x3s are actually 2 1/2 in. wide, you can use a cutoff as a spacer during layout.

Establish the overhang



Tack a 2x4 spacer and ledger to the rafter tails to establish the 1 1/2-in. overhang for the undercourse shingles. Once the undercourse shingles are in place, remove the spacer and ledger to make room for the first course of visible shingles, which will overhang the undercourse by an even 1/4 in.

Nail a course at a time



If you're not comfortable placing nails by eye, you can snap a chalkline or place a dry line between the two jigs to guide your nail placement and ensure that the following course will hide your fasteners by about 1 1/2 in. The string is also helpful on windy days to keep the shingles from blowing around.

DAY 6 POLYCARBONATE ROOF

In addition to being used to store garden tools, this shed can be used for starting seeds. To maximize the incoming sunlight, the south-facing portion of the roof is finished with clear polycarbonate roofing panels.

Support the roof panels



Polycarbonate panels don't need much support, so this side of the roof requires only two pieces of skip sheathing. Align them with the blocking in the fly rafters to help support the fly-rafter assemblies.

Cut to length



Clamp the corrugated roofing panels together, and cut them to length with a circular saw. To get clean cuts, the roofing manufacturer recommends mounting the sawblade backward. Cutting this material is very loud, so wear ear protection.

Fasten carefully



Don't overtighten the fasteners; overtightening can compress their rubber washers and limit panel movement. As with the cedar shingles, use a spacer and ledger to keep the overhang consistent.

2x3 skip sheathing centered over the fly-rafter blocking is all the support needed for the roof panels.

Ridge cap

3/4-in. overhang at eave

Drill for screws



While they're still stacked, mark the sheathing locations on the panels, and drill 1/4-in.-dia. pilot holes for the gasketed screws. Drill through the raised portion of the panels, not through the troughs, where water is more likely to seep in.

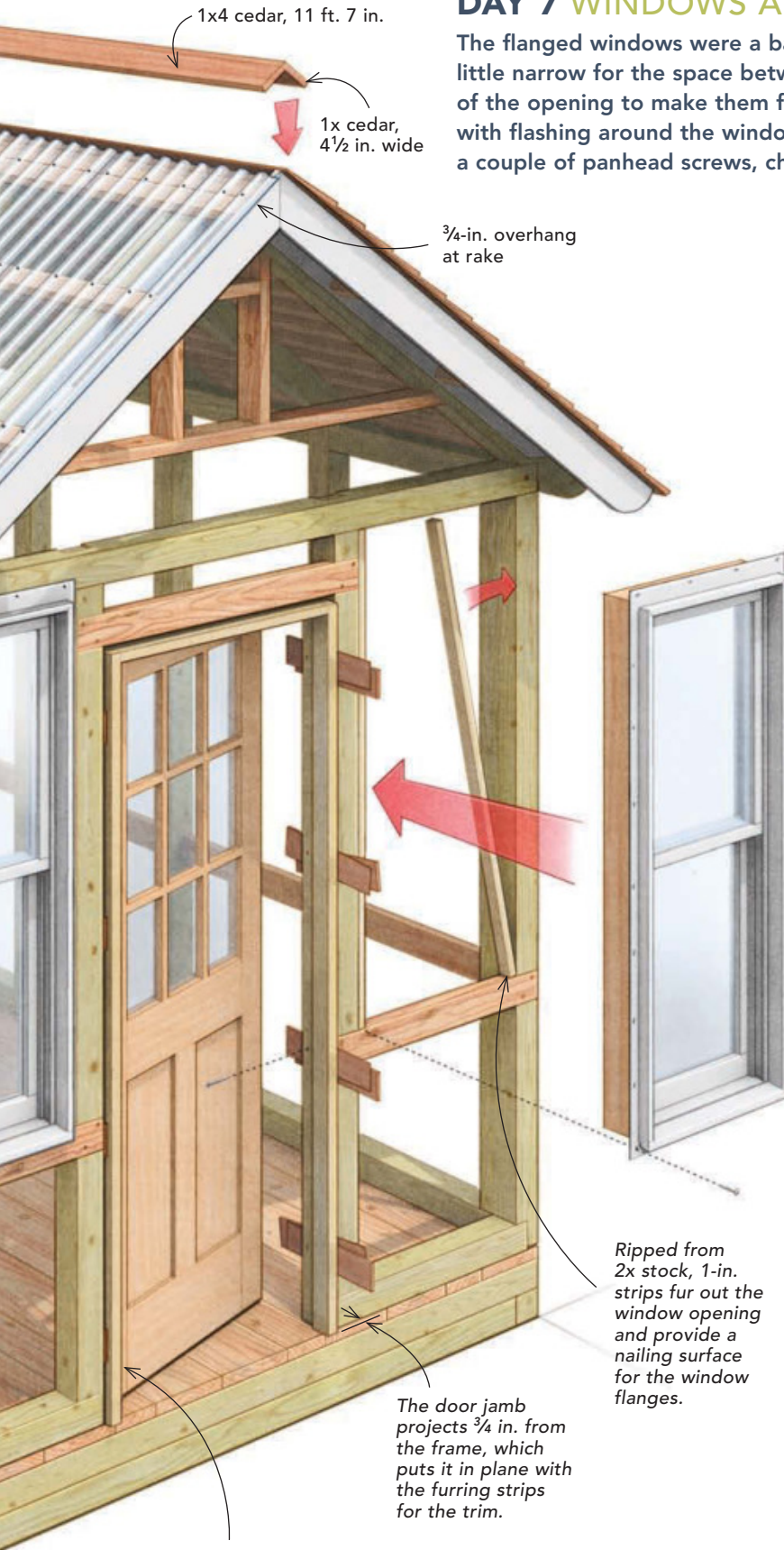
Overlap the seams



As you work across the roof, overlap the panels by one full trough. The last panel needs to be ripped to width for the proper overhang along the rake. Again, use a circular saw with the blade mounted backward.

DAY 7 WINDOWS AND DOOR

The flanged windows were a bargain-bin deal at a local lumberyard, but they were a little narrow for the space between the posts. The frame needed blocking on each side of the opening to make them fit. This shed has no weather barrier, so we didn't bother with flashing around the window flanges. Each window was simply fastened in place with a couple of panhead screws, checked for level and plumb, and then fastened securely.



Space the windows evenly



When placing multiple windows with trim in between, leave nice, even spaces between the windows so that you don't have to make tapered rip cuts to fit the trim. Establish the gap between the middle windows, then work to the outside.

Seal the bottom of the door



The door doesn't include a threshold because sealing against drafts isn't necessary and having no sill makes the shed easier to sweep out. Without a threshold, though, the bottom of the jamb legs and the door slab must be sealed with primer.

Plumb the door with shims



The solid-fir 9-lite door was fitted with a jamb kit prior to installation. Shims at the upper corners lock the door into position temporarily while allowing it to be adjusted for plumb.

Screw the door to the frame



The door jamb must be set out from the frame in line with the 3/4-in. furring strips that will back up the door trim. Once in position, the prehung unit is fastened to the frame with screws through both jamb sides.

DAY 8 LOWER TRIM AND SIDING

This shed has two different types of siding—clapboards on the lower half and board and batten on the upper half—and they aren't the same thickness. To keep the upper and lower halves of the siding and trim in plane with each other, add $\frac{3}{4}$ -in.-thick furring strips to the lower half of the shed before the trim and siding work begins.

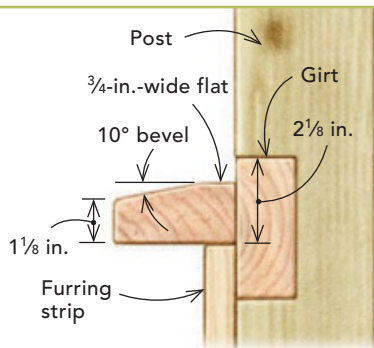


Pad out the lower trim

Furring strips are used to space the trim and siding on the lower half of the shed so that they're in the same plane as the board-and-batten siding on the upper half of the shed.

A chalkline guides the furring strips

Install the lower furring strips so that they start $2\frac{1}{8}$ in. from the top of the girt that runs around the entire building. This keeps the sill straight and provides solid nailing.



Furring strips are set $1\frac{1}{2}$ in. from the opening to provide nailing for the clapboards.



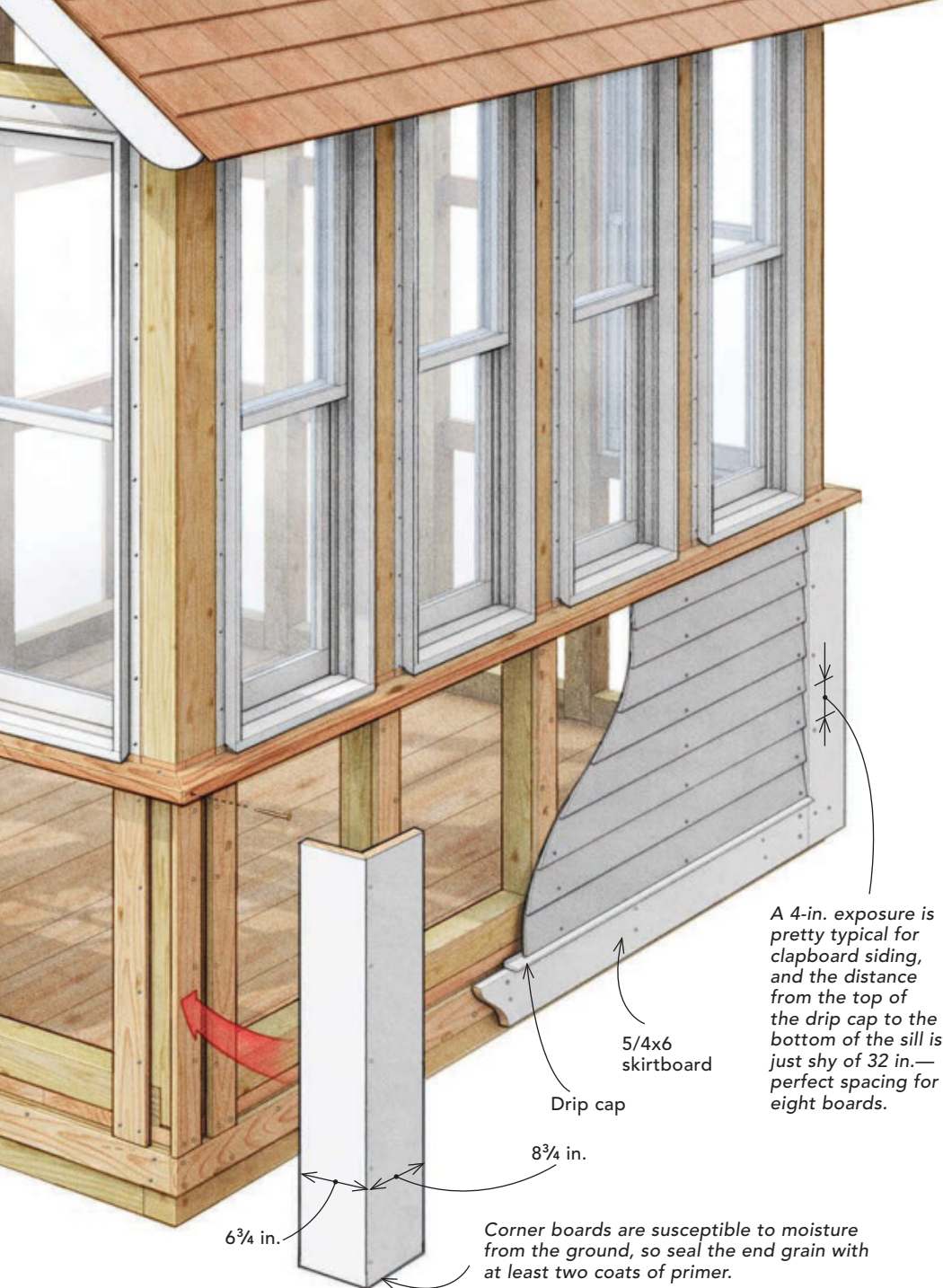
Nail the sill atop the furring

A continuous sill ripped and beveled from 2x stock rests on top of the furring strips, dividing the upper and lower siding and acting as a sill for the windows. Nails are driven through the top of the sill into the furring and the posts for a solid connection.



Lock down the corners

Lock the miters of the sill with a single exterior screw at each corner of the shed. This keeps the miters tight against seasonal movement.



Lay out the clapboards



The best way to keep siding in line from one side of the building to the next is to measure and mark the siding exposure on a story stick, then to use the stick to mark the siding exposure on the inside edges of each corner board. Make sure to account for the lip on the back of the drip cap when marking the height of the first course.

Flex them to fit



Cut the clapboards just a hair longer than the space between the corner boards so that you can spring them into place for a snug fit.

Nail 'em off



Prime all cuts, and fasten the clapboards with a single siding nail at each framing member. The top clapboard is ripped to 4 in. for an even exposure.

Assemble the cornerboards



Join the mitered edges of the corner boards with trim screws. Butt the assembly tight to the underside of the sill, and fasten it with ring-shank nails.

Cap the skirtboard



A wooden drip cap is fastened atop the skirtboard, helping to direct water from the trim and spacing out the bottom edge of the first course of clapboards.

DAY 9 UPPER TRIM AND SIDING

The board-and-batten siding on the upper half of the shed is a combination of primed 1x10 and 1x3 trim boards. The wide boards get fastened near the center; the edges, which are pinned down by the battens, are left to expand and contract with seasonal changes.

Start in the middle



For the board-and-batten siding on the gable ends, start with the center board and work your way out. Make sure to get the first board dead plumb. If it's not perfect, you'll fight the layout all the way across the wall.

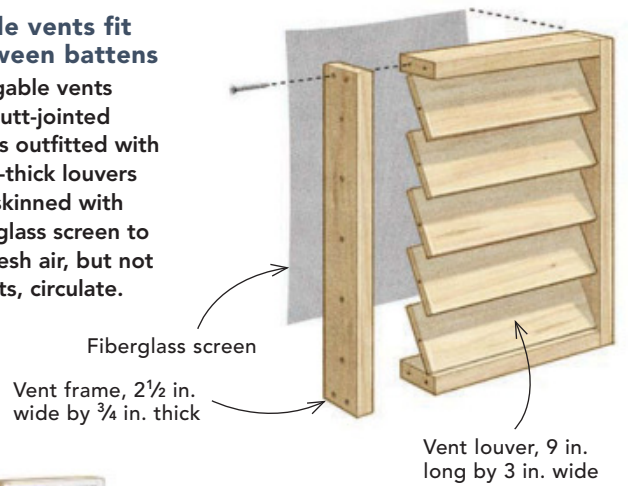
Use a spacer block



A spacer keeps the board layout consistent. A horizontal trim board will span above the door and windows, making it possible to use short boards on the gable.

Gable vents fit between battens

The gable vents are butt-jointed boxes outfitted with $\frac{3}{8}$ -in.-thick louvers and skinned with fiberglass screen to let fresh air, but not insects, circulate.



Gable vent, 10½ in. by 14¼ in.

The final piece of fly-rafter blocking goes in after the trim.

Furring strip

For the fascia above the windows, use a piece of 5/4 trim between the rafter tails, and then run a continuous piece below the rafters.

Furring strips around the windows ensure that the trim will be in plane with the fly rafters and slightly proud of the battens.

Mark the fascia in place



When fitting the fascia board around the rafter tails on the back of the shed, locate the notches by cutting the fascia board a little long, tacking it in place, and using a square and a pencil to mark the cuts right off the rafters. Once it's marked, pull the board back down and cut it with a jigsaw.



Cover the gaps



The job of the 1x3 battens is to hide the expansion gaps between the boards and to prevent the boards from cupping. Siding nails should go through the middle of the battens and into the framing.

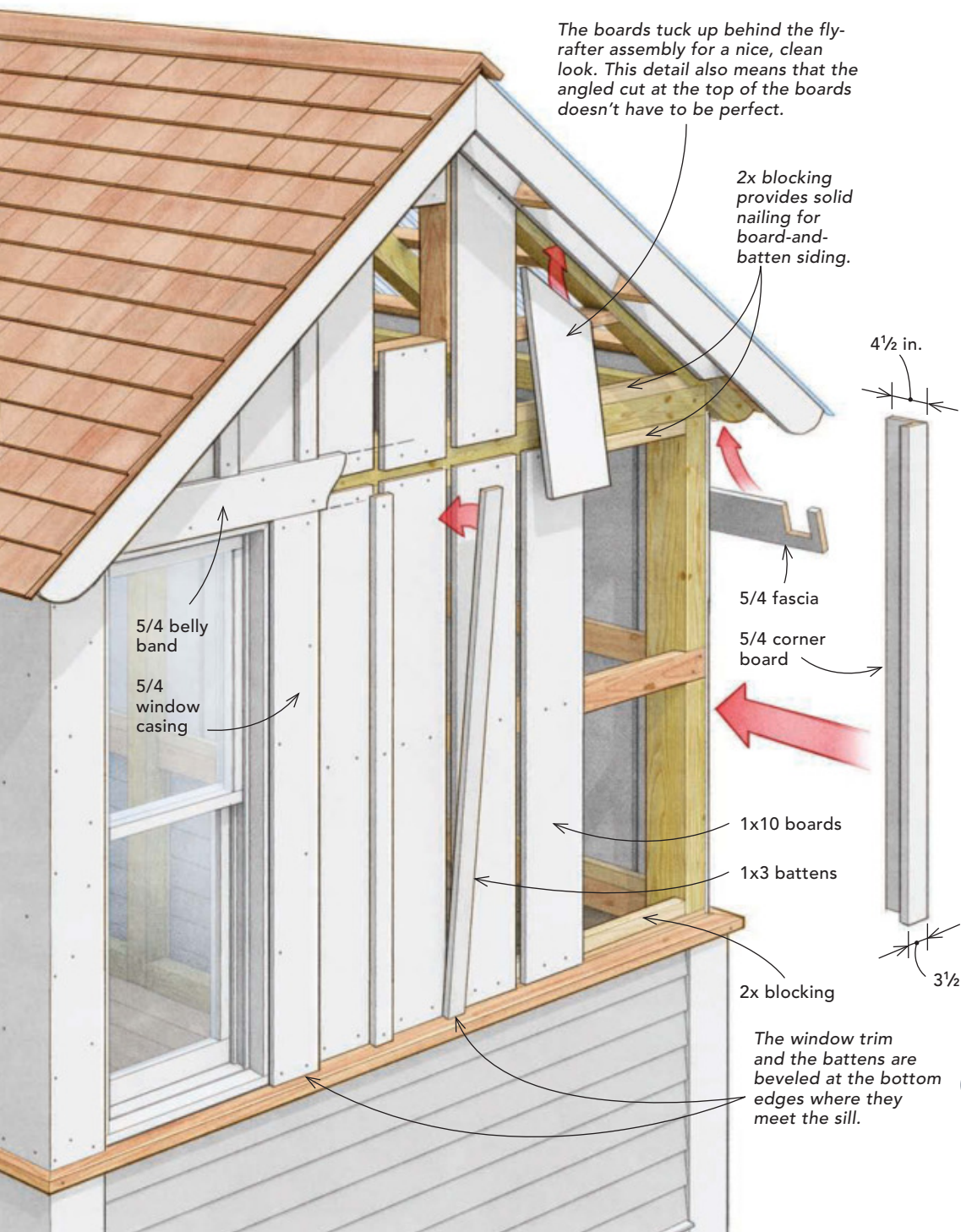
The boards tuck up behind the fly-rafter assembly for a nice, clean look. This detail also means that the angled cut at the top of the boards doesn't have to be perfect.

2x blocking provides solid nailing for board-and-batten siding.

Trim out the vents



The last step is to install the gable vents, which slide into place from inside the shed and get screwed to the frame. On the exterior, trim above and below the vents ties them into the battens for a clean look.



Explore the shed in SketchUp

Download a full-scale SketchUp model of this garden shed at FineHomebuilding.com/sheds.

Shortcuts to a Shed



One builder, one weekend. Balloon-framed gable ends, factory-primed siding panels, and a straightforward framing plan are a few of the features that streamline this shed's construction.

Time-saving tips about planning, materials, and construction that will help to get any outbuilding up in a hurry

BY RICK ARNOLD

I've always enjoyed projects that let me step back and see a completed, weathertight structure in just a short period of time. Building a shed like the one shown here is just this type of project. From foundation to roof, it involves nearly all the framing components of a house, yet it can be completed by just one person in a weekend.

When homeowners hire me to build a shed, it's usually because they want it to match their house. The materials that are used to build a shed from scratch typically cost only about half of what you'd pay for a shed made in a factory and trucked to your site. Also, a custom

shed that matches the house enhances the property value rather than detracts from it.

Smart framing saves time and materials

I give myself a couple of days to build a shed like this, but careful planning is key. First, I write down all the measurements, then create a cutlist. From the cutlist, I make a buy list that I can give to the lumberyard for a materials delivery.

To save time and money, I design the shed's framing so that there's a direct load path from rafter to stud to floor joist. For the floor, I

A FAST FOUNDATION SUPPORTS BASIC FRAMING

Don't bother with stakes, strings, or batterboards. I nail together the rim of the floor frame, roughly square it, and use it as a guide to locate four holes for my PVC-based pier foundation (sidebar right). I center the holes about 1 ft. from each end of the frame. After I dig a small patch at each hole location, I slide the frame out of the way to dig the holes and to level the piers.



PVC piers are easy to level. Fit all four PVC piers in their bases, and set them in their holes. After cutting the first one a few inches above grade, I level across to mark the cutlines on the other three.



Beams eliminate the need for joist hangers. I let the side rim joists overlap each double 2x6 beam. This creates a ledge inside the rim that supports all the joists. I toenail the rim and joists to the beam for a solid connection.

Plastic piers save time

I used to dread the grunt work of hauling cinder blocks, gravel, and maybe even wet concrete for a shed foundation. Six years ago, eager to find an alternative, I tried the RediFooting. Designed to exploit the strength and durability of schedule-40 PVC pipe, these piers require no concrete or cinder blocks, and can handle a load of 10,000 lb. as soon as the hole is backfilled.

Setting the piers is simple. Once the holes are dug, I drop in each RediFooting base with a length of PVC pipe attached. I establish a level line for all the piers, cut the schedule-40 pipe to length, then set each base, pipe, and cap assembly in its hole. The cap accepts a 3½-in.-thick beam. I finish by tamping the backfill. A Redi-Footing (cap and base pieces) costs \$33.



THE FLOOR DECK IS A PERFECT PLATFORM FOR WALL FRAMING



A big blade chops studs with a single cut. Replacing my worm-drive saw's standard blade and housing assembly with a Big Foot version lets me cut with a 10¼-in.-dia. blade. I gang the sidewall studs together, square the ends, and cut them to the same length in a single pass. A Big Foot attachment costs about \$240.

Sheathe and side in one step. LP's SmartSide panels are ¾-in.-thick OSB, but have a simulated cedar-channel exterior texture. The factory-applied primer can be left unpainted for up to 120 days. Edges are designed to lap over studs (inset photo) for an easy, weathertight installation. A 4x8 panel costs about \$35.



Let the walls lean out and the siding hang down. Once the wall is up, I brace it leaning out so that I can easily build and stand the gable walls on the floor deck. The 7-ft.-5-in. wall height allows the siding to hang down past the floor framing and act as a drip edge.



Fine-tune the wall placement with the holding nail. Before I build the wall, I snap a layout line 3½ in. in from the edge of the floor and toenail the bottom plate to the inside. When I stand the wall, the nails keep the wall from sliding off the floor. Once the wall is up, I can move the wall back to the line by bending the nail with a hammer.

use beams to support the rim and the floor joists instead of supporting the joists with joist hangers connected to the rim.

I lay out the joist locations 16 in. on center and use the same layout for the studs and the rafters. I use only one wall top plate because the roof load is transferred directly from the rafters to the studs.

Finally, the gable-end walls are framed so that the top plate is at the same height as the top of the rafters to support the roof sheathing. This saves me the expense of four rafters and also the time required to cut and install them.

Material choices make a difference

For this shed, I used PVC for all of the trim. This matched the house and also saved me the time of prepping and painting. I gave the shed a steeply pitched roof that matches the house while also adding overhead storage space.

I like LP's SmartSide panels for shed-wall sheathing. These oriented-strand-board (OSB) panels come with exterior primer already applied and a cedar-channel pattern on the outside face, so they can serve as finished siding. However, I build out the rake trim ¾ in. so that in the future, I can easily install the sidewall shingles to match the house.

A few years ago, I discovered RediFooting, a pier foundation that uses commonly available schedule-40 PVC pipe in place of poured concrete (sidebar p. 29).

Shed foundations are always a balancing act. It's tempting to provide the bare minimum because frankly, it's only a shed. In my mind, the bare minimum is a pressure-treated floor system

BALLOON-FRAMING THE GABLE WALLS WON'T SLOW YOU DOWN

laid directly on cinder blocks set on grade.

Although I like to have something a little more substantial, poured-concrete piers that are set below the frost line seem like overkill for a small shed. Generally, unless otherwise specified, I will excavate below the topsoil and, if the ground is not gravel, provide a 4-in. bed of gravel to keep the foundation drained.

Weatherizing an unheated structure is simple

A shed doesn't have the same complex weatherization considerations as a house, but water still needs to be kept out. For the roof, I use $\frac{1}{2}$ -in. AdvanTech OSB sheathing because it doesn't swell with moisture. For this shed, I used a long-lasting architectural shingle left over from roofing the house. The eave detail keeps rain off the siding.

The height of the shed is designed to keep water out as well. I cut the studs so that 8-ft.-tall sheathing panels will hang about $\frac{1}{2}$ in. below the bottom of the floor joists of a 7-ft.-5-in.-tall wall. This creates a drip edge that helps to keep the joists dry. I coat the first inch of the inside edge of the panel with wood preservative because it will be exposed below the floor joist.

I spend extra for AdvanTech $\frac{5}{8}$ -in. tongue-and-groove sheathing for the subfloor to give it a little extra stiffness, and I coat the underside with preservative. Because the underside of the shed is exposed, I use pressure-treated lumber for the support beams and floor joists.

Make roof framing easier with a calculator

For a structure this small, you could do a reasonable job of working out the rafter pattern by



Gang-cut the gable-wall studs. I don't mess around with marking and cutting each board separately. I mark and cut the bevel angle on all the studs at once using the diagonal function on the construction calculator. Then I rearrange the studs, using the calculator's rake-wall function to determine the difference in length from one stud to the next. That enables me to gang-cut them again with the bottoms aligned.

Screw the center stud, but nail the rest. I have to remove the top 7 $\frac{1}{2}$ in. of the center stud later to support the 2x8 ridge board. Before I assemble the wall, I cut halfway through the stud from the back to make it easier to remove. The rest of the studs are nailed to the top plate with 16d nails.



Well-thought-out design details keep things moving. The back wall goes up first to get it out of the way. For the front wall, I use the existing layout where I can. For example, the center stud becomes part of the door's rough opening. I use an existing stud on layout for the window as well.

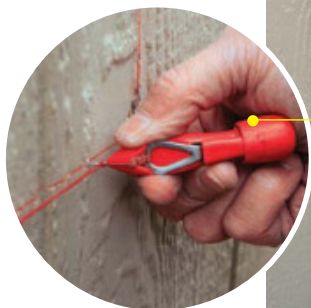
FINISH THE SHEATHING WITHOUT TOUCHING A TAPE

measuring from point to point and pulling a stringline in a couple of places. But even for a job this small, I prefer using a construction calculator because it saves time, head-scratching, and wasted material. I use the Construction Master Pro. It costs about \$80 and is extremely powerful, yet simple and straightforward to use.

On this shed, I brought the top ends of each gable wall up flush with the top edges of the rafters. To figure the length of the rake-wall studs, I started with the length of a sidewall stud. Then I adjusted for the thickness of the top plate set to the roof pitch ($1\frac{5}{16}$ in. instead of $1\frac{1}{2}$ in.). Next, I added the rafter's height above plate measured from the inside face of the wall. The result was the length of the first gable-wall stud to the short point. To get the length of each consecutive stud along the rake wall, I entered the rake angle, which is the same as the roof pitch, and the run, which is the distance from the first rake-wall stud to the center stud. Pushing the rake-wall function provides the correct lengths.

I also can use the calculator to find the length of the rafters and the location of the bird's-mouth and tail cuts. □

Longtime builder Rick Arnold lives in Rhode Island. Photos by John Ross, except where noted.



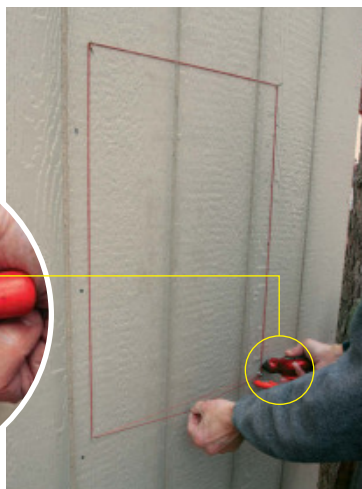
Factory edges align panel.

With a horizontal ledger tacked $\frac{1}{2}$ in. below the floor joist, I can tilt the panel in place and check the wall for square at the corner. Once satisfied, I nail the panel using the channels to help me eyeball the stud location.



Mark but don't measure the gable end.

I could work out this rake cut on the calculator, but in this instance, it's more efficient to hold the panel in place to mark the cutline. If I'm lucky, I can cut one side and have a big enough piece left for the other side.



Mark and cut window and door openings.

From the inside, I drive a 10d nail through the sheathing at each corner of the opening. From the outside, I stretch a stringline around the perimeter of the nail points, then snap the lines to guide where I cut through the sheathing with a circular saw. Where I would normally drive a nail or ask a helper to hold the end of the chalkline, I can push in the needle point of a Rocket Anchor (\$20, see inset photo) and have a free hand to snap the string.



TRIM THE RAKE FIRST; THEN INSTALL THE FASCIA AFTER THE ROOF FRAMING

Framing and trim go on together. After I establish solid staging, I build out the gable-end rake trim to $\frac{3}{4}$ in. proud of the sheathing. This provides space for siding to tuck behind the trim if it's added later. I let the bottom end run wild and cut it later to fit the fascia board.



To see how Rick Arnold uses a construction calculator to figure out rafters and rake walls for this shed, visit FineHomebuilding.com/sheds.



Create a pocket for the ridge. At the top of the center stud, I finish the plunge cut that I started before I assembled the wall. Once the cut is complete, I remove the two screws holding the top plate to the center stud, remove the piece, and drop the ridge board into place.



Locate the fascia with a straightedge. I hold my Speed Square on top of the rafter and butt the top edge of the fascia against the square before nailing it fast. This ensures that the roof sheathing is not pushed up where it meets the fascia.



Cut the rake trim flush with the fascia. Once I've secured the rake trim to the fascia with a couple of trim nails, I use the edge of the fascia to guide the plumb cut on the rake trim. Then I make a horizontal cut even with the bottom of the fascia.



Use a level to scribe the rake return quickly. I tack a short piece of trim in place along the rake, then scribe the vertical and horizontal cuts.

A man in a white long-sleeved shirt and tan pants is standing on a green step ladder, working on the roof of a wooden pergola. He is using a yellow power drill to secure a wooden beam. The pergola is made of light-colored wood and has a series of horizontal beams forming the roof. It is situated in a backyard with a house in the background and trees. The ground is covered with gravel.

Build a Gateway Pergola

This cedar structure combines the look of traditional joinery with contemporary lines—all built with simple techniques

BY JUSTIN FINK

When my friend Brian started talking about building an outdoor structure to create a threshold between his short gravel parking area and the front yard of his house, it was clear that a large pergola would be the ideal solution. Set atop a timber retaining wall and flanked by plantings, the pergola would create an informal, open gateway.

But, like any other widely available, mass-produced outdoor structure, store-bought pergolas suffer from inelegant designs, subpar materials, and haphazard assembly methods that place a high value on convenience at the expense of durability. I knew we could do

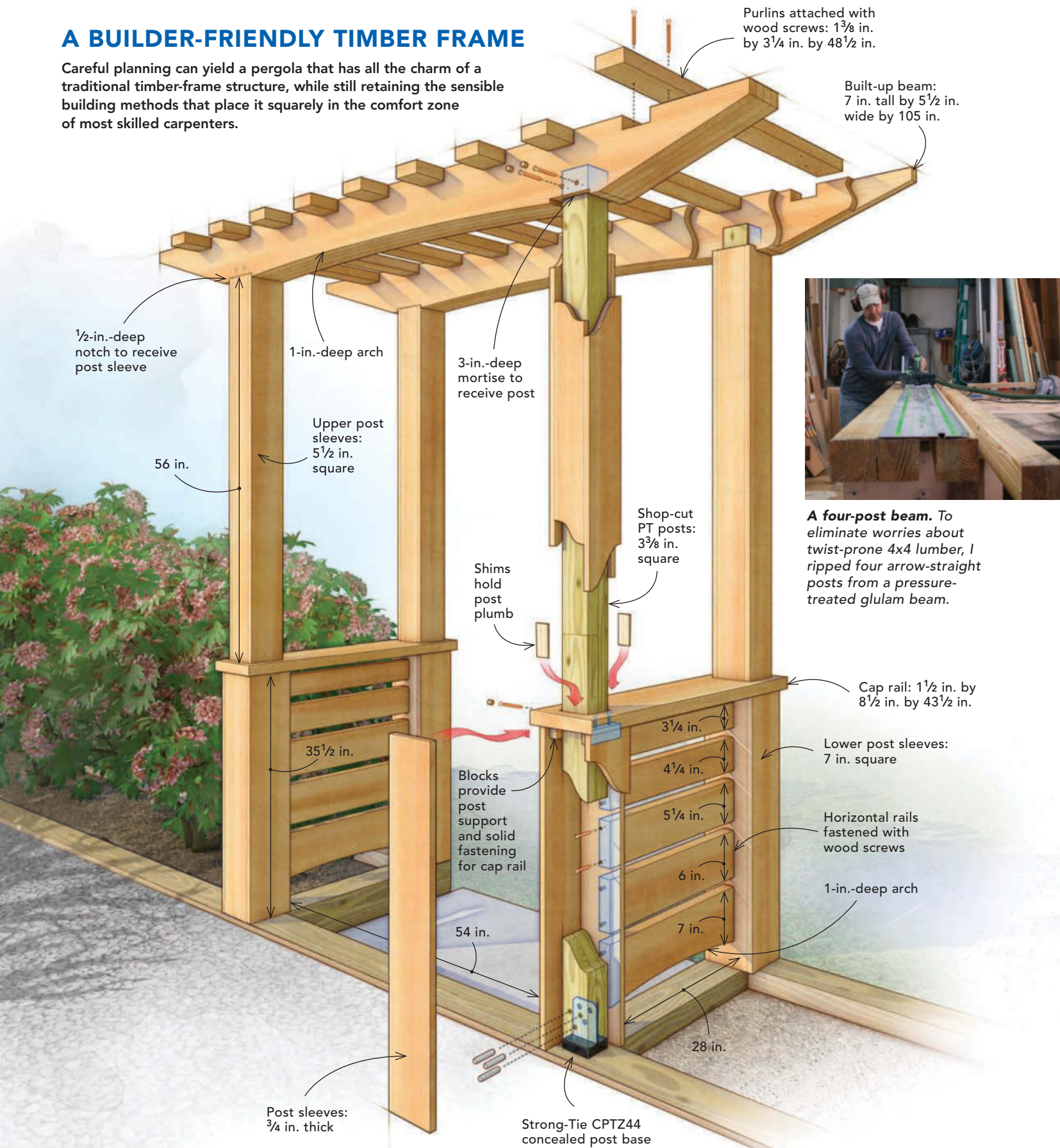
better, so we set out to design a custom alternative. The design we came up with reflects Brian's contemporary, Asian-inspired taste, and could be built by anybody, regardless of whether they have access to the large timbers or specialized tools needed to erect a true timber-frame structure.

Start with a style in mind

The pergola would become the first thing seen and passed through on the way to the house, so it needed to mesh with the architectural style of the home, which had been remodeled to have a somewhat contem-

A BUILDER-FRIENDLY TIMBER FRAME

Careful planning can yield a pergola that has all the charm of a traditional timber-frame structure, while still retaining the sensible building methods that place it squarely in the comfort zone of most skilled carpenters.



A four-post beam. To eliminate worries about twist-prone 4x4 lumber, I ripped four arrow-straight posts from a pressure-treated glulam beam.

Explore the pergola in SketchUp
Download a full-scale SketchUp model of this pergola at FineHomebuilding.com/sheds.



BUILT-UP BEAMS

Unlike solid 6x8 cedar, shop-laminated cedar beams allow the individual plies to be cut and curved without a large bandsaw or timber-framing tools.



The curve comes first. After aligning the 1/4-in. plywood router template to the top edge and centerpoint of the 2x beam ply, mark the curve and cut wide of the line with a jigsaw.



Tapers with a track saw. With the curve marked, lay out the rest of the beam with a framing square before cutting the tapers on either end of each ply with a track-guided circular saw.



Blunt the beam ends. After cutting all the tapers, remove the point of each beam ply. These cuts don't have to be exact, as they'll get cleaned up after the plies have been laminated.



Bearing-guided cleanup. After rough-cutting each 2x, realign and attach the template with double-stick carpet tape, then set the depth of a spiral-cutting, bearing-guided router bit to ride on the edge of the 1/4-in. plywood.



To see a video on how to quickly make this simple curved template, visit FineHomebuilding.com/sheds.

porary exterior—lap siding mixed with vertical siding, paint mixed with natural wood, and several levels of landscaping, hardscaping, and attached structures. The look leans towards an Asian aesthetic, which also happens to be the basis of the Arts and Crafts style. So, it made sense to build on this concept by including the look of traditional mortise-and-tenon joinery and clean, square edges. The contemporary feel came into play with the incorporation of some Asian design elements—subtle curves, recessed purlins, and crisp horizontal lines—which became a good opportunity to deal with crucial issues of

proportion. Because the space demanded a fairly large structure, we worked hard to keep it looking well-rooted with a sleek, airy feel for the upper portion, flowing down to a substantial base.

Materials and methods that make sense

A conventional solution for building a post-and-beam-style pergola like this one would be to use—you guessed it—solid wood posts and beams. But solid timbers require traditional joinery, and that means lots of time spent on mortises. This wouldn't be a deal breaker on



Rip the remainder. Set the tablesaw fence to a 7-in. rip cut to trim the excess from the bottom of each beam ply, creating flat spots where the posts will later meet each assembled beam.



Don't be shy with the glue. Spread a thick coat of exterior wood glue—as much for sealing the wood between pieces as it is for adhering them—across both mating surfaces before joining the pieces and securing them with screws every 4 in. around the perimeter.



Clamps assemble pairs. After the glue holding each pair of plies has set, back out the screws used to clamp the pieces, then glue and clamp pairs together with screw holes facing inward where they will not be seen.



Sand and shape. Don't fuss over perfect alignment during glue-up. Use 10 minutes and some 80-grit sandpaper for the inevitable task of blending and smoothing seams.

a simple four-post, two-beam pergola, but our design included five horizontal rails that would need to be mortised between pairs of posts, upper posts of different dimensions than the lower posts, and a wide cap rail on each side that would have to tie into the posts with through-mortises.

Although it didn't offer much cost savings (cedar is expensive no matter how you slice it), I set aside the idea of solid posts and beams and instead opted to laminate more commonly available 2x cedar to create the top beams, which I then set atop pressure-treated posts

wrapped in 1x cedar. This approach allowed me to install the rails faster, eliminated worries about tying the cap rails into the posts, simplified the required tools and the process of shaping the curved beams, and gave me complete control over the apparent width of the posts, which could now run uninterrupted from base to beam.

Choosing a material for the structural posts was a challenge, though. Any builder who has worked with pressure-treated 4x4s knows they are prone to twisting, and that movement would wreak havoc on this assembly. In an effort to find a stable, rot-resistant, affordable solu-

TIMBER-FRAME-STYLE JOINERY

With the help of some common power tools, you can add the feel of timber-frame joinery to the beams without too much traditional fuss.



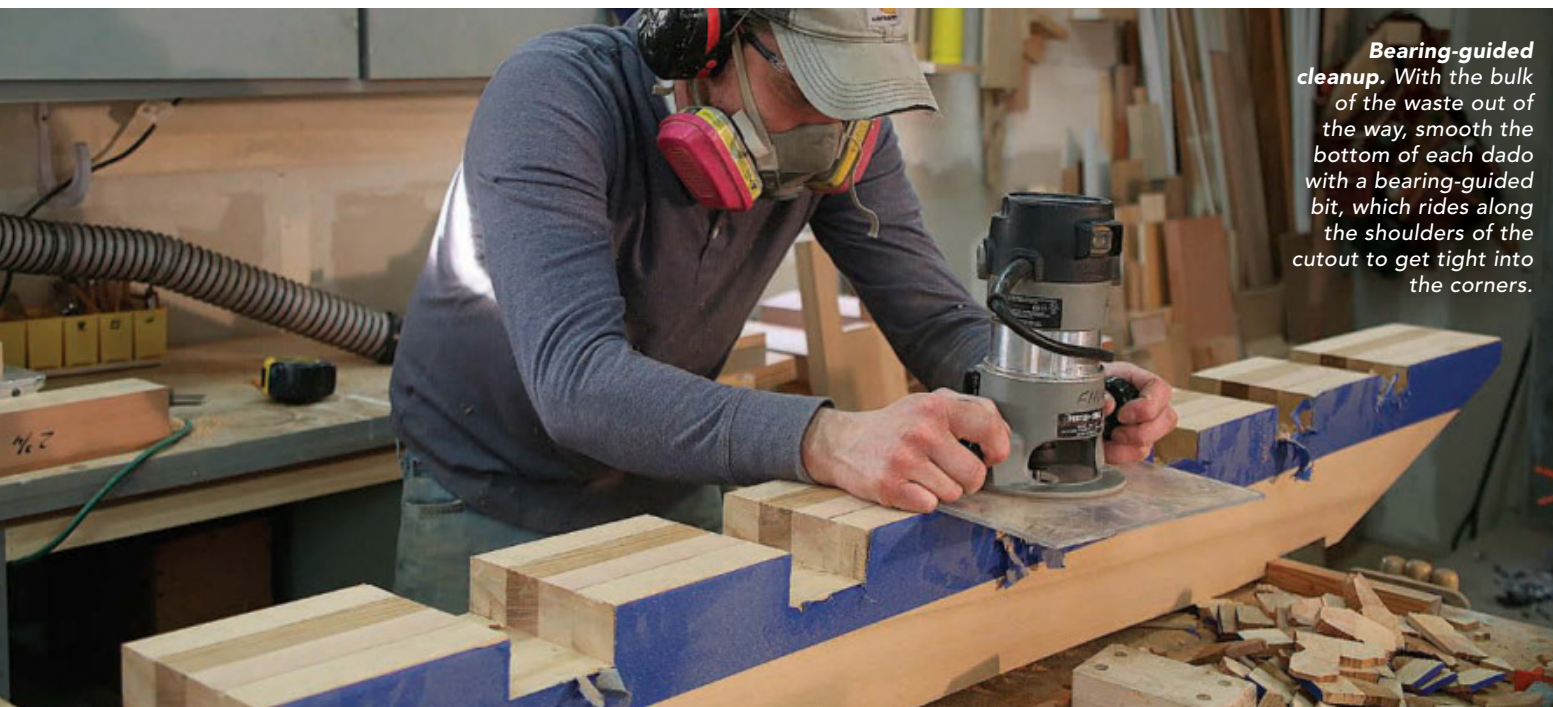
Notches for post sleeves. Use a simple router template to guide a router collet and mortising bit, creating notches where the upper post sleeves will attach to the beams.



Forstner followed by a chisel. The fastest low-tech method for making deep mortises is to drill holes with a Forstner-style drill bit, then remove the waste with a chisel and mallet.



A dado for each purlin. After taping each side of the beam to prevent tearout, make a series of parallel circular-saw cuts to rough out a dado for each purlin, which are then quick and easy to knock free with a hammer or bend and break with a chisel or pry bar.



Bearing-guided cleanup. With the bulk of the waste out of the way, smooth the bottom of each dado with a bearing-guided bit, which rides along the shoulders of the cutout to get tight into the corners.

tion, I ordered a pressure-treated glulam beam from my lumberyard, which I then ripped into four arrow-straight posts that would be far less likely to twist.

The posts would be secured to the timber retaining wall via 4x4 post bases, but in order to ease this process I chose Simpson Strong-Tie CPT44Z concealed post bases that use metal through-pins installed from one side rather than the traditional post bases that require nails or screws driven from two sides. This meant I could assemble most of the wrapped posts in the shop—leaving just one side off each post—

and I would still have all the access I'd need for securing the posts to the post bases.

Prefabrication and prep work

The tools required for building this pergola aren't exotic, so there's no reason the whole job can't be done right on-site if desired. Personally, anytime I have the option to build a project in the shop versus doing the work on-site, I choose the shop. Having my tools organized and close at hand means a faster, more efficient workflow. In this case it

HOLLOW ASSEMBLY CREATES A SUBSTANTIAL BASE

To beef up the appearance of the structural 4x4 shop-cut posts, I used wide, hollow post sleeves infilled with wide horizontal rails and a substantial cap rail.



Three-sided sleeves. Start the lower half of each side of the pergola by assembling the butt-jointed post sleeves, which are left open on one side to allow access to attach the rails and, later, to secure the hidden 4x4 posts to their bases.



Keep the rails simple. Drive a pair of screws through the post sleeves into the end grain of each horizontal rail to hold them tight, in line, and on layout, ensuring their position with a spacer board under the rails and a 1 $\frac{1}{4}$ -in. spacer block between each end.



Make way for the posts. Drill a $\frac{1}{2}$ -in. hole on either side of the cap rail to provide access for a jigsaw to make each square post-hole cutout without resorting to an awkward plunge cut.

Fasten the cap. After adding blocks to hold the posts steady in the oversize sleeves and to provide fastening for the cap-rail screws, add a spacer to ensure the open side of the sleeves are held to the right width before fastening from above where the screws will be hidden by the upper post sleeves.



was an added convenience, as I prefabricated as much of the pergola as I could on cold late-winter days in anticipation of an only slightly warmer early-spring installation.

The goal was to leave the shop with subassemblies of parts that could then be put together in place. I started with the top beams, which were the most labor-intensive part of the build. I laminated each of the two beams from four 2x8s that I individually rough-cut and then curved with a template-guided router before joining them together with a healthy coating of waterproof exterior wood glue.

Once the beams were glued up, I did the fit and finish work, including thoroughly sanding with both 80-grit and 100-grit sandpaper and creating pockets for post sleeves and mortises for the posts themselves as well as dadoes across the top of the beams to receive the purlins.

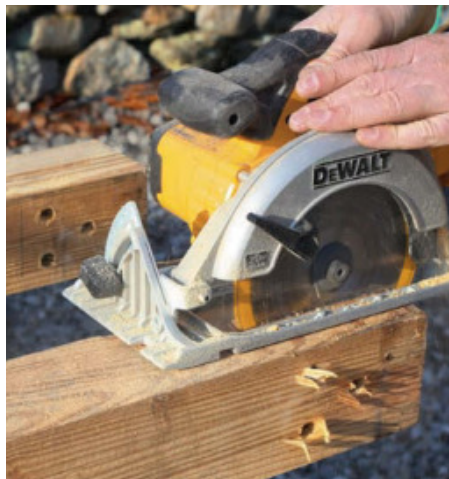
Everything below the beams and purlins can be broken down into a pair of lower halves and a pair of upper halves. The lower halves consist of wide post sleeves and horizontal rails, which are crowned with a hefty cap rail with jigsaw-cut square holes. These square holes allow the shop-cut 4x4 posts to slide into the lower assemblies and be

PREFAB PARTS ASSEMBLE EASILY ON-SITE

If the shop portion goes as planned, you can arrive on-site with two nearly complete lower assemblies, four posts and upper sleeves, two beams, a stack of purlins, and a fairly straightforward half-day of work.



Convenient template. Clamp the CPT44Z post-base bracket to the post, using it as a template for boring the holes to receive the metal pins.



Easy kerfs. Make parallel passes with a circular saw on both sides of the post to create the $\frac{3}{16}$ -in. kerf necessary to receive the vertical fin of the base bracket.



Set the bases. Pan-head structural screws provide a quick connection between the post base and the timber retaining wall.



Pins for the win. Unlike conventional post bases, these allow the posts to be fastened from one side, so the lower assembly can already be in place.



Shim it plumb. Using a long level, plumb each post in both directions and hold them in place with shims. Cut the shims flush to prevent interference with the upper post sleeves.

attached to the post bases once on-site. Then the upper post sleeves can be slid onto the posts before the beams are installed.

The on-site assembly work started with locating and setting the concealed post bases, being sure to orient each so that when the lower assemblies were later dropped into place there would be access for driving the metal pins through each post before fastening the final piece of cedar on the lower sleeve. With the lower assemblies and posts located and locked into their plumb positions, it was a matter of

hefting the beams up and onto the post tops, where structural screws make the permanent connection. The last step was to drop the purlins into their dados.

We chose to let the cedar fade to a natural gray, but a penetrating oil would also be a suitable, relatively low-maintenance finish. □

Justin Fink is editorial director. Photos by Brian Pontolilo, except where noted.



Sealed connection. After masking off the surrounding cap rail, apply a bead of marine adhesive sealant, then slide the upper post sleeve into place and tack it with finish nails.



Finish the base. Coat the edges of each remaining post sleeve, slide them into place, and fasten with finish nails.



Beams drop on. Apply sealant to the top of each post sleeve, then lower the beams into place and fasten them to the posts, bunging the holes for a clean, finished look.



Purlins come last. Tap each purlin into place and fasten with exterior wood screws, which are then covered with a smear of adhesive to protect against pooling water.

A Small, Stylish Shed

Durable materials make this toolshed as long-lasting as it is attractive

BY JOHN MICHAEL DAVIS

When my clients asked me to design a small outdoor storage shed for their potting equipment, I saw it as a fun project that would be complicated only by New Orleans's balmy, wood-attacking climate. To keep their little shed from succumbing to the elements, I used a series of techniques I've developed in my 30 years as a New Orleans restoration carpenter.

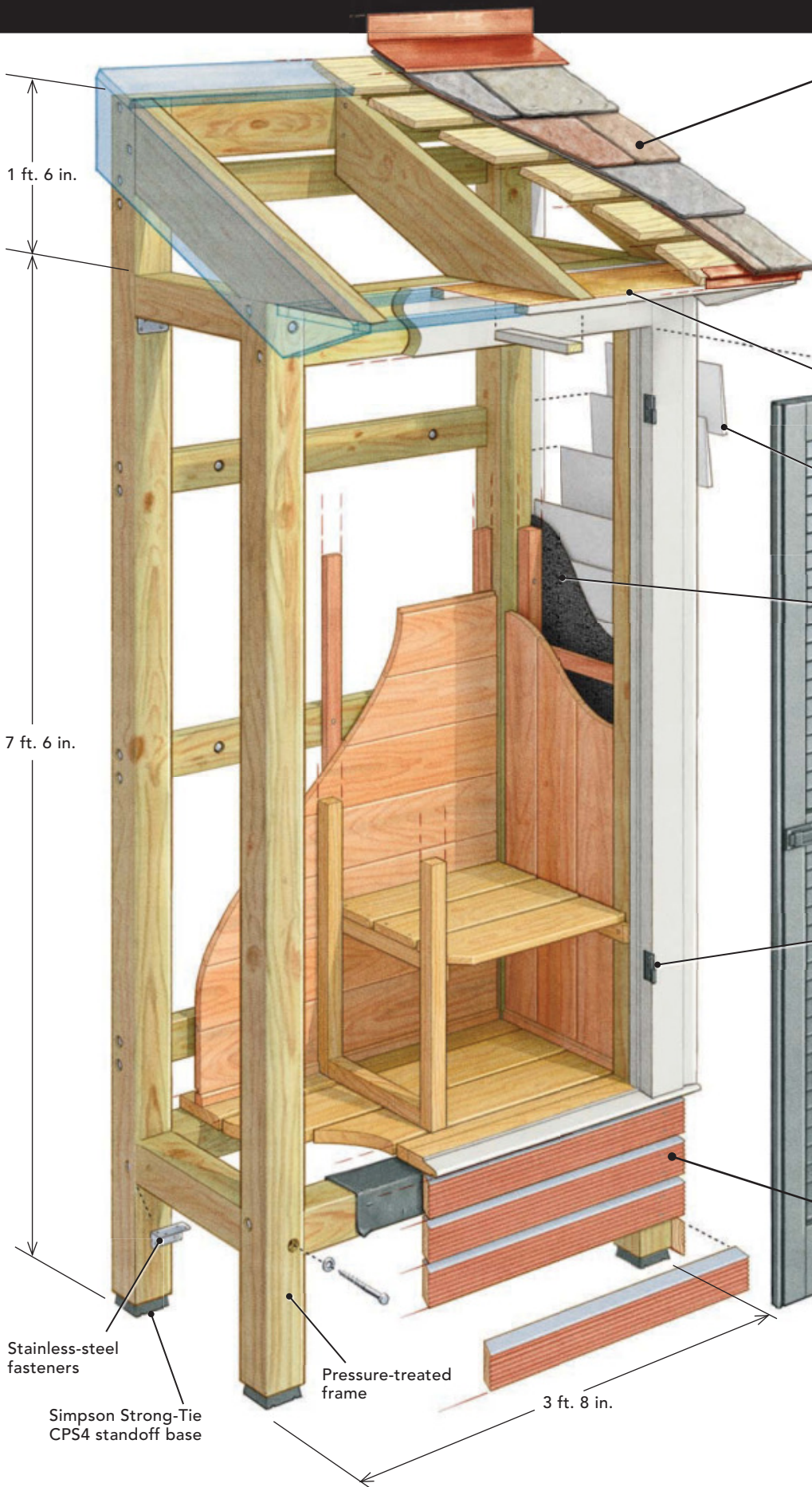
The first line of defense is a sturdy frame built with pressure-treated stock that has a 0.60 retention level. Most folks don't realize it, but pressure-treated lumber is available in treatment levels from 0.15 to 0.60. The numbers translate to the amount of treatment chemical (in pounds) per cubic foot of lumber. Higher numbers mean more resistance to insects and decay.

Stainless-steel fasteners are used throughout, and Enkamat drainage mats between the frame and the siding prevent rot and mold from getting a foothold. I capped the little structure with slate roofing I bought from a salvage dealer. Louvered doors and bronze screening over a pair of soffit vents provide lots of ventilation, which prevents the objects inside from mildewing.

My clients wanted a small shed, but you could easily adapt the design to match the scale of your outdoor living space. Unless you're willing to spend several hundred dollars for custom shutters, I'd start the design process with stock shutters or louvered doors. □

John Michael Davis is a restoration carpenter in New Orleans. Photos by the author.





Salvaged slate caps the roof. To match the main residence, the shed sports slate roofing bought from an architectural salvage dealer. A space between the slate and the copper flashing adds ventilation.

Bronze screening

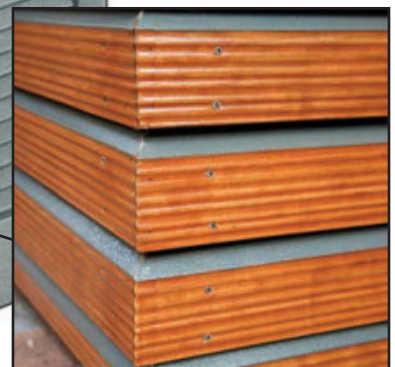
Cypress siding

Enkammat

Louvered shutters

Powder-coated slide bolt

Powder-coated hinges



Inspired by brick. The Spanish-cedar skirting is textured with a router-made, beaded profile so that it better matches the house's brick foundation. Gray paint between courses mimics mortar.

Simple Shaker

Modest, functional, and at home in any backyard, this traditional gable outbuilding is a reminder that some designs never go out of style

BY JUSTIN FINK AND MATTHEW MILLHAM

We're big fans of the beauty and simplicity of Shaker-style furniture and buildings, so when a client approached us wanting to build a small backyard workshop inspired by one of the outbuildings at Hancock Shaker Village in Massachusetts, we not only happily agreed, but we already knew the exact building he was in love with from our own visits to that museum.

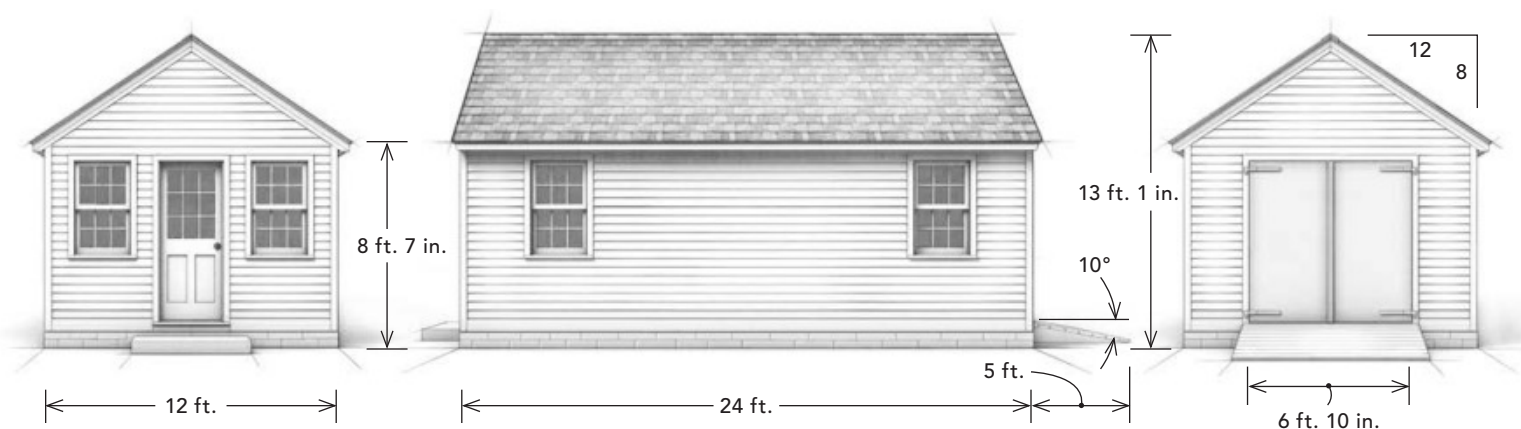
We agreed up front that we wouldn't be building a replica of the original building—in terms of actual measurements, materials, and assemblies—but rather an homage, updated and modernized with regard to materials, durability, assembly techniques, and size. □

Justin Fink and Matthew Millham are editors at *Fine Homebuilding*. Photos by Rodney Diaz, except where noted.



THE INSPIRATION

Working from the original building, we measured trim details, studied their construction (which varied from one side of the building to another), and then recreated the assembly for our own outbuilding.



CUSTOMIZED FOR OUR NEEDS

The original structure was built symmetrically, with a single entry door on both gables. Since our version is a combination workshop/storage building, we changed one gable end to include wide barn doors and a ramp.



Explore the shed in SketchUp

Download a full-scale SketchUp model of this shed at FineHomebuilding.com/sheds.



Shed

A COMPACT FRAMED FLOOR

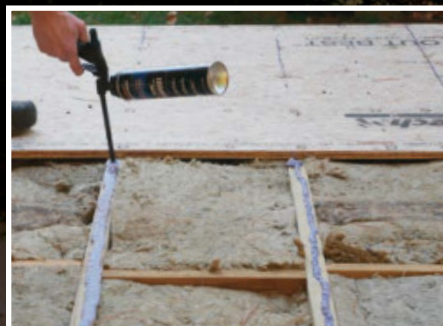
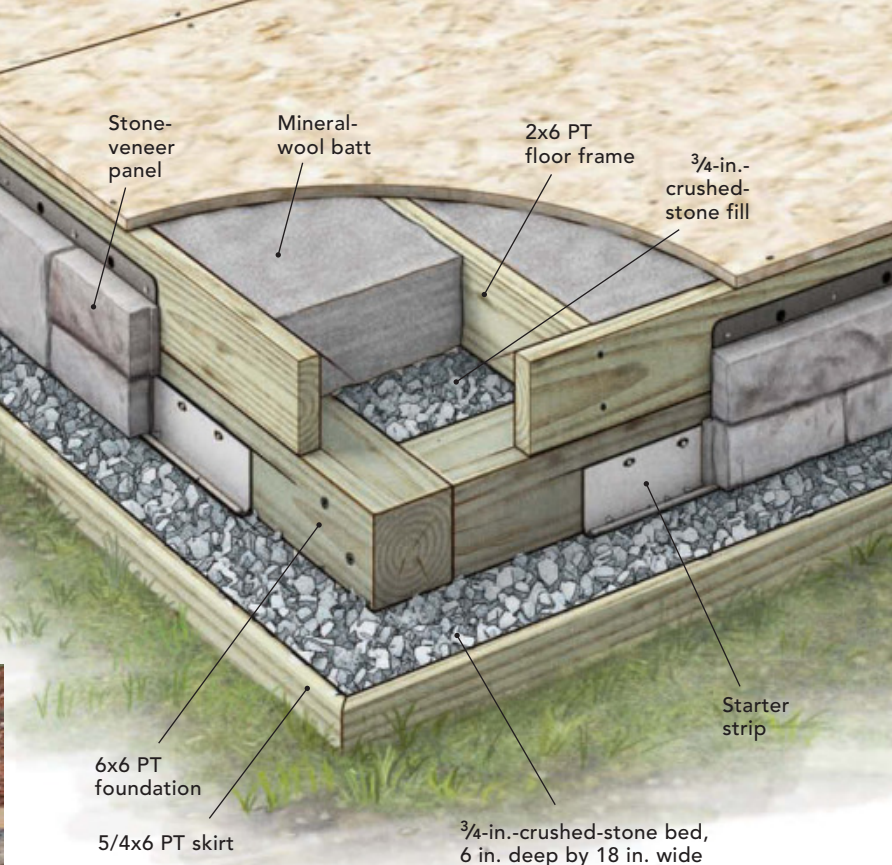
Built atop a 6x6 foundation set on and infilled with gravel, the ground-level floor system is insulated for comfort, supports the manufactured stone attached to the outside, and keeps the shed visually rooted to the ground.



Build the box. After squaring up the rim joists and tacking them to the 6x6 foundation, infill the box with 2x6 joists, nailed through at either end and then reinforced with blocking at midspan to keep them from rolling.



The right insulation. The client has plans to use a portion of this outbuilding as a workshop, so we insulated the floor prior to sheathing. Mineral-wool batts, placed between joists and resting atop the gravel below, are the ideal choice in this situation because they are not affected by moisture.



A structural vapor retarder. The subfloor of the shed, glued and nailed in place, not only provides the structural finish to the floor frame, but also acts as the vapor retarder in this particular assembly, helping to keep any moisture under the frame from migrating upward into the conditioned space above.





Start with the support track. To support the bottom edge of the first course of stone, a plastic starter strip is fastened into the 6x6 foundation. To keep the strip level around all sides of the building, measure down from the subfloor and snap lines.

A FAUX-STONE SKIRT

The original Shaker shed was set atop a stone foundation, and although hiring a skilled mason wasn't in the budget, we were able to recreate the look using Versetta Stone, a panelized faux-stone system.



As simple as sinking screws. Each stone panel is set alongside the previous, and fastened to the framing with corrosion-resistant screws. Later, this flange will be tied into the water-resistive barrier above.

Corners need to be cut. To create the look of finished outside corners, this system uses special double-ended corner pieces, which need to be cut in half on-site. A diamond blade in an angle grinder or masonry cutoff saw makes quick, clean work of the job.



WALLS ARE STANDARD FARE

Just like on any other stick-frame build, we laid out and assembled the walls on the subfloor and then worked together to tip them into place.

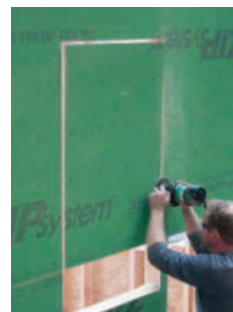
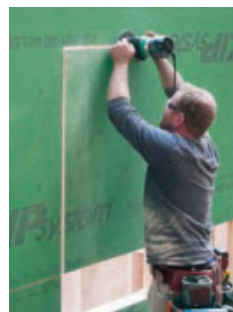
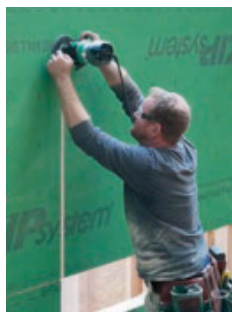
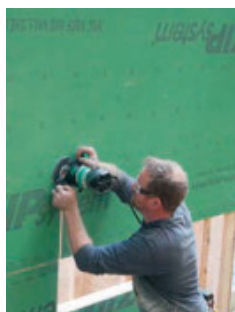


Gables come first. Working off measured drawings, cut all the plates, studs, sills, headers, and gable rafters before laying everything out for assembly.



Eaves are unsheathed. Because we chose to frame each eave wall as one long assembly, we had to leave the sheathing off until after each wall was tipped into place. Alternatively, you could sheathe all but the ends of the wall on the deck, and then fill in the sheathing once upright.

Easy openings. To get quick, clean-cut window and door openings, run the sheathing right over the voids, and then cut away the waste using a router and a panel pilot bit.



Plan ahead. Before tipping the walls in place, have a plan for securing them upright. We fastened temporary 2x4s to the foundation and floor system, and made sure the level and nailer were close at hand, allowing one person to quickly check for plumb and brace the wall.



A SIMPLE, ELEGANT ROOF

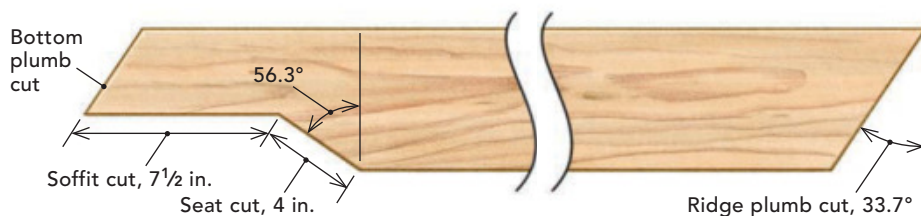
We considered using a ridge beam for this roof, but the size of the beam was larger than the two of us wanted to deal with. Instead, we used a standard ridge board, and kept the work manageable by installing it in two pieces.



A ridge in two parts. The length of the building forced us to add a post 8 ft. from one end to help support the ridge. We used the post as a cut point, allowing us to build the ridge board in two pieces for easier assembly.

Careful rafter cutting

The rafters on this shed must be cut to the proper length and angled to meet the ridge and plate, just like on any roof, but also must have consistent, accurately cut tails, which will be the foundation of the roof trim.



Installed in pairs. To help ensure the ridge stays straight, install the rafters in opposing pairs, and keep an eye on how each fits at the top and bottom. Any changes to the way a rafter meets the ridge board or wall might indicate that things are drifting out of alignment.



A third set of hands. To help keep the sheets of sheathing in place and aligned for installation, add a 2x cleat to the rafter tails, fastening it so that it projects up enough to catch and hold the first row of sheathing.

WEATHERTIGHT WINDOWS

Rather than buying complete window units for this project, we chose to buy divided-lite wooden sashes and then build frames to hold them. Because windows are notorious points of water entry, it's crucial to do a thorough job of waterproofing every opening and then flashing the windows after they're installed.



Start at the sill. Apply a piece of flashing tape across the rough sill of the window opening, extending each end about 6 in. up the sides. The tape should overhang the outside of the opening by 1 in. to 2 in., allowing it to be folded down and adhered to the surface of the water-resistant barrier.



Sides come next. Install a continuous piece of flashing tape up each side, this time overhanging from the water-resistant barrier into the opening. Make a short, diagonal cut at the top and bottom, and fold the tape into the opening.

Cover the corners.

The overlap between sill tape and side tape has the potential for a pinhole leak right on the outside corner of each opening. For added insurance, cut a small bow-tie-shaped piece of tape and stretch it diagonally across the corner.



Head flashing above all.

The last piece of tape goes across the head of the window opening, and should cover the top edges of the tape used on each side of the window and extend out at least a couple of inches to either side. Cut and fold it in the same way as the side tape.



Pressure is a must. All flashing tapes, regardless of type, rely on pressure-sensitive adhesives, and must be rolled (strong hand pressure can work too) after installation to ensure a lasting bond.



In with the window. Set the window unit into the opening, and shim under each vertical leg to bring it into plumb. For windows like these, without a nailing fin or casing, align the jamb edges flush to the sheathing—or, if you plan to install a rainscreen, leave them to protrude the thickness of the furring strips. Once plumb and aligned, shoot a few finish nails through the sides to tack the window in place.



Bridge the gap. After the window is installed, apply tape to the sides, and then the top, bridging the gap between jambs and sheathing. Hold the tape close to the outer edges of the jambs where it will later be covered by the casing. Don't tape the bottom of the window; leave this open to allow any water to escape.



Battens create some space. Before casing the window, add vertical furring strips or corrugated plastic battens to pad the siding and trim off the sheathing and allow for airflow and drying.



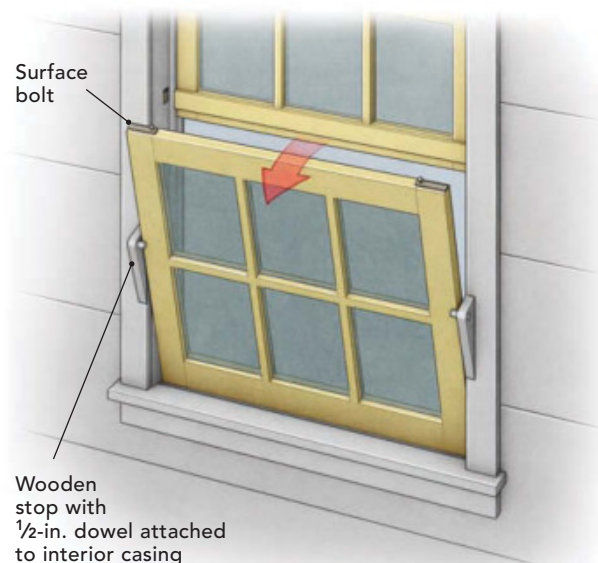
Save the sills for last. We installed the sill after completing the flashing so that we could tape the jambs to the sheathing without interruption.



Casing finishes the job. The window can either be trimmed one piece at a time or you can preassemble the trim on a worktable and then install it in one piece.

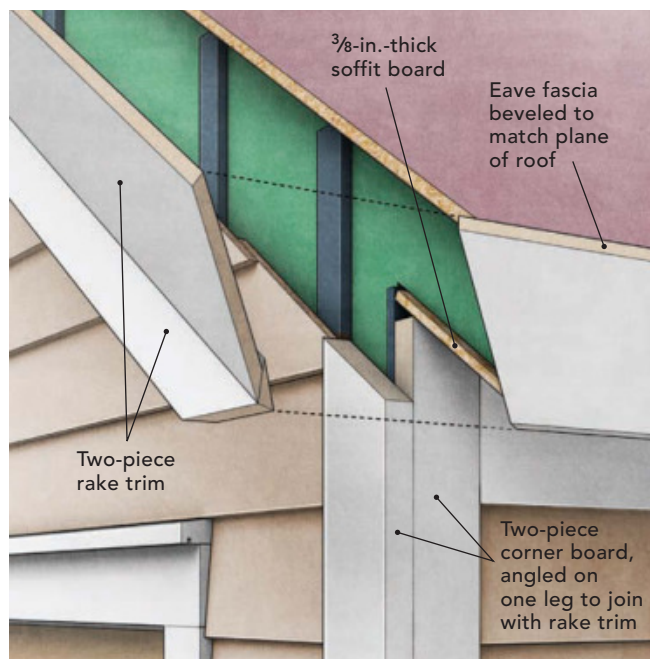
A hopper sash

Disguised as double-hungs, these site-built windows function as hopper windows. The upper sash is fixed, while the lower sash is held in place with two surface bolts installed on the top of the sash. Slide the bolts inward and the window tilts in and down to provide fresh air. Wooden stops fastened to the interior casing keep the sash from tipping in too far.



STREAMLINED ROOF TRIM

Despite looking simple, the roof trim on this project proved a real challenge. To keep all the bevels, miters, and orientations straight, we made mockups for both sides of the roof, and marked all of the necessary cutting information right on each piece. These became our on-site road map for assembling the real thing. The bevel and miter angles are specifically for an 8-in-12-pitch roof, but can be adjusted for a roof with a different slope.

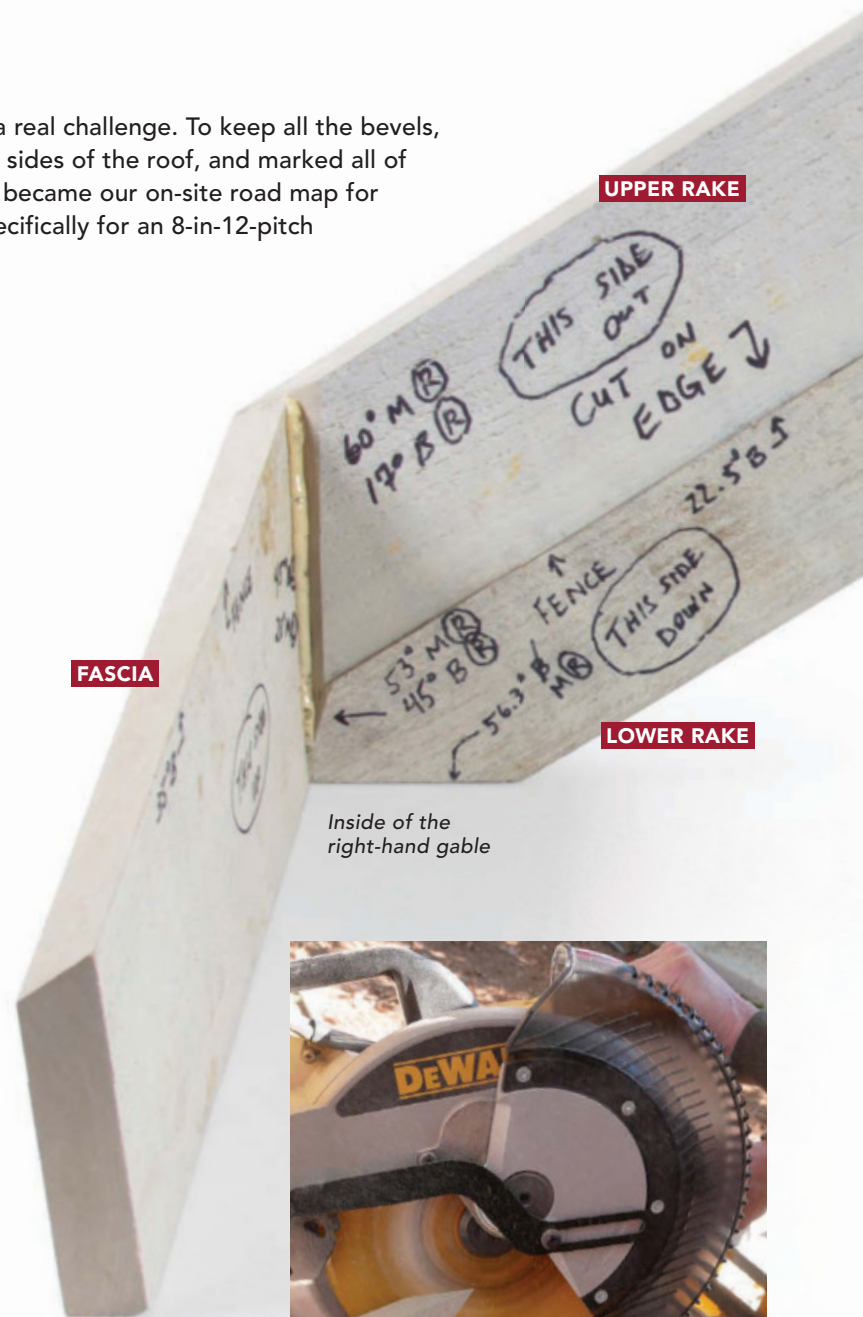


To see a video of this Shaker-style roof trim coming together, visit FineHomebuilding.com/sheds.

Eave fascia. After beveling the top edge of the fascia trim so it matches the angle of the roof (in this case, about 34°), cut the angled ends on a miter saw, with the piece set on the flat and the saw set to a 20° miter and a 45° bevel.



Lower rake. The top edge of the lower rake trim is beveled at 22.5°, and then cut in two passes: the first (left; 56.3° miter) creates the level cut at the bottom; the second (right; 53° miter, 45° bevel) clips off the point of the level cut where it will connect to the eave fascia.



Upper rake. Joining the eave fascia and upper-rake trim requires a steep miter; in this case, about 62°. This saw maxes out at a 60° miter, so after making the cut (with the stock on edge and the saw set to a 60° miter and a 17° bevel) we used a block plane to finish the job. For saws with even less miter capacity, it may be easier to shim between the trim and the fence to achieve the desired angle. The top edge of this piece also needs to be beveled to plane out with the roof sheathing.





Soffits come first. Start the roof trim by attaching the soffit boards, which should be flush with the front edge of the rafter tails (or front edge of the subfascia, if present).

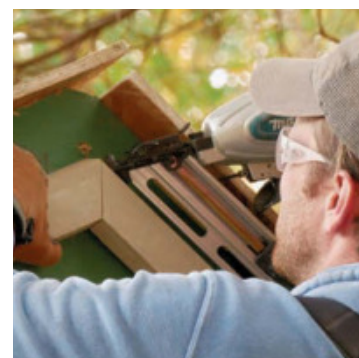


Preassemble corner boards. One half of the corner board is straight at the top so it butts into the soffit board, and the other half is angled to match the roof and set down the height of the rake trim.



Align the fascia. These angled fascia boards extend beyond the gable so they can later receive the rake trim. Alignment is key; the heel of the miter should meet the butt end of the soffit board. When working solo, attach a temporary support to the side of the building to hold up the far end of the board while you focus on the miter.

Start the gable trim at the bottom. The narrow lower rake trim rests on the angled corner board and extends all the way to the roof peak. If working alone, drive hand nails into the sheathing farther up the gable to support the trim while you focus on getting tight joints at the bottom.



Meet in the middle. At the peak of the gable, align the pieces and mark a plumb line where they overlap. Cut just outside the line on each piece, and then sneak up on a tight fit using a sharp block plane. When satisfied with the joint, add glue and pin it together using opposing finish nails.



Bisect and connect. Join the two pieces of upper rake together at the peak, using glue and one or two nails to tack the miter together. Again, if the joint needs to be finessed, a sharp block plane will do the job.



Clamp for a tight joint. With the lower rake trim in place, the upper piece can be installed. Once you're happy with how the bottom and top joints are fitting, apply glue and place some clamps on the two-piece rake to help pull it together and keep it tight while the glue sets up.



Ready-made skirt stock. The Boral TruExterior skirtboard stock we used has a starter strip built into the top edge—a sleek look that matches the original structure. Hold the skirtboard 1/2 in. off the top of the stone skirt to allow air to enter the rainscreen assembly.

CAREFULLY PLANNED CLAPBOARDS

The long, straight lines of the clapboards really help sell the simplicity of this design, but that only works if you lay out and install the siding with care, ensuring the courses line up intentionally with the window and door trim and at the transition from corner board to rake trim.



Consistent spacing. After laying out the courses of siding to ensure that the clapboards line up with the finished window trim, we used a combination of tools to help with installation. Siding gauges hold each piece close to its final location, but it's a good idea to do the fine-tuning with a gauge block cut from a piece of scrap before fastening in place.



A rabbet and a rip. To get a clean finish on the top course of lap siding, cut a rabbet into the back bottom edge of the fascia trim before it's installed. Then the siding can be cut to width, tucked up underneath, and fastened in place.



Angled up the rake. Fasten each piece of lap siding to the gable end of the building with nails driven into the rainscreen furring strips, spaced no more than 16 in. on center.



Fasten the points. After installing the gable lap siding with a siding nailer, come back with a 15-ga. finish nailer to fasten the long edge of each angled piece. The smaller nails are less obvious from the ground, and less likely to splinter the delicate point of the cut siding.

AN UPDATED ROOF

The original structure has a cedar-shake roof, with no drip edges to encourage proper drainage; we opted for asphalt shingles and stock drip edging for a classy but resilient roofing system.

The right stuff. To deal with the projection of the rake trim, we chose a metal rake edge wide enough to extend back to the sheathing for fastening. On top of that we added self-adhesive membrane to seal the transition, and a bead of roofing sealant under the shingle ends.



Put a lid on it. Asphalt shingles combined with galvanized metal rake and drip edging ensure that the roof of this outbuilding will remain watertight and stylish for the long haul.





Learn the basics of
timber-framing and
get an outbuilding
in the process

Traditional Timber-Framing Techniques

BY WILL BEEMER

There's something magical about timber-framing. It's difficult to describe or even identify the qualities that make it so. Maybe it's the result: a long-lasting, beautiful, strong structure. Or perhaps it's the process: teamwork, community, craftsmanship. I worked on my first timber frame back in 1980. Forty of us raised an entire house frame by hand in one day, and I was hooked for life.

Like any building discipline, timber-framing is a complex subject that can't be described adequately in a book, let alone a magazine article. At the building school that

I run, students build a 12-ft. by 16-ft. frame that involves all the major elements of timber-framing. Building that simple frame inspires many students to dig deeper and try their own projects. In this article, I'll describe that same frame and try to inspire readers as well. Please remember that for any building project, it's a good idea to consult a structural engineer and the local building inspector.

Select the right wood

Here in the Northeast, our favorite species for timber-framing is eastern white pine. It is lightweight, is easy to work with hand tools,

and has one of the lowest shrinkage rates of all available woods. Red oak and Douglas fir also are popular woods valued for their strength and rich red color. Southern yellow pine is strong and a darker gold than white pine. White oak is also strong and stable, and it is highly resistant to rot, which makes it attractive for use in porches and outdoor structures. These five species account for the vast majority of timber frames that are built in the United States.

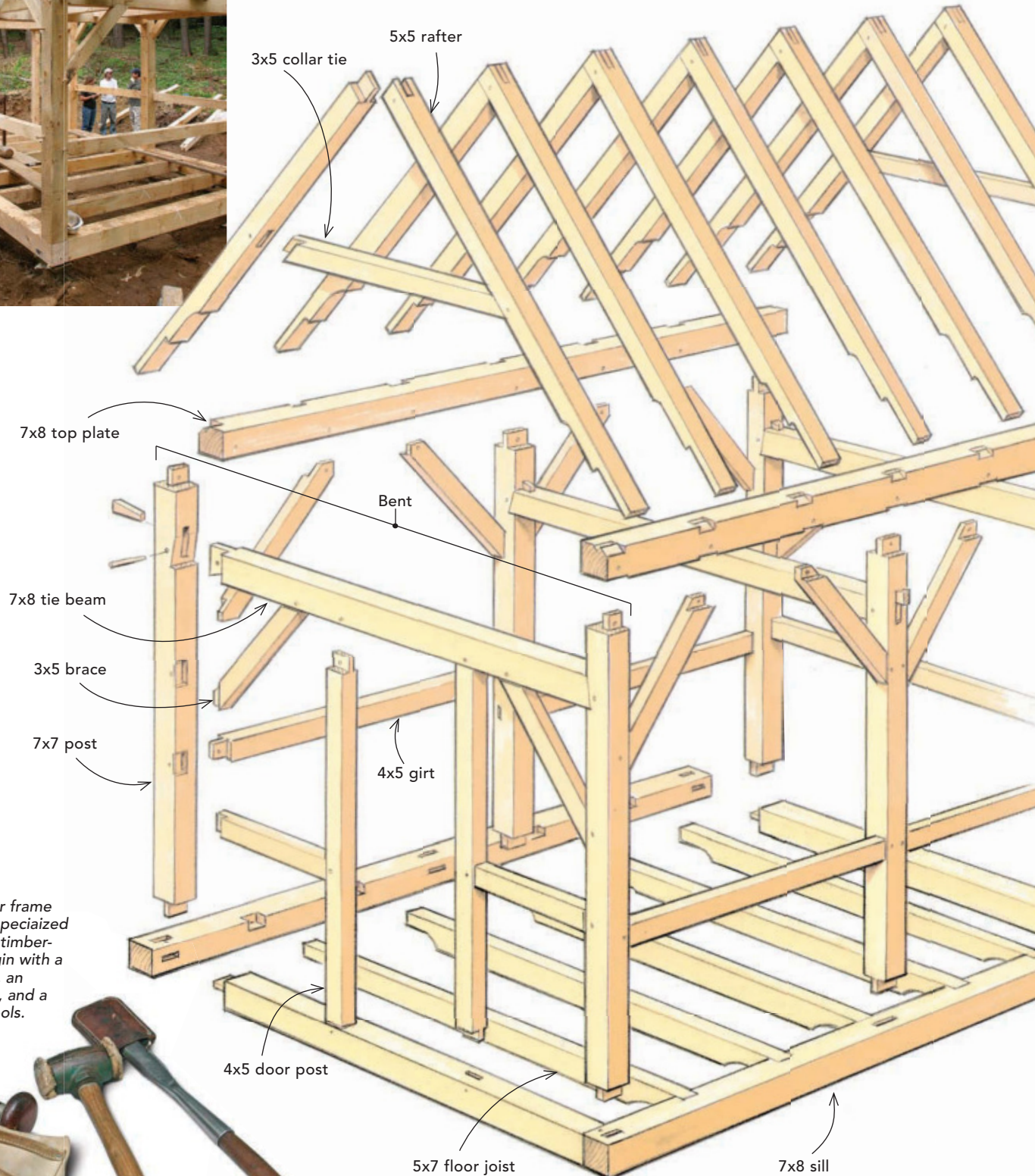
You can buy timber from a mill that will grade it or hire a grader to come in, but this step is not always required. Our local





LEARNING IN SMALL SCALE

The best way to investigate timber-framing is to attempt a small frame that incorporates the basics of joinery and design. The drawing below illustrates the frame's basic anatomy. Frame sections called bents are assembled first, followed by plates and rafters.



Cut a timber frame with a few specialized tools. Most timber-framers begin with a circular saw, an electric drill, and a few hand tools.



Drawings: Dan Thornton



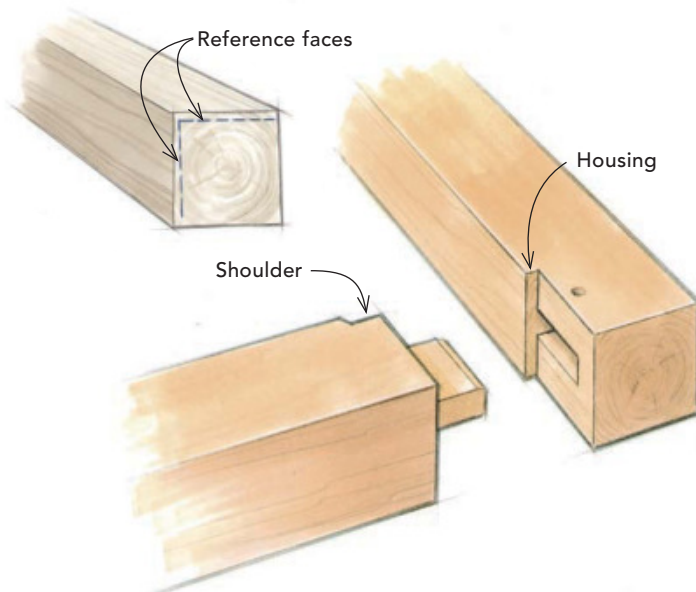
CUTTING A TENON

The most common joint is the mortise and tenon. The shoulders of the tenons, which bear the load and ultimately determine the final dimensions of the frame, must be cut accurately. After laying out the tenon (1), set the circular saw to the depth of the shoulder; then make an accurate cut on the shoulder line. Kerf the rest of the shoulder to the end of the tenon (2). (Be aware that if the timber isn't square, the sawblade depth to the tenon could change from one side to the other.) Knock out the waste with a hammer before final paring. With a rabbet plane and/or timber-framing chisel, pare the tenon to its lines (3), then cut the tenon's opposite side. After cutting and beveling the shoulder (4), taper and chamfer the tenon's edges so that it won't bind in the mortise. Use a combination or framing square to check tenon thickness and distance from the reference surface.



SQUARE-RULE LAYOUT

Timbers usually arrive on-site roughly square and nominally dimensioned. Square-rule layout compensates for these expected inconsistencies. On each timber, the straightest two adjacent sides that are most square to each other are marked as reference faces. All joinery measurements are made from these faces; any discrepancies in a timber's dimensions are canceled by cutting a housing or shoulder on the joint's mating surface.



inspector (and code) requires only that timber be produced by a state-registered mill, that the timber be stamped for species (but not grade), and that the timbers be structurally sized as if they were #2.

How a timber frame works

A typical timber frame consists of posts (vertical members), beams (or girts, horizontal spanning members), and braces (for racking

resistance). Ideally, the timber frame should be designed to make all joints carry only compressive loads after the frame is raised. This way, the mating surfaces, or shoulders of the joints, can handle the weight efficiently, and the tenons and pegs aren't subject to tensile forces that try to pull them apart. The main function of the pegs (also called pins or trunnels) is to draw the joint up tight during assembly and hold the joint together during

raising. Diagonal braces help to stiffen the frame and to reduce stresses in the joints.

Timbers often are cut in a shop and brought to the site for assembly prior to raising day. They can be assembled either as bents, which usually run across the short dimension of the building (perpendicular to the ridge), or as walls, longitudinal assemblies running parallel to the ridge. The method that you use depends on the raising

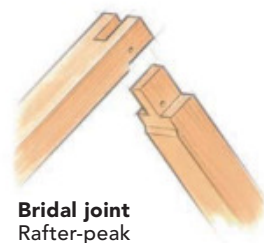
CUTTING A MORTISE

After drawing the layout lines, cut the edges with a chisel to keep tearout to a minimum. I use a 1½-in. auger bit in a heavy-duty ½-in. electric drill (1). (If auger bits are hard to find, you can use self-feeding Forstner-type bits, but you'll have to back out and clean the hole frequently to avoid getting stuck.) To make sure I'm drilling plumb and square to the timber surface, I bolted a plywood bracket and bullseye level to the drill motor housing. After roughing out the mortise with the drill, I go back with the proper-width chisel and clean it out (2). Use a 3-lb. mallet to drive the chisel down the ends of the mortise (thus severing the grain), and then use hand power and a little body weight to pare down the sides (3). Alternate between cutting the end grain and paring down the sides, and always keep the bevel of the chisel toward the inside of the mortise. Use a combination or framing square to check the width and squareness of the mortise (4). After the mortise is complete, cut the housing (if there is one) either by roughing it out with an ax or kerfing with a circular saw.

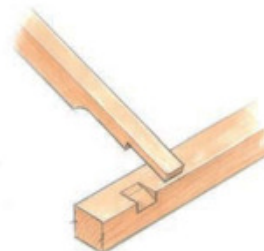


Common timber-frame joints

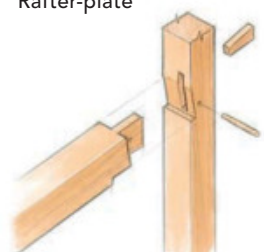
In addition to the mortise and tenon, the following joints also contribute to this frame.



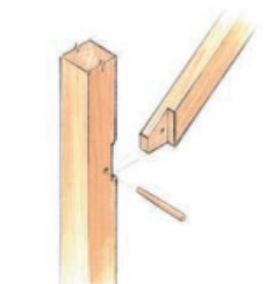
Bridal joint
Rafter-peak



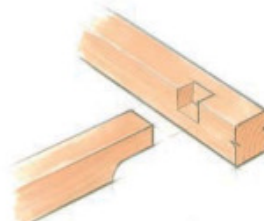
Housing
Rafter-plate



Wedged dovetail
Tie beam-post



Mortise and tenon
Brace-post



Drop-in housing
Joist-plate



RAISING THE FRAME

Safety comes first. Pay attention to the raising leader, keep focused on the job, and minimize tool use overhead. Even so, hard hats are a good idea. Before you start, it's wise to check the tenon sizes one more time.

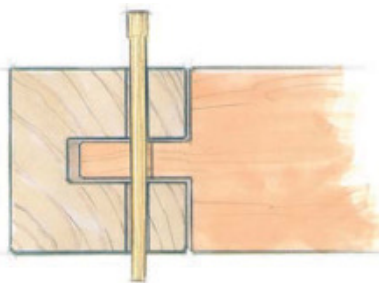
1. Assemble the sills on the foundation (drawing p. 57). Square up the assembly, shim level, and add remaining joists. Add temporary planking or a plywood floor.
2. Assemble the first bent, aligning the post tenons over the sill mortises, then work the posts onto the tie beam while inserting braces and girts. Raise the bent and brace plumb.
3. Assemble and raise the second and third bents as before.
4. Erect staging or planking across tie beams, then lift plates to that level. Insert the plate braces into each post, snug up the pegs, then place the plates onto the post and brace tenons. Secure with pegs.
5. Raise planking to the plate level, then assemble the first rafter and collar tie on the ground, raise it, and secure the tails to the plate's rafter seat with 20d nails.
6. The next five rafter sets are passed up individually and pegged together at the peak.



Pegs are available in $\frac{3}{4}$ -in. and 1-in. diameters.

DRAW-BORE METHOD MAKES A SNUG JOINT

When joints are drilled for pegs, the hole through the mortise is drilled first. The tenon is inserted into the mortise, marked, then offset by $\frac{1}{8}$ in. When the tapered peg is driven into the hole, it will draw the mortise and tenon tight and keep them that way.



method (crane or hand), the sizes of the timbers, and the layout of the posts in the floor plan.

The square-rule method of layout compensates for irregular timber

Accurate layout is critical for a building to end up plumb, level, and square. Much of the skill in timber-framing lies in accounting for variations in the timber as it comes from the sawmill and as it goes from a green to a dry state. (Anyone who wants to simplify layout can pay extra for dry lumber milled to exact dimensions in a four-sided planer.) For the frame shown here, we used green timbers that were slightly irregular in dimension and square, so we used the square-rule layout to overcome these irregularities. This system ensures that the outside faces of perimeter posts and the tops of rafters, joists, and beams all will be flush and will match the building's critical dimensions. Nonreference faces will vary to suit the joinery.

After checking a timber for crown, twist, and big knots that can complicate joinery, we select two layout faces that are adjacent and square to each other. All the joinery is laid out parallel or square to these two layout faces; housings cut into nonlayout faces allow us to bring the mating timbers into the face of a smaller, imaginary "perfect" timber within a larger irregular timber. All mortises and tenons in this frame are laid out with their outside edge $1\frac{1}{2}$ in. from a layout face and are $1\frac{1}{2}$ in. wide. Larger sectioned timbers would use a 2-in. setback and 2-in. width. This rule of thumb allows you to use the $1\frac{1}{2}$ -in.-wide tongue or 2-in.-wide blade on a framing square as a basic layout tool.

Timber-framing joinery is based on the mortise and tenon

One of the major appeals of timber-framing is that you can see the timbers in a completed building and also appreciate the joinery that connects them. Most joints are variations of the mortise and tenon, and are secured with pegs or wedges. Simple tenons that aren't required to do much work after raising (such

as post tops or girt/brace ends) are cut 3 in. to 4 in. long. Longer tenons are a requirement if the tenon and its peg are going to be subjected to some tensile stresses in service, as in tie-beam ends. The tenon width is usually the full dimension of the timber, unless that width comprises the mortise. Tenons always should be laid out with their length parallel to the grain of the tenoned members, thus ensuring continuous fibers to the end. Tenons also are tapered and chamfered to make assembly easier.

A mortise is laid out so that the length (which corresponds to tenon width) runs parallel to the grain of the mortised member. Mortises are cut $\frac{1}{8}$ in. to $\frac{1}{4}$ in. deeper than the tenon so that the tenon doesn't bottom out before the shoulders meet; you can cut the tenon a bit shorter, too. □

Will Beemer is co-executive director of the Timber Framers Guild and the director of the Heartwood School in Washington, Mass. He has been timber-framing for 25 years. Photos by Charles Bickford, except where noted.



A frame for all seasons. A small timber frame like this one offers a great deal of design flexibility. Its uses have ranged from a guest cabin to a garden shed to an artist's studio.



ON THE WEB

For more timber-framing techniques and information about building this timber-frame shed, including a detailed parts list, visit FineHomebuilding.com/sheds.

Build a Streamlined Woodshed

Designed to be erected in a day, this shed uses readily available materials and basic tools



BY ROB WOTZAK

A few years ago, I offered to help a friend build a woodshed in his yard. I imagined a simple rack made of 2x4s and a few sheets of metal roofing—but when I found out the shed would need to hold five cords of wood, I had to adjust my plans. The design I came up with is easy to scale up or down, as I did for the much smaller shed shown in this article.

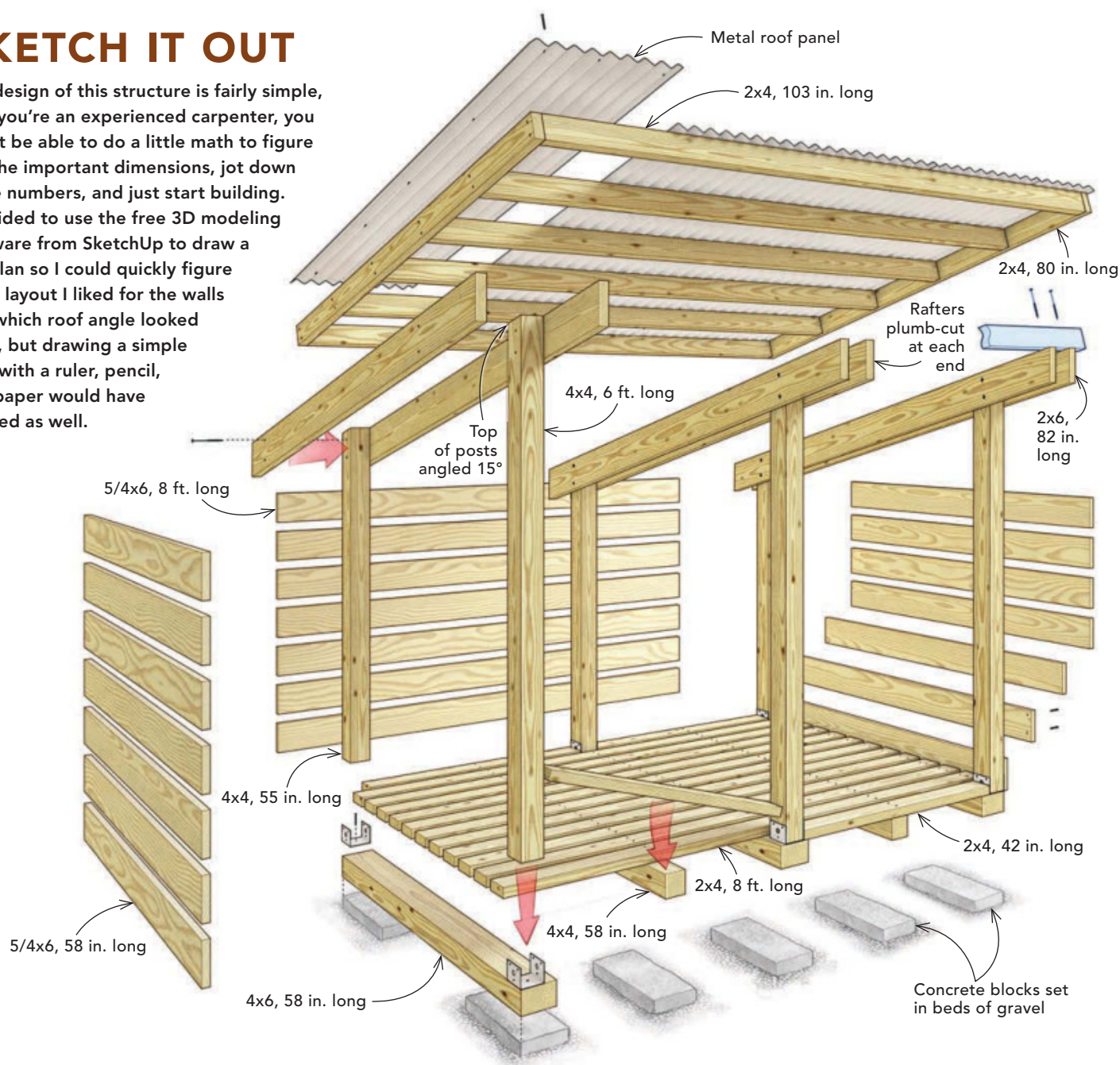
Ideally, a woodshed is sized just tall enough to comfortably walk inside to stack firewood. With a shed roof, the deeper the structure, the taller it needs to be. A cord of stacked firewood takes up 128 cu. ft.—basically a 4-ft. by 4-ft. by 8-ft. pile. When planning your own shed, choose a height and floor layout that works for you, but don't forget to consider adding a decent roof overhang on the front for extra protection from the elements.

This shed measures 5 ft. deep, 8 ft. wide, and 8 ft. tall, so I was able to use standard-size framing lumber with minimal waste, but you can build whatever size fits the number of cords you want to store and the space you have in your yard. □

Rob Wotzak is digital brand manager. Photos by Kiley Jacques, except where noted.

SKETCH IT OUT

The design of this structure is fairly simple, so if you're an experienced carpenter, you might be able to do a little math to figure out the important dimensions, jot down some numbers, and just start building. I decided to use the free 3D modeling software from SketchUp to draw a full plan so I could quickly figure out a layout I liked for the walls and which roof angle looked right, but drawing a simple plan with a ruler, pencil, and paper would have worked as well.



MATERIALS LIST

Foundation

- (8) 50-lb. bags of gravel
- (10) 4x8x16 solid-concrete blocks

Floor

- (1) 4x6x16, PT
- (1) 4x4x10, PT
- (13) 2x4x8, PT
- (6) 4x4 galvanized post bases
- (1) Box Simpson Strong-Tie #9 1½-in. Structural-Connector Screws (100-count)
- (1) 5-lb. box 3-in. galvanized deck screws

Posts/rafters

- (3) 4x4x12, PT
- (6) 2x6x8, PT

- (1) Box FastenMaster Headlok 4½-in. Heavy-Duty Flathead Fasteners (50-count)

Walls

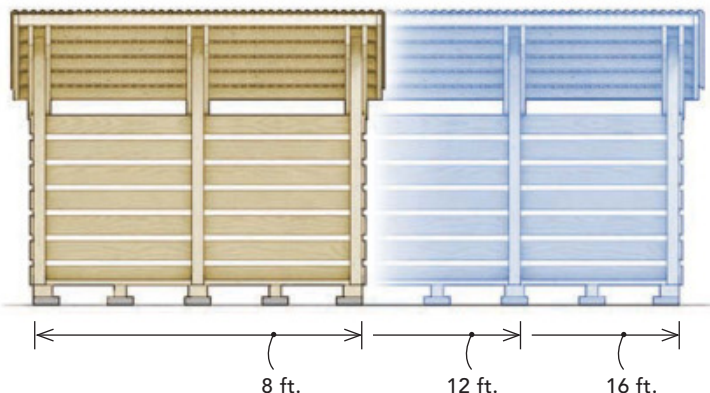
- (7) 5/4x6x8 PT deck board
- (7) 5/4x6x10 PT deck board
- (1) 5-lb. box 2½-in. galvanized deck screws

Roof

- (6) 2x4x10, PT
- (2) 2x4x8, PT
- (5) Union Corrugating 2.16-ft. by 8-ft. Corrugated Metal Roof Panels
- (1) Box Tek's #9 Self-Drilling Roofing Screws (400-count)

MODULAR METHOD

The design can be scaled up or down. Making additional bents is simplified by the assembly-style approach.



PREP THE SITE

There are a few different ways to prepare the shed base. For the shed featured here, which is small in size, I opted for a grid of concrete blocks set in gravel. Another option is to lay a bed of tamped gravel, which provides a dry, mud-free site to build on. (Plus, you don't have to get fussy when raising and leveling the shed—if one sill beam is a little low, just lift it and rake some gravel under it.)



Dig footings. Set and level solid concrete blocks on compacted gravel to support the ends of each of the floor beams.

CUT THE PARTS



Cut floor beams to length. The shed depth and resulting beam length are based on how many courses of firewood you want to fit in the shed—in this case, three. Consider the proportions that will look good and use a common board length that will leave little waste after being cut to size. Make two passes with a circular saw for the cuts.



Figure out post lengths. Mark and cut the tops of the front and rear posts to match the height and pitch of the roof. If you did an accurate drawing, you should be able to pull the lengths and cut angles right from it, but you can also lay the posts out on the ground with a sill beam, a rafter, and a tape measure and mark your cuts in place.



Cut posts. Flush-mounted rafters are held in place with TimberLok screws because the rafters are just supporting a lightweight metal roof. If this method won't pass code where you live, mark and cut 1½-in. notches at the tops of the posts.

ASSEMBLE THE BENTS



Attach post bases. Fasten the bases to the ends of the beams. Put them all the way to the edge for the side beams and center the hardware on the center beam. To keep things simple, these post bases are installed with screws rather than bolts.

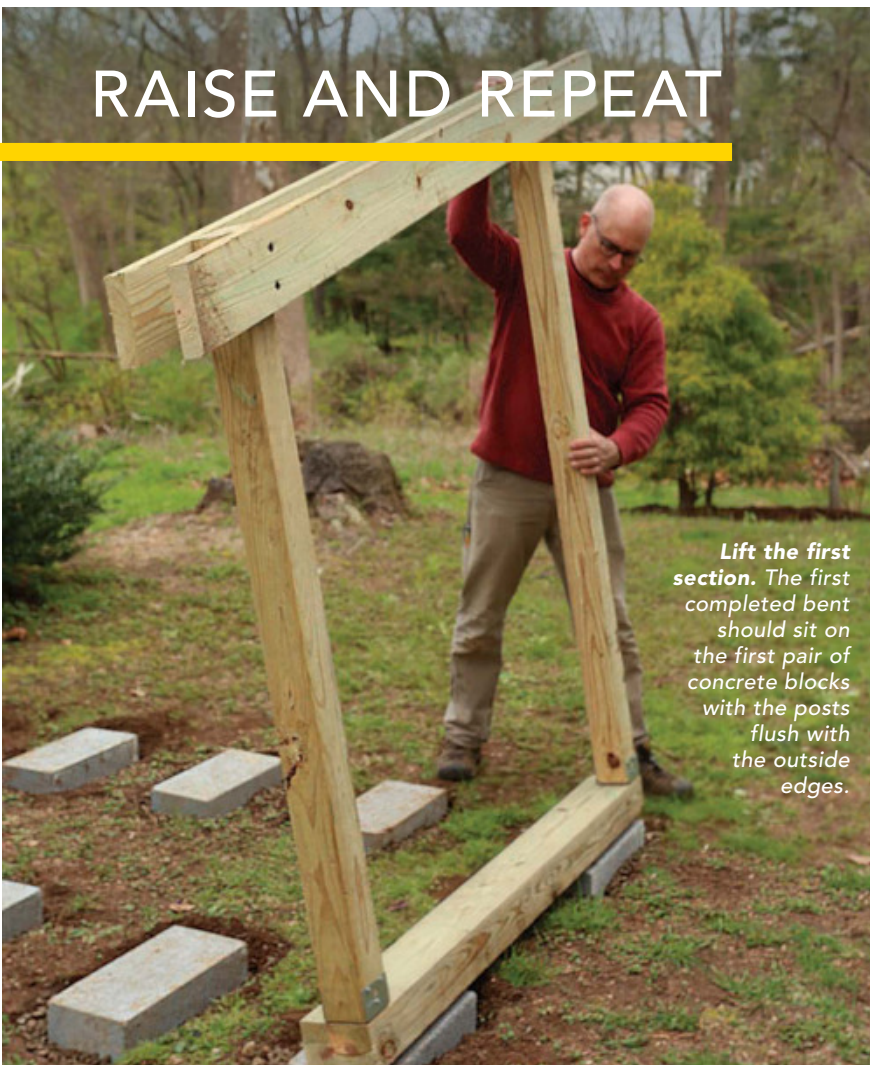
Cut and secure rafters. Once the posts are squarely attached to the beams, cut the rafters to length and fasten them at the top of the posts, leaving the desired overhang on each end.



In hindsight... You will attach the posts while the sill beams are lying on their sides, so learn from my mistake and orient the hardware so the fastening flanges are on the front and back instead of the sides—otherwise you will have to flip the whole assembly over to drive the screws on one side of the base.



RAISE AND REPEAT



Lift the first section. The first completed bent should sit on the first pair of concrete blocks with the posts flush with the outside edges.



Plumb the posts. Attach temporary diagonal bracing to keep the shed frame plumb and square until there are enough floor and wall boards attached to lock everything in place. Keep the bracing completely inside the perimeter of the shed on the back posts so it won't be in the way when installing the walls.

LAY THE FLOOR

I've found that if I choose appropriate spacing for the floor beams, then 2x4s are plenty strong for a shed floor. Because this shed sits right on the ground with nothing to hold each of its beams in position, the floor boards keep the base square.

Lay intermediate floor beams. There is no beam on the front or back of the shed and no true floor joists. With this system, you raise the main frame sections, drop the additional beams in between, and screw down the 2x floor boards to tie everything together.



Fasten floor boards. Attach the 2x4s at the front and back, putting two 3-in. screws into the boards where they cross each beam. Infill with enough floor boards to leave 1-in. gaps for airflow to help dry the firewood. Use 1-in.-thick scraps to space them out as you fasten them down.

ERECT THE WALLS

Because everything is locked in with temporary bracing, it doesn't matter which side you put up first. I'm using 5/4 PT decking for the walls because it provides a good balance of strength, thickness, and board width. Plus, it's nice-looking and straight boards are generally easy to find compared to PT 2x4s or 1x4s. I planned this shed to be exactly 8 ft. long so I could buy 8-ft. boards for the back wall without having to cut them to length.

Put on the sides. The wall boards go up in the same fashion as the floor boards. Put a 2x4 scrap at each end to create a 1½-in. gap and lay the next course, then fasten the boards with 2½-in. screws at each post. Using spacer blocks means there's no need to measure when laying out the courses. Plan the height so the top of the wall will finish with a full-width board.

INSTALL THE ROOF

It's easiest if you design your shed to use standard-length metal roofing panels. My local lumberyard carries galvanized metal in 8-ft. and 12-ft. panels, which are ideal, but for this project I needed to cut sheets on-site.

Fasten purlins. Set each 2x4 purlin on edge and then fasten them into the tops of the rafters with HeadLok structural screws. Because the shed's metal roofing runs from front to back, the rafters act more like beams to support the horizontal purlins.



Trim detail. Fasten a 2x4 board to the ends of the purlins to finish off both sides of the roof framing.



Cutting sheets on-site. Clamp a board or other straight edge onto the entire stack of panels and use a metal-cutting blade in a circular saw to make quick and clean cuts in the roof panels.

Screw sheets to framing. Use self-tapping metal-roofing screws to fasten the panels to the purlins. These screws have silicone or rubber gaskets to prevent leaks. Refer to the manufacturer's fastening schedule for the ideal spacing.



Add remaining panels. Work from one end of the roof to the other, following the roofing manufacturer's guidelines for panel overlap and fastener layout.

Craftsman-Style Pergola

Durable materials and strong joinery mean this great-looking gateway will be around for a long time

BY CHIP HARLEY

Building a pergola can be a lot like building a piece of fine furniture. The finished product exhibits great craftsmanship while showcasing the beauty of wood. Unlike a cherry Shaker table, though, a pergola is exposed to sun, rain, wind, and snow. It's important to build one that can weather the elements and live a long life.

Look to the site for inspiration

The pergola shown here consists of four posts supporting a canopy of purlins and joists. With this basic tunnel shape as a starting point, I looked to the house for inspiration because my goal was to integrate the pergola's design with the site. I wanted to mimic the brackets that support the gable eaves on the main house, so I used 6x6s chamfered to a point and notched over the posts. The cor-



Is it a trellis, an arbor, or a pergola?

Although the terms often are used interchangeably, trellises, arbors, and pergolas are distinctly different structures.

A trellis is typically a latticework built to support climbing plants or vines. It can be a simple panel



Trellis

attached to the side of a building, or it can be freestanding in a garden or yard.

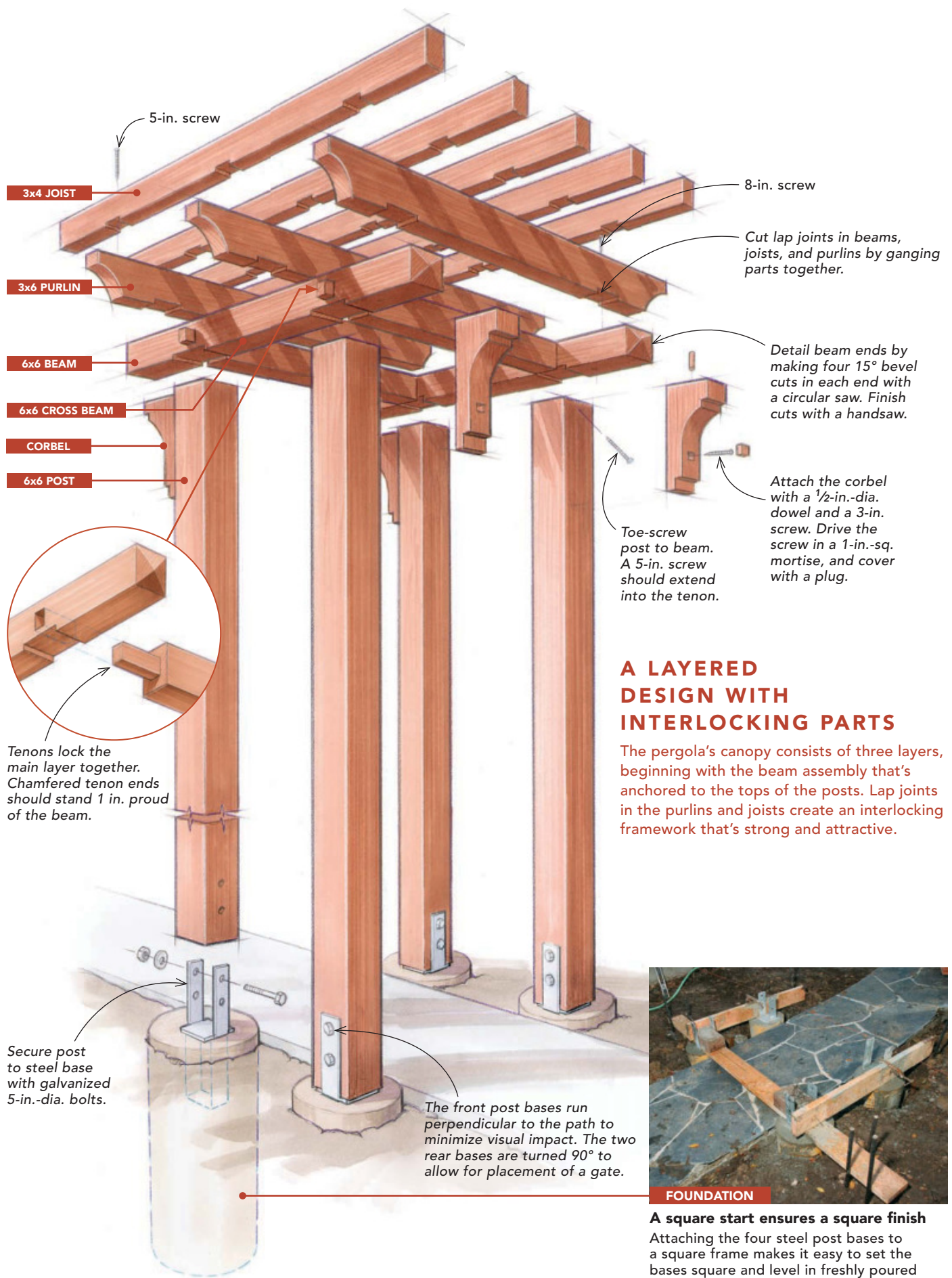
An arbor usually incorporates a trellis into its structure, creating a tunnel-like passageway of climbing plants. Arbors have a

Arbor



continuous run of latticework from one side of the "tunnel" to the other, often in an arched shape.

Pergolas, too, are designed to support climbing plants. Unlike arbors, though, pergolas simply have posts supporting a rooflike structure. They're most commonly used to shade a walkway or a deck.



A LAYERED DESIGN WITH INTERLOCKING PARTS

The pergola's canopy consists of three layers, beginning with the beam assembly that's anchored to the tops of the posts. Lap joints in the purlins and joists create an interlocking framework that's strong and attractive.



FOUNDATION

A square start ensures a square finish

Attaching the four steel post bases to a square frame makes it easy to set the bases square and level in freshly poured concrete piers.

TEMPORARY BRACES KEEP POSTS PLUMB

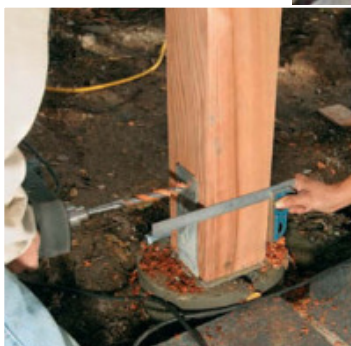


Once the concrete set, I installed the four posts. With the posts braced plumb, properly spaced, and cut to height, I took all the measurements needed to build the canopy in my shop.

POSTS

Use spacers and braces. Install temporary 2x4 spacers to maintain uniform distance between posts. Horizontal cleats clamped outside the braces keep them in place and provide a nailing surface for a diagonal brace that extends to a stake in the ground.

Bore holes from each side. Center an auger bit in the post base hole while an assistant helps to keep the bit level with a combination square. Bore halfway through the post, then finish the hole from the other side.



Make this cut carefully. Level top cuts are made with posts in place, two passes for each post. Although it's not used here, a guide block clamped to the post would support the base of the saw to ensure a precise cut.



belts beneath these beams were copied from the ones on the house, lending another visual tie-in. To evoke the Craftsman aesthetic, I chose large-dimension stock. Although 2x6s and 2x4s would have worked well for the upper layers, I used 3x dimensions to keep in scale with the 6x6 posts and beams.

I designed the construction details to ensure the pergola's stability and longevity, and I also wanted to show some level of craft without making the process too difficult or expensive. To guarantee the pergola's durability further and to enhance its visual appeal,

I chose redwood reclaimed from an old bridge. Although I built the canopy in my shop, this pergola could be built on site using the tools most carpenters have in their trucks.

Build the canopy on the ground

With the initial sitework complete and the posts braced plumb as shown above, I took measurements for the beam notches and cross-beam lengths, and headed to my shop to build the canopy.

We began with the main 6x6 beams, which would be notched to fit on the posts. Because

the beams and posts would be set flush to each other on the sides, I eased the edges of the notches and the tops of the posts with sandpaper. This treatment expresses the joint and hides small inconsistencies.

The two 4x6 cross beams between the two main beams add structural integrity to the pergola. Mortise-and-tenon joints give the assembly the strength to resist racking, and the shoulders of the tenons set the distance between the posts. The proud through-tenons add visual interest. I cut the through-mortises in the 6x6 beams with a plunge

THE CANOPY GOES TOGETHER WITH LAP JOINTS, MORTISES, AND TENONS



The technique I use to notch the beams also works for lap joints in the purlins and joists. I cut lap joints with the parts ganged together, using a sacrificial piece of plywood to eliminate tearout.



LAP JOINTS



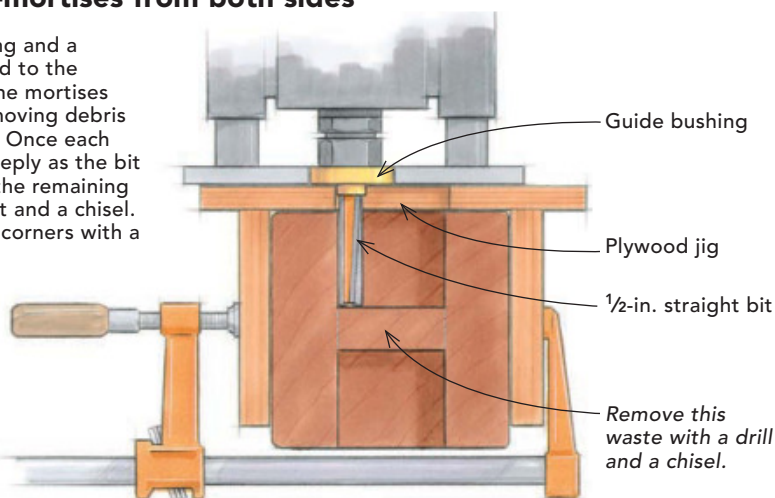
Cut lap joints in stages. Make a series of closely spaced kerfs with a circular saw. After knocking out the waste with a hammer, finish with a chisel. Use a trim router and a combination square to fine-tune the fit.



MORTISES

Rout through-mortises from both sides

With a guide bushing and a plywood jig clamped to the beam, plunge-cut the mortises in $\frac{1}{4}$ -in. stages, removing debris after each full pass. Once each side is routed as deeply as the bit can reach, remove the remaining waste with a drill bit and a chisel. Square the mortise corners with a chisel and a rasp.



TENONS

Cut tenons with a crosscut sled. Made of plywood, the sled rides on runners that fit in the tablesaw's miter-gauge grooves. Cut the tenon shoulders first, using a finish-cutting blade. Then switch to a stacked dado set to maximum width, and make multiple passes to cut each tenon cheek. For an easier fit, use a utility knife to pare out the section of tenon corners that won't be visible.



Test-fit, adjust, and assemble. Chamfer the tenon ends, and use a handplane to trim the tenon if the fit is too snug. Then coax the joints together with a wood mallet and scrap block.

HIDDEN FASTENERS LOCK THE LAYERS TOGETHER



Once all the pieces are cut, I lay out everything on a table, then mark and label the pieces. Fine-tuning the notches happens now, too, so that assembly goes smoothly at the site.



SUPPORT BEAMS

Install the beam-and-cross-beam assembly. Test-fit post cutoffs in the beam notches before hoisting the unit on top of the posts. Slight adjustments to post locations are made by loosening the spacer clamps.



PURLINS



JOISTS

Add the purlins and joists. Any adjustments to lap joints are made on the ground in the dry-fit/layout stage. Here, the top layer locks the bottom layer in place. Install long screws from above to keep the joints tight.

router equipped with a guide bushing and a straight bit. (This also could be done using a straight bit with a top-mounted bearing.) Between 1/4-in.-deep passes, I vacuumed the mortise to keep the router running smoothly. Using a saddlelike plywood jig, I was able to line up the mortise from both sides, leaving it perfectly square so that the cross-beam shoulder sits flush with the beam.

We cut the tenons on a tablesaw and cleaned up the tenon cheeks with a block plane, a chisel, a rasp, and a sanding block until they slipped into the mortises without binding.

After cutting the 3x6 purlins to length, we used a pattern to mark the curved ends, then made the cuts on a bandsaw. We used a drum sander to smooth out the saw marks. Next, we

laid the 3x6 purlins on the beam assembly, centering them over the beams and scribing notch locations with a marking knife. The 3/4-in.-deep lap joints lock the beams tight to the cross beams.

The topmost layer consists of five 3x4 joists placed over the 3x6s. The layout again began with finding the center of the lower layer. Once the 3x4s had been cut to length, I finished the ends with a simple 1/4-in. chamfer.

Corbels complete the details

The final pieces cut were the four corbels. I made a stiff paper template from a tracing of an existing corbel on the house and used it to draw the four corbels on pieces of 4x6 redwood. These pieces were cut on the bandsaw

and cleaned up on belt and drum sanders. I used a hollow chisel mortiser to cut 1-in.-sq. mortises about 1 in. deep in the faces of the corbels. I then made square plugs with finished, chamfered ends to fit snugly into these holes.

Assemble the beams and cross beams

Careful, precise work in the shop ensures that the assembly work on-site goes smoothly. With all parts cut and ready, it was time to assemble the canopy on the posts. We kept the beam-and-cross-beam assembly together, lifting it onto the posts as a unit. A small amount of fussing resulted in the beam notches sliding cleanly over the posts. We clamped the beams tight to the cross beams



and set the 3x6 purlins in place over the beams. The layer of 3x4 joists was assembled in the same way, resulting in a rigid structure that locked in place without fasteners.

When the final position of all pieces was established, we fixed the beams to the posts with 5-in.-long exterior screws. By drilling pilot holes up at an angle from the face of the posts into the beams, we were able to catch the tenons as well. These screws were countersunk, and the heads later were covered by the corbels. We used 8-in. screws to fasten the purlins to the beams and 5-in. screws for the

joists. Screws were countersunk slightly, and the holes were filled with silicone after the wood was coated with clear finish.

With the fence and gates installed, the pergola is now the centerpiece of the garden. My clients and I eagerly await the arrival of the final touch, clusters of white wisteria gracefully entwined in the redwood canopy. □

Chip Harley is a principal in the design/build firm Holland & Harley Construction Inc. in Berkeley, Calif. Photos by Christopher Ermides, except where noted.

CORBELS

Toe-screw posts to the beam assembly. Drill pilot holes and drive two 5-in. screws through each post and into the tenon. This permanently secures the canopy to the posts.



Install the corbels with hidden fasteners.

To locate the dowels accurately, use a dowel center, pressing the corbel up into the beam at the desired location on each post. Before inserting the dowel in the corbel, dip it in water and coat both ends with exterior-grade polyurethane glue. A screw through the mortise locks the corbel in place. Finally, glue a plug into the mortise to hide the screw head and to mirror the through-tenons.





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. □

Joseph Truini is a writer from Roxbury, Conn. This article is an excerpt from his book, *Building Sheds* (The Taunton Press, 2016). Photos by Geoffrey Gross, except where noted.

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). 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.



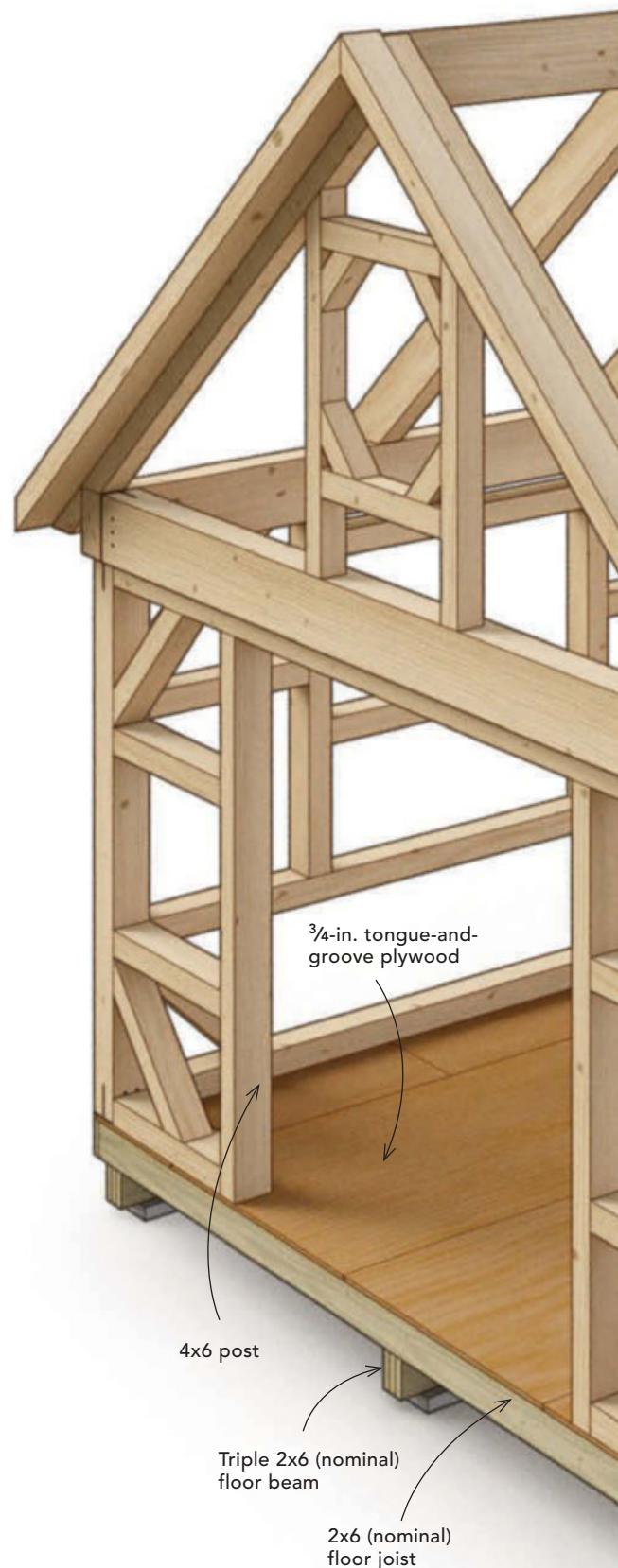
Chamfer the slots. A router fitted with a second plywood jig and a 45° chamfering bit eases the edges of the slots to allow the T-Rex connectors to sit flat against the post ends when inserted into each slot.

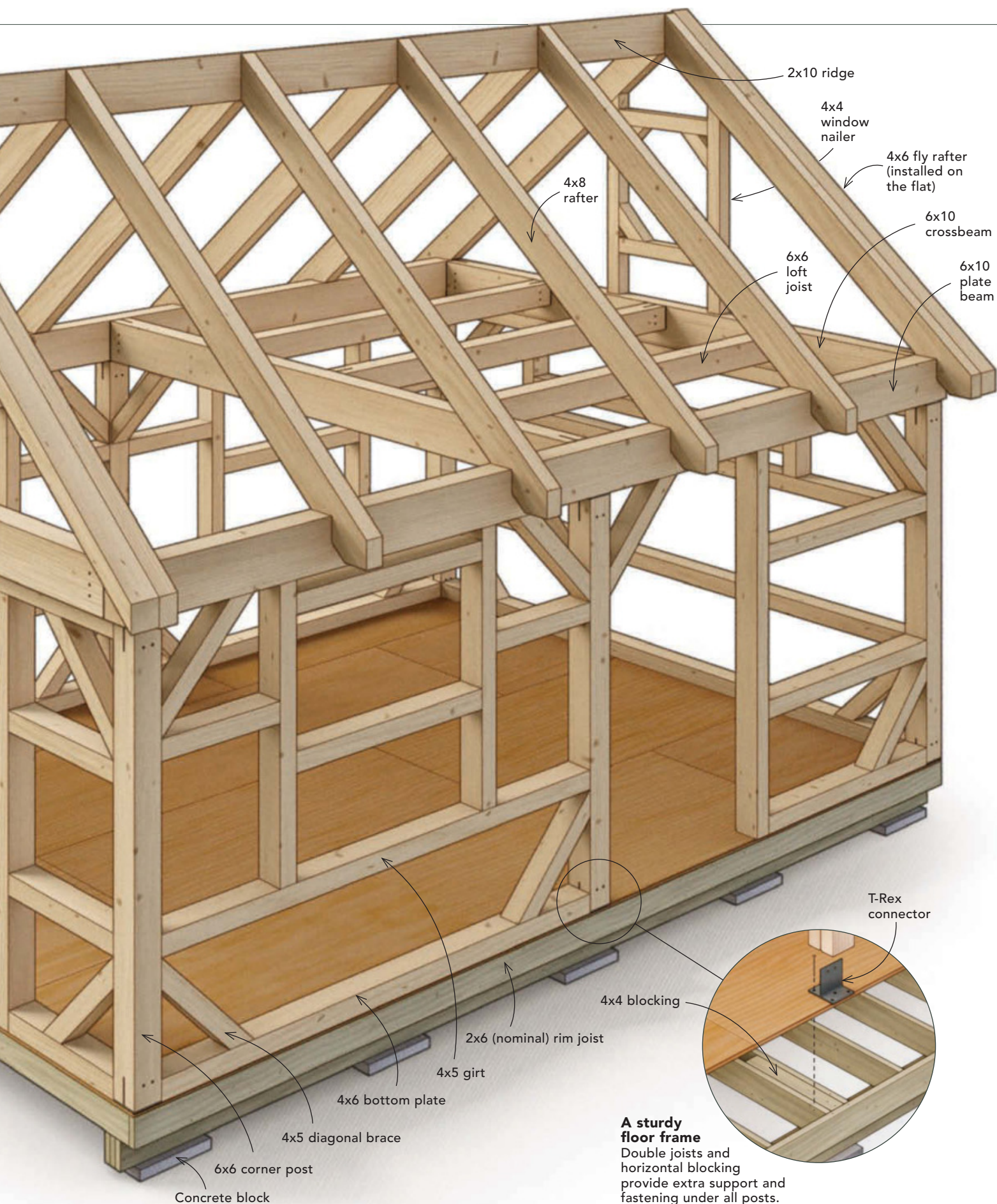


Bore the holes. Screwed to the post, a third jig made from scrapwood and two steel bushings provides an accurate way to drill holes for the aluminum pins that secure the posts to the connectors. Bore two holes clean through both the post and the connector with a 1/2-in. twist bit.

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.





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.



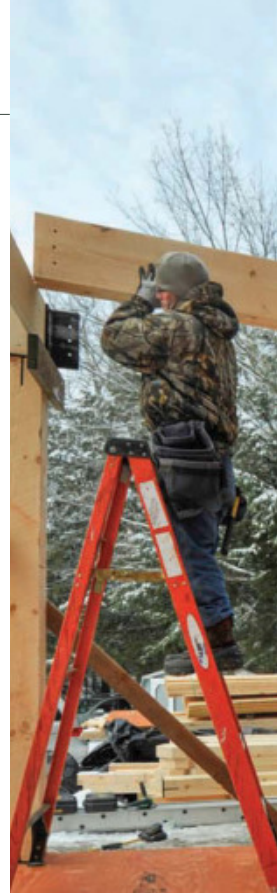
Braces hold the posts plumb. After securing all six posts (each with two pins), use a 4-ft. level and temporary 2x4 diagonal braces screwed to the posts to hold them plumb.



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.



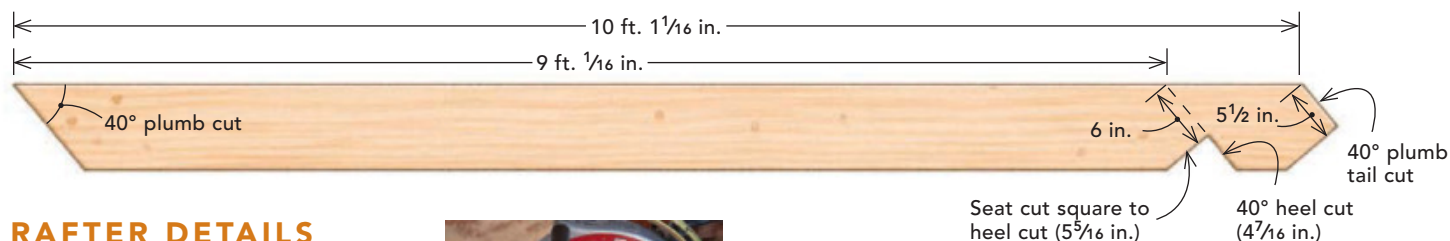
Crossbeam placement. Lower each crossbeam into place, fitting the connectors into the slots. Resting the crossbeam on the 2x6 cleats, hammer three aluminum pins through each end of the crossbeam.



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.



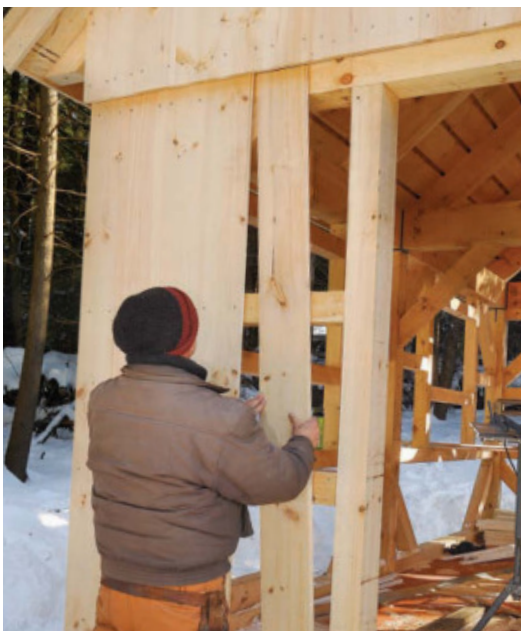
Start mid-gable. Cut each piece longer than necessary, with the upper end cut at 40°. Face-nail the right-hand piece plumb, with its tongue to the right. Rip and glue a spline in the groove, and install the left piece with its tongue facing left. Side in both directions for symmetry.



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

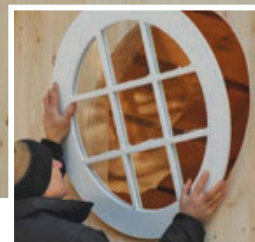
There is no mechanism to these windows. Closed, they simply sit on the sloped sill, held by the overlapping exterior trim and a barrel bolt. Open, they lean inward against keepers.



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

Backyard bliss

A collection of diminutive buildings shows how thoughtful siting and exemplary planning can yield a backyard destination you won't want to leave.

AN OLD-TIME GARDEN SHED

There's no obvious connection between burying utility lines and putting up a garden shed, but that's what happened at our house. After years of trying to get the power company to streamline a patchwork of wires that crossed over our backyard, the work finally happened. It meant that at last we could improve our yard without worrying about a trench carving it up in the future.

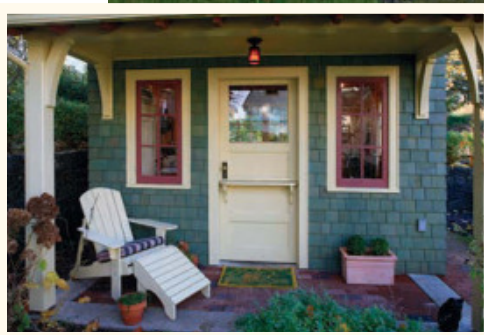
So we fixed the drainage; terraced the slopes; and built rock walls, a brick patio, and a pergola. We also left a spot in the southeast corner for a garden shed.

Initially, the shed's purpose was to store garden tools and supplies that were clogging the garage. Its role evolved into a place where we also could have tea and maybe even camp out with the grandchildren. The shed's most important purpose, however, was to anchor the corner of the yard visually, giving shape to a series of roomlike outdoor spaces.

Starting points for the design included a porch (teatime shelter on a rainy Oregon morning), a steep roof (18-in-12 pitch to relate the shed to the steep roof of the existing house), and no modern construction materials. We did use a modern design tool, though. Creating the design in SketchUp



Make it look old. Exposed framing with diagonal sheathing harks back to early-20th-century building practices. Recycled windows, an old Dutch door, and used brick emphasize the rustic feel.



Almost like a four-poster bed. Surrounded by bracketed posts, the porch extends the architectural details and colors that characterize the main house into the backyard.



It's a sleepover shed. Camp-style beds in the loft slip into dormers on both sides of the steep roof. The hatch in the floor between them leads to a pull-down ladder for access.

let us build the shed on-screen, right down to the number of studs. Our builder, Marv Glover, used both two- and three-dimensional views as he assembled the shed.

The shed's rectangular footprint measures 8 ft. 6 in. by 12 ft. 6 in.; a 4-ft.-6-in.-deep porch faces the yard. Stick-framed with 2x4s, the shed is sheathed with 1x10 pine boards applied diagonally and exposed on the inside as finished walls. All 12 windows are made from recycled sash. An extrawide pull-down stair leads to a loft, which has dormers front and back. We built a bed into each dormer, with storage underneath.

We compromised a bit on our old-materials-only directive. Besides an electrical system, we installed 1½-in. foil-faced rigid insulation under the roof and wall shingles to boost thermal performance. We also mixed our own weathered green stain for the shingles and used gloss enamel paint on the trim and other exposed wood.

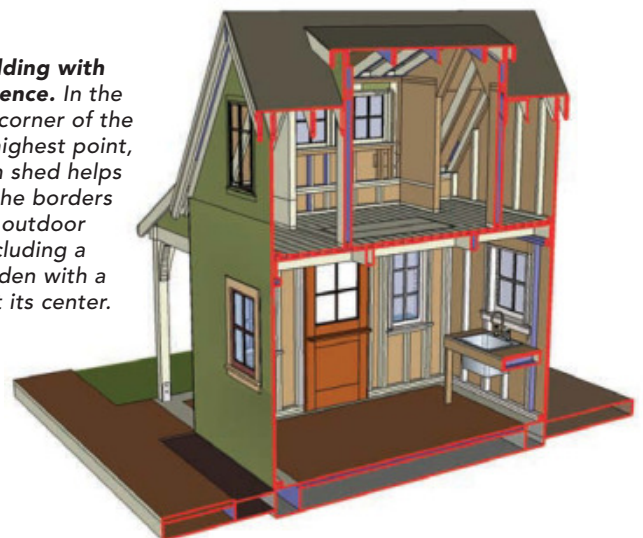
The shed is a pleasure to look at any time we're in the garden, and it's a wonderful retreat from the house. We love it. The grandchildren love it. In the summer, it is the last spot in the garden to be hit by the late-evening sunset. It glows.

Design David Edrington, Eugene, Ore.

Construction Marv Glover, Marv Glover Design & Construction, Eugene, Ore.

Photos Kent Peterson

A tiny building with a big presence. In the southeast corner of the lot, at its highest point, the garden shed helps to define the borders of distinct outdoor spaces, including a formal garden with a fountain at its center.





Behind the scenes.
Under an extended
roof, custom
threaded-rod
brackets provide
off-the-ground
storage for kayaks.

THE SHEDTEAU

A sobriquet coined by its builder, Gene DeSmidt, the shedteau is the chateau of sheds. Assembled with exemplary care and meticulously painted, stained, and oiled, the shedteau uses simple lines and materials. Perched on concrete piers, the building includes a cantilevered bench for seating at the small table and a workbench hung from rods. Bikes, camping gear, ladders, and all the earthquake-preparedness provisions that everybody on the West Coast should have and few do are stored inside.

Access to the shedteau is through a door made of recycled redwood with an old steel-sash window. The door rides on barn-door hardware from Richards-Wilcox. These timeless components would look at home on a steam-powered locomotive. The shedteau has its own accessories: custom bits

of hardware painted the same red as the Golden Gate Bridge. Made by Andrew Williams, the custom brackets support roof braces, anchor-tie rods, and even kayak storage shelves on the back side of the little building. At 120 sq. ft., the shed didn't have to go through a daunting permit process, and placed in the northwest corner of the lot, the building provides privacy for neighbors on both sides. It's a classic example of site repair: Improve the lot by building on the least desirable portion of it. The grapevine pompadour turns crimson in the fall.

Design Laura Hartman, Berkeley, Calif., fernauhartman.com

Construction Gene DeSmidt, Oakland, Calif., desmidtbuild.com

Photos Charles Miller



INTIMATE AND INVITING IN TOWN

What began as an addition to the main house and a garage replacement led to the total re-landscaping of this backyard. The sloping lot was graded and then finished with a retaining wall and pair of patios, all built using Vermont fieldstone. Because the house is nestled into the base of a small hill, the view from the neighbor's house is directly into this yard. To create a bit of privacy, the homeowner's architect brother-in-law designed the red-cedar and galvanized-steel pergola over the main patio. The addition of a children's play structure at the back of the yard completed the project.

Landscape design Cynthia Knauf, Cynthia Knauf Landscape Design, Burlington, Vt., cynthiaknauf.com

Hardscaping and installation Church Hill Landscapes, Charlotte, Vt., churchhilllandscapes.com

Pergola design Michael Willoughby & Associates, Birmingham, Mich., mwa-architects.com

Pergola construction Red House, Burlington, Vt., redhousebuilding.com

Photo Susan Teare, susanteare.com



NIGHTTIME IN NEW HAMPSHIRE

A screened porch and stone terrace were added to this home as part of a whole-house remodel. The porch features motorized retractable screens that open it up to the rest of the terrace. To add interest and functionality, the designer incorporated recessed areas into the terrace for gardens and a fire pit. From the fire pit area you can sit back and enjoy the view yet still stay warm on chilly New Hampshire nights.

Design Richard G. Holt, Cormack Construction Management, Madison, N.H., cormackconstructionmanagement.com

Landscape design and installation R. Theresa Puza, Gardens to Imagine, LLC, Henniker, N.H., gtiarborists.com

Photo Cheryle St. Onge, cherylestonge.com



MODERN-DAY TIMBER-FRAME PAVILION

This living and dining pavilion and pergola near Portland, Oregon, was added during the whole-house remodel of a timber-frame home. The pergola and pavilion were crafted with reclaimed industrial timbers salvaged by Pioneer Millworks. The 560-sq.-ft. pavilion includes an outdoor kitchen and dining space as well as a cozy seating area complete with Rumford fireplace. With additional bar seating and built-in benches, there's plenty of room for entertaining family and friends and enjoying the incredible views on all sides.

Design Jonthan Orpin, Maxine Bromfield, and David Shirley, New Energy Works Timberframers, Portland, Ore., newenergyworks.com

Construction Kevin Reese, K. Reese Enterprises, Lake Oswego, Ore.

Photos Loren Nelson Photography, lorennelsonphotography.com, courtesy of New Energy Works Timberframers





project gallery



STUDIO AND STORAGE

Don't let the pretty face and cozy interior of this little structure fool you; it's actually Deborah and Norman Lee's backyard storage building. This hardworking shed, christened "the cottage" by the Lees, is a marvel at multitasking. The 9½-ft. by 6-ft. interior provides plenty of wintertime storage for deck and patio furniture. When warm weather arrives, interior decorator Deb moves her drafting table and a comfy daybed into the space, and the storage area is transformed into the perfect outdoor studio. The shed's windows and door were salvaged from a neighbor's renovation project, and the shed's roof is outfitted with a rainwater-collection system for the Lees' gardens. As an added bonus, the Lees agree there's no better place for watching the sunset at "happy hour" than the inviting bistro set on the cottage's deck.

Design and construction Deborah and Norman Lee, Dartmouth, N.H.

Photos Norman Lee





SHED FOR A MODERN GLASS HOUSE

Architect Mark LePage says this shed “turned out to be one of our favorite projects.” After his company completed a full restoration of a 1969 contemporary house, the homeowners requested that his company design and build a modern shed to complement the house and pool.

Design Mark R. LePage, Fivecat Studio Architecture, Pleasantville, N.Y., fivecat.com

Construction Cascade Construction, Mt. Kisco, N.Y., cascadenyc.com

Photo courtesy of Scott LePage Photography

PLAYHOUSE AND STORAGE IN AN OLD GARAGE

Double-hung windows, dormers, and a cupola transform this detached garage into an outbuilding with character and purpose. An attached ladder provides access to a small hideout.

Photos Tom O'Brien





BRINGING IT ALL TOGETHER

The main level of this bank barn is used as a gathering place for entertaining friends and family. A more recent addition, the 16-ft. by 24-ft. Pennsylvania bluestone terrace, was designed and built by Church Hill Landscapes. It gracefully connects the house and barn and provides an inviting outdoor area for cooking and dining, and with its dry-laid retaining walls of Adirondack fieldstone and radius bluestone steps custom-fabricated on site, the terrace appears as if it's always been a part of the bucolic Vermont landscape.

Design and construction Nate Carr, Church Hill Landscapes, Charlotte, Vt., churchhilllandscapes.com

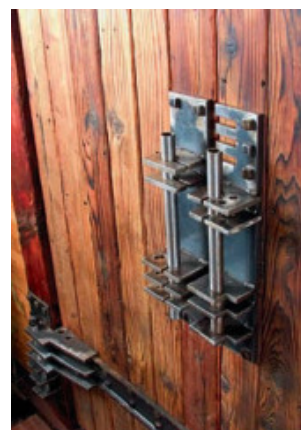
Photo Susan Teare, susanteare.com



SHINTO SHED

The extreme simplicity of the ancient shinmei-zukuri style of Japanese architecture inspired Glenn Montgomery's 9-ft. by 12-ft. shed. The winning entry in our "Show Us Your Sheds" online gallery contest, this shed is based on the design of Japan's Ise Grand Shrine. Montgomery built much of the shed from reclaimed materials. These included 6x16 old-growth timbers salvaged during a renovation of Denver's original Neusteter's department store and semirotten 2x6 decking that Montgomery culled, denailed, ripped, and rabbeted to create the redwood siding. The steel platform was salvaged from commercial-foundation lagging, and the joists are

repurposed Unistrut rescued from job-site roll-off containers. New corrugated galvanized roofing, glazing, fasteners, and some steel plate rounded out Montgomery's materials list. Early in the shed's design phase, Montgomery decided that the large overhang would make a good shelter for new finds that were destined for his shed and, once that was completed, future projects. With each load of salvaged materials, Montgomery reassures his patient wife, Debbie, that he will "build something with it someday." But as everyone knows, job-site salvage can't just be taken home and reused immediately. It must be seasoned for at least five years.



Montgomery designed and fabricated the custom door pulls and hinges.

Design and construction Glenn Montgomery, Colorado Springs, Colo. **Photos** courtesy of Charles Walters Photo

STORYBOOK SHED

During cocktail hour one night, Karen Metzger sketched her ideal garden outbuilding. That was all that her husband, Greg, needed to begin work on their 8-ft. by 12-ft. shed. Built mostly with salvaged materials, the shed has top-hinged windows for ventilation, a gable and loft for storage, an oversize rear door for bringing in large equipment, a potting bench, and even a place to display the antlers they found in the woods.

Design, construction, and photo

Karen and Greg Metzger, North Tonawanda, N.Y.



POTTING SHED AND MORE

What began as a simple shed evolved into a 16-ft. by 20-ft. outbuilding. A 12-ft. by 24-ft. shed-roof extension wraps around the rear and side to shelter tractors and yard tools, the east-wall window provides natural light for a potting station, and a loft has storage for an "endless pile of construction debris" from ongoing projects. The doors, windows, and finish materials reflect design elements in the house and barn.

Design, construction, and photo

Michael Shipe, Stephens City, Va.



THE QUEEN'S MAGICAL SHED

Using the remains of projects "full of goodness," Rory McDonnell constructed this shed full of "good light and air circulation." Too lovely to be used for storing the lawn mower and out-of-season sporting goods, the shed was claimed by McDonnell's wife, Catherine, as a tree-sheltered retreat for dreaming, napping, and creating art.

Design, construction, and photo
Rory McDonnell, Build, Stratford, Ont.

CEDAR-SHAKE GARDEN SHED

Built on piers so that it could be moved with a forklift if needed, this garden shed was built for the owner's new riding mower. The walls were sided with cedar shakes to match the house and were painted dark green to minimize the visual impact in a tree-filled yard. False windows were installed to add interest to the otherwise plain walls. Homeowner Nick Poepping says the shed was a "fun project and definitely adds a focal point" to his wife's flower gardens.

Design, construction, and photo
Nick Poepping, Quincy, Ill.



Garden sheds with style

BY ROXANA VARGAS-GREENAN

In my neighborhood, the majority of houses have a storage shed tucked somewhere in the backyard. It's often placed in the most inconspicuous location on the lot with little attention given to its scale, its design, or the quality of its materials.

However, by paying attention to the scale of a storage shed and by placing it sensitively in the landscape, you can transform it into a garden shed, a decorative focal element in the yard.

Purpose and proportions dictate shed size

The first thing you need to determine is the size of the shed, a function of both the shed's purpose and the size of the garden. Start by considering how the shed will be used. Will it be available for an activity such as potting? Will it be a backyard destination with an adjacent sitting area or patio? What items will be stored in the shed: outdoor tools and toys or overflow items from the house? Make a list of the things you want to store to estimate the space you need.

At a minimum, a garden shed needs to be 3 ft. deep for storage. Shelves maximize storage, but they should be at least 13 in. deep. To improve access, consider double doors to expose more of the interior.

If the shed will be used for an activity such as potting, you'll need a small work area inside or outside the structure. I like a counter about 3 ft. long and 2 ft. deep. For an inside workspace, you also need room to move around, generally about 3½ ft. of depth (enough for a small chair).

A shed that is too large will look out of place and will diminish the usefulness of the yard. I prefer to limit the footprint of the shed to a proportion of garden size. For small gardens (up to 900 sq. ft.), the shed can be up to 3% or 4% of the garden. For a garden between 900 sq. ft. and 1500 sq. ft., devoting 5% to a shed is OK, but generally, I would not exceed 100 sq. ft. In a garden 3000 sq. ft. or larger, I suggest limiting the shed to 150 sq. ft.

Site the shed thoughtfully

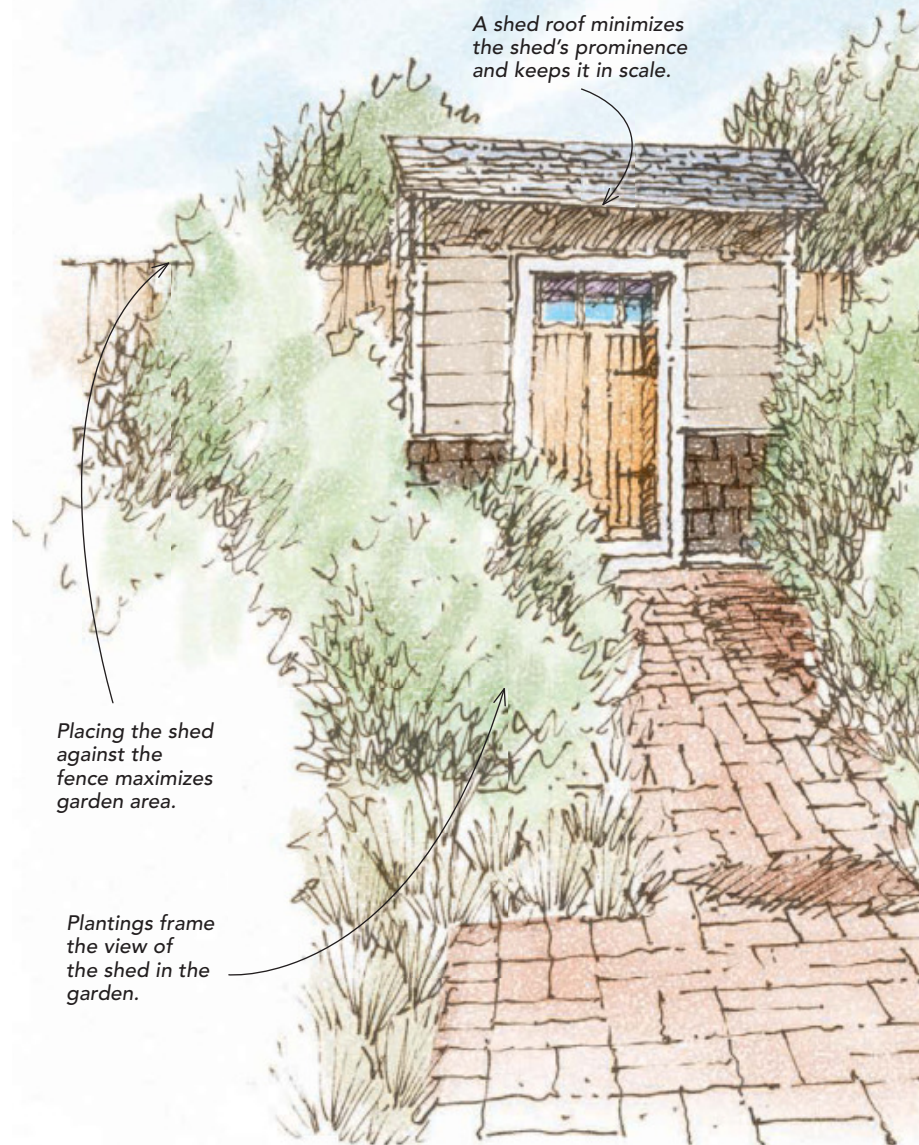
The garden's style also influences the shed's placement because the structure should be an integral part of the garden design. If the

garden has a formal layout, the shed will likely play a major role as the focal point of several views within the garden. In a more informal or picturesque garden, the shed can be placed along a meandering path or be revealed slowly through layered plantings rather than be seen from all vantage points.

As you think about placement, consider the shadows that the shed will create. Placing the shed on the north side limits shadows and maximizes sunlight in the garden.

Details create appeal

Generally, the shed's style draws inspiration from the house. However, if the house doesn't have a distinctive style or if the



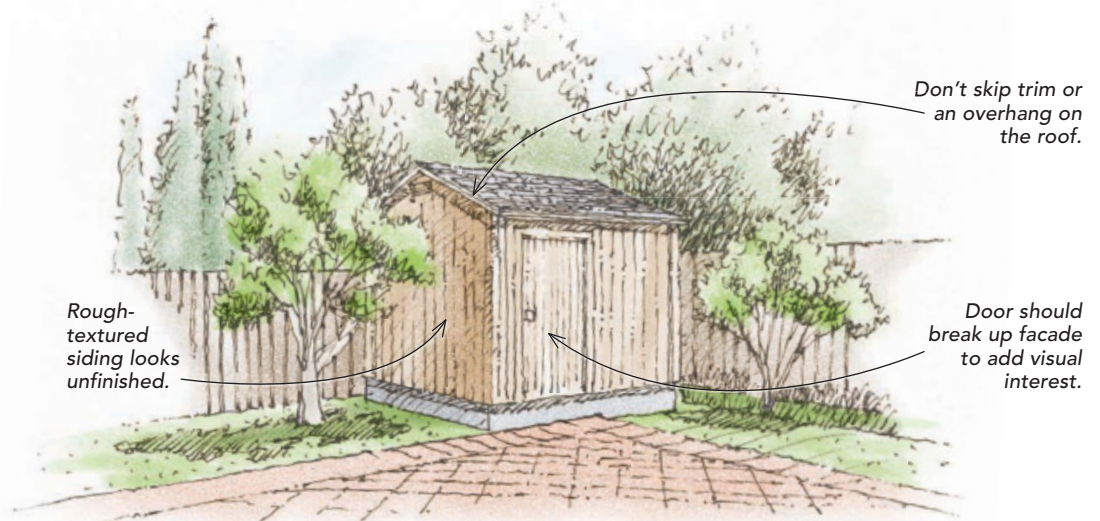


MIMIC THE HOUSE, BUT REDUCE THE PROPORTIONS

This shed draws inspiration from the house, sharing the primary siding and trim elements. It's appropriate to reduce the size of the shed's details proportionally to match its smaller scale. For example, the siding exposure might be reduced, and the rafter tails might be 2x4s instead of the 2x6s on the house. The roof's low pitch helps to keep the height appropriate for the shed's 4-ft. by 6-ft. footprint. On small sheds, avoid steep roofs such as a gambrel or front gable. Although there isn't room for a window, the small glass lites in the door offer enough transparency to prevent a fortresslike feel.

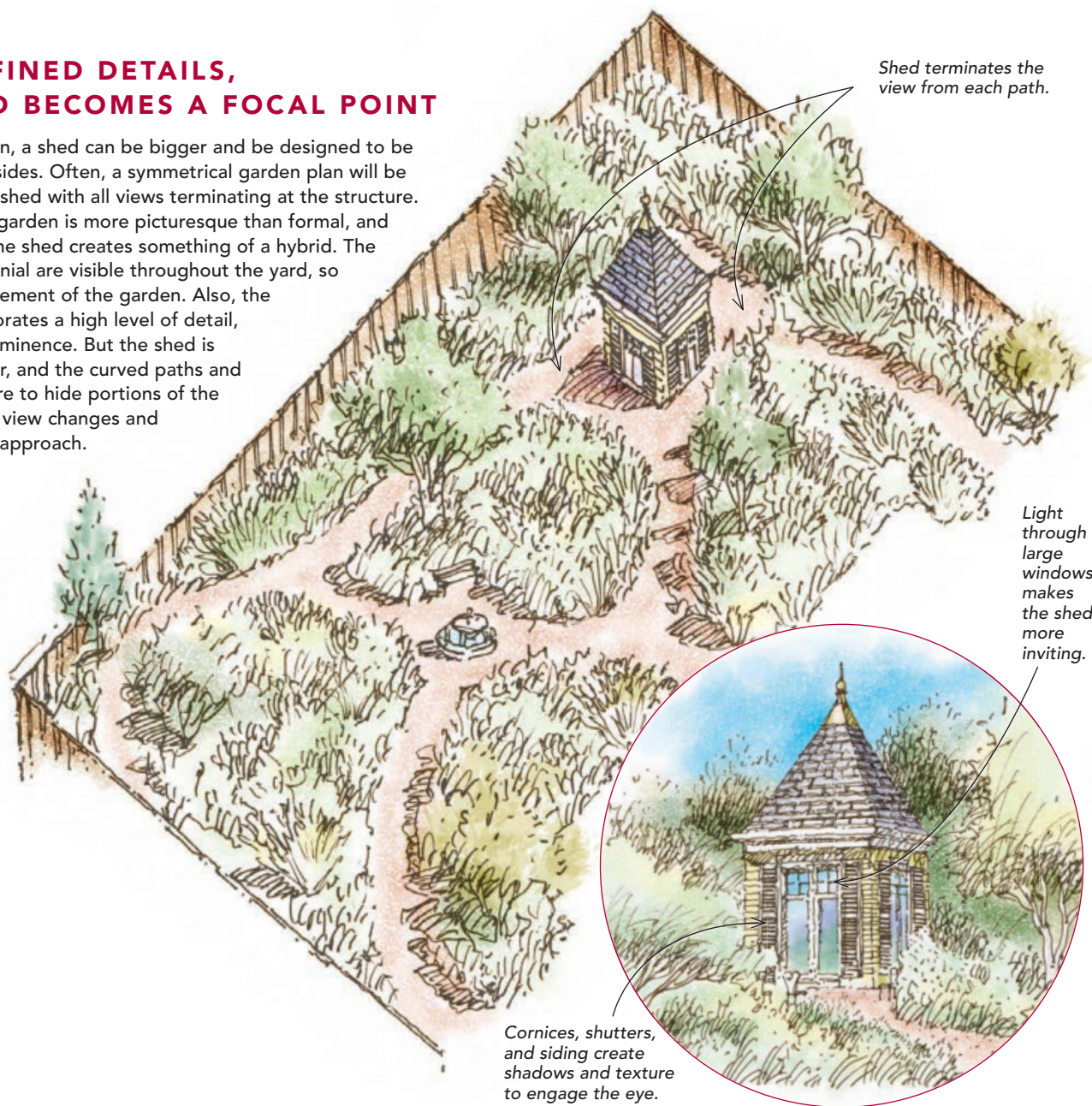
YOU CAN'T HIDE A BAD DESIGN

In a small yard or garden, even a small shed immediately attracts the eye and becomes a focal point, so don't try to hide it by tucking it into a corner. This shed is probably slightly too large for the space, but the problem is exacerbated by a flimsy-looking roof, monolithic facades, and poor-quality materials.



WITH REFINED DETAILS, THE SHED BECOMES A FOCAL POINT

In a larger garden, a shed can be bigger and be designed to be viewed from all sides. Often, a symmetrical garden plan will be centered on the shed with all views terminating at the structure. In this case, the garden is more picturesque than formal, and the location of the shed creates something of a hybrid. The steep roof and finial are visible throughout the yard, so it's the central element of the garden. Also, the structure incorporates a high level of detail, reflecting its prominence. But the shed is slightly off center, and the curved paths and plantings conspire to hide portions of the shed so that the view changes and surprises as you approach.



garden is far from the house, you have a bit of leeway. In these cases, the plantings can lend themselves to a particular style. For example, softer flowering plants lend themselves to a traditional look, while more structural plants, such as bamboo, can relate to modern designs.

Regardless of style, sheds are viewed close up, so use high-quality materials. I avoid plywood siding and synthetics (vinyl and plastics). I pay particular attention to the craftsmanship of the doors, the size of the roof overhang, and the size and placement of the windows.

The shed's reduced scale makes the door a prominent visual element. Doors should be a minimum of 6 ft. tall. Their style can

vary—carriage-door style, tongue-and-groove planks, or simple patterned doors—but the emphasis should be on quality. For an unpainted door, cedar's warm color tones and weather resistance work well. Fir and poplar are common for painted doors. I find that iron hardware complements unpainted wood surfaces, while brass hardware is appropriate for a more finished design.

The roof should have an overhang to lend mass to the roof edge and to help protect the door. Without it, the shed will have an insubstantial and flimsy appearance. Even a 6-in. overhang can provide an impact.

Windows help to connect the shed to the house and break up the facade, especially on sheds that are the focal point of the garden

or that are larger than 75 sq. ft. The windows and trim should be similar to those on the house. However, if your budget is small, I suggest passing on the windows and putting the money toward high-quality siding and an attractive door. Use siding that provides texture and shadow, such as clapboards or shingles. If you want the shed to blend in with the landscape, leave the cladding natural, or paint it a shade of green. To distinguish the shed from the garden, add color. The trim color from the house often is a good choice.

Roxana Vargas-Greenan is an architect and urban designer in Berkeley, Calif. Drawings by the author.

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