

Turn Your Garage Into a Real Workshop

Make it comfortable and you'll spend more time there

BY MICHAEL PEKOVICH





I set up shop in the two-car garage of my Connecticut house when I started at *Fine Woodworking* 13 years ago. Coming from California, I wondered why so many folks in this area chose to work in their cramped basements rather than their spacious garages.

But when November came around, I understood. The propane heater I had installed was no match for the un-insulated roof and walls, cold concrete floor, and leaky garage doors. After emptying a 60-gal. propane tank in less than a month, my shop quickly became a three-season workplace and its floor space was increasingly devoted to bikes, camping gear, and chicken feed.

With access to the *Fine Woodworking* shop at work, I asked myself if I even needed a home shop, but after sharing the shop for years and watching rust develop on my woodworking machines at home, I finally decided I really needed my own heated workspace. This meant insulating the floors, walls, and ceiling, hanging and finishing drywall, and installing new doors. I also bought a manufactured shed to house all of the non-woodworking items that had been slowly encroaching on my workspace.

I'm a woodworker, not a carpenter, so a lot of the tasks on this project were new to me. Fortunately, with the folks at *Fine Homebuilding* just down the hall, I had access to decades of collective building knowledge. Admittedly, some of the building solutions I came up with might not be realistic on a typical building site where speed and efficiency dictate how to accomplish every task, but they made sense to me as a woodworker on a very tight budget. I hope they make sense to you, too.

Two garage doors—two different approaches

It was easy to see I was losing many of my heating dollars through the gaps in the garage doors. Weatherstripping and insulation kits are available for doors in good repair, but my old rotting doors had to go. The question was how to replace them. I thought about a set of steel insulated doors, but I didn't like the idea of hoisting open a roll-up door in the middle of winter and letting the cold air rush in.

Instead, I decided to replace one of the overhead doors with a normal walk-out door. This would

4 steps to a warmer shop



1. Install new doors



2. Add a wood floor



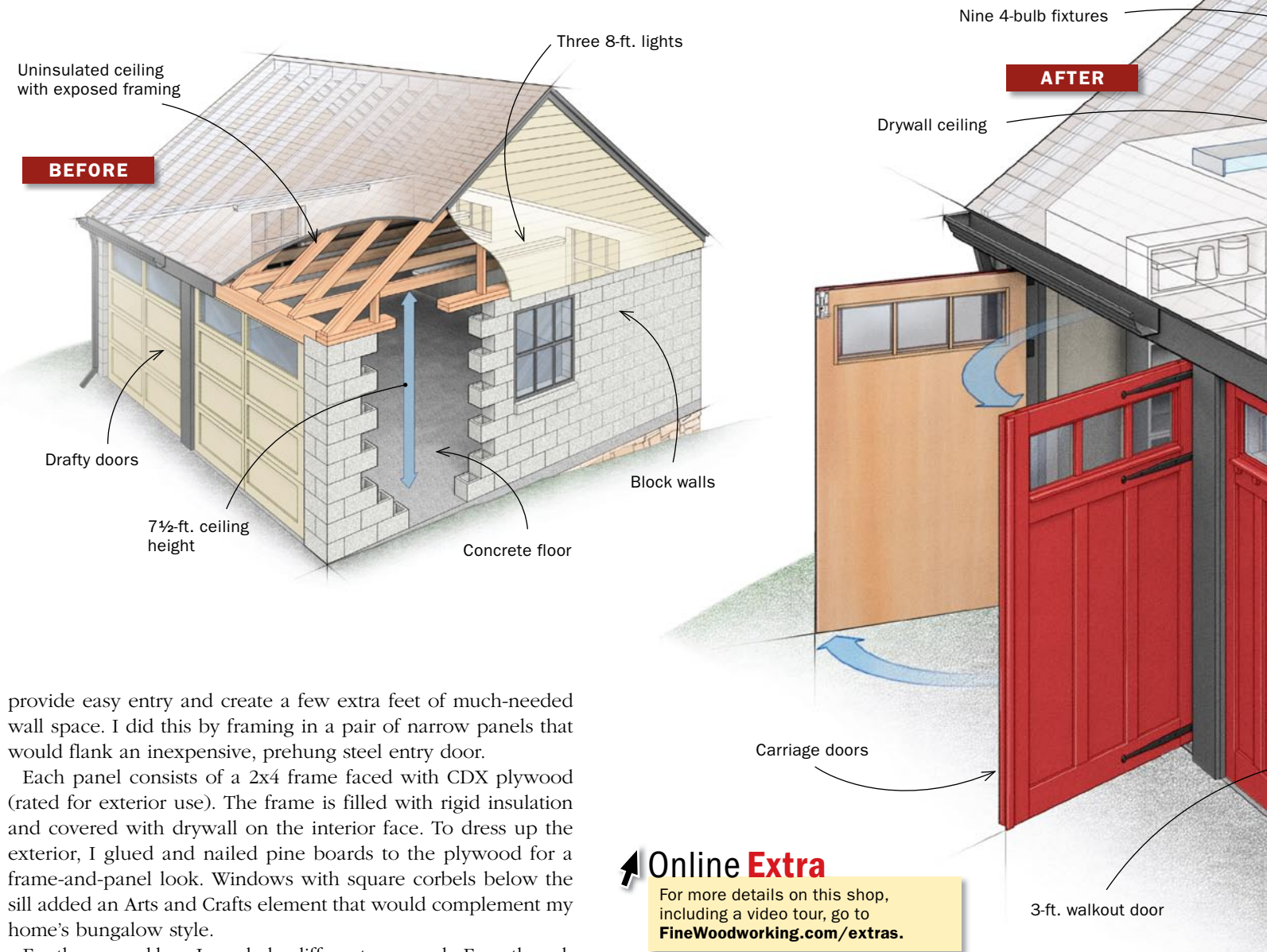
3. Finish the ceiling



4. Insulate the walls

THE BIG PICTURE

With its drafty doors and concrete floor, Pekovich's uninsulated shop was limited to warm-weather woodworking. Even in the summer, the low ceiling, dark walls, and minimal lighting made the space feel cramped and dreary. By adding insulation, improving the lighting, and replacing the garage doors with shopmade carriage doors, he transformed the space into a comfortable, year-round workspace.



provide easy entry and create a few extra feet of much-needed wall space. I did this by framing in a pair of narrow panels that would flank an inexpensive, prehung steel entry door.

Each panel consists of a 2x4 frame faced with CDX plywood (rated for exterior use). The frame is filled with rigid insulation and covered with drywall on the interior face. To dress up the exterior, I glued and nailed pine boards to the plywood for a frame-and-panel look. Windows with square corbels below the sill added an Arts and Crafts element that would complement my home's bungalow style.

For the second bay, I needed a different approach. Even though I never intend to park a car in the space, I still wanted to leave a door wide enough to drive through in case we ever decide to sell the house. I also like the idea of having a large opening for machinery and lumber, and letting in sunshine on nice days.

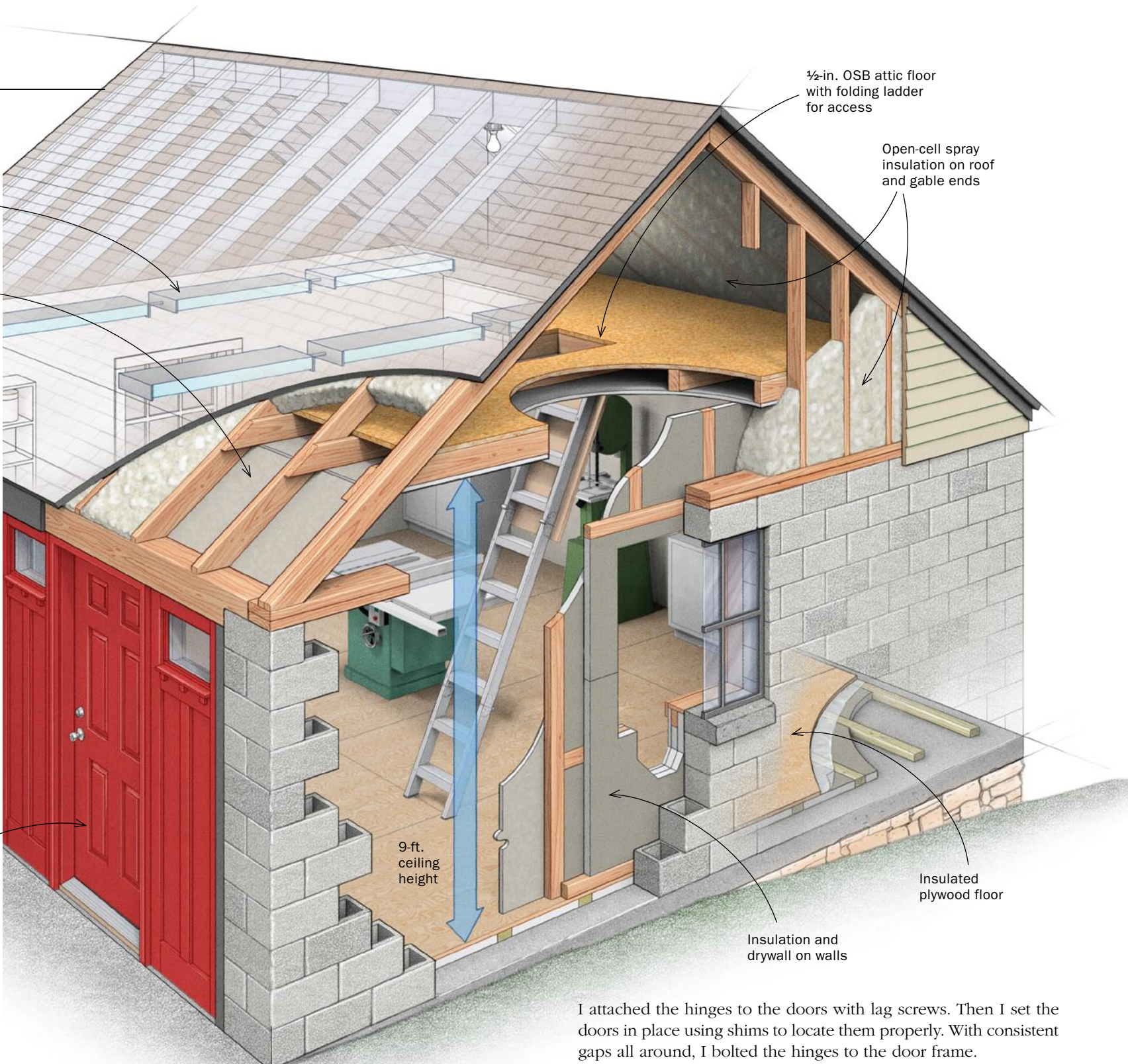
Instead of a roll-up door, I opted for a pair of swing-out carriage doors. I thought the carriage doors would be easier to weather-seal and would offer more insulation. Eliminating the garage door's overhead tracks would also give me additional headroom and provide greater flexibility with the lighting layout. After getting a quote of \$4,000 for professionally made doors, I decided I could make my own.

Carriage doors anyone can build—I wanted the doors to be lightweight, well insulated, and really rigid to resist sagging over time. True frame-and-panel construction didn't seem to be a good

way to accomplish any of those tasks. Instead, I chose a torsion-box design consisting of a solid-wood frame with plywood on each face, similar to the way a hollow-core door is made. This would create a very rigid structure with plenty of room for insulation.

I started with a 1½-in.-thick poplar frame joined with stub tenons. Long tenons aren't necessary; in fact, biscuits would work fine, because all the strength comes from the plywood skins. I used a dado blade to cut a ½-in.-wide by 1-in.-deep groove in the frame parts. I also used the dado blade to cut stub tenons on the ends of the parts to fit the groove. The frame was glued and screwed through the tenons.

I filled the cavity with rigid insulation and glued and nailed plywood to each face. This created a very rigid torsion box that should



1/2-in. OSB attic floor with folding ladder for access

Open-cell spray insulation on roof and gable ends

9-ft. ceiling height

Insulated plywood floor

Insulation and drywall on walls

resist sagging for many years. The outer face is 1/2-in. plywood while the inside face is 1/4-in. plywood to help keep the weight down. I added windows and framed the outside face with 3/4-in.-thick lumber for a frame-and-panel look similar to the other bay. The final result is 48-in.-wide door that weighs less than a typical solid-oak entry door, and at \$300, is far cheaper than a custom-built door. The guys at *Fine Homebuilding* were impressed.

I mounted the doors with long strap hinges that are plenty strong and look great. They were also very easy to install. First,

I attached the hinges to the doors with lag screws. Then I set the doors in place using shims to locate them properly. With consistent gaps all around, I bolted the hinges to the door frame.

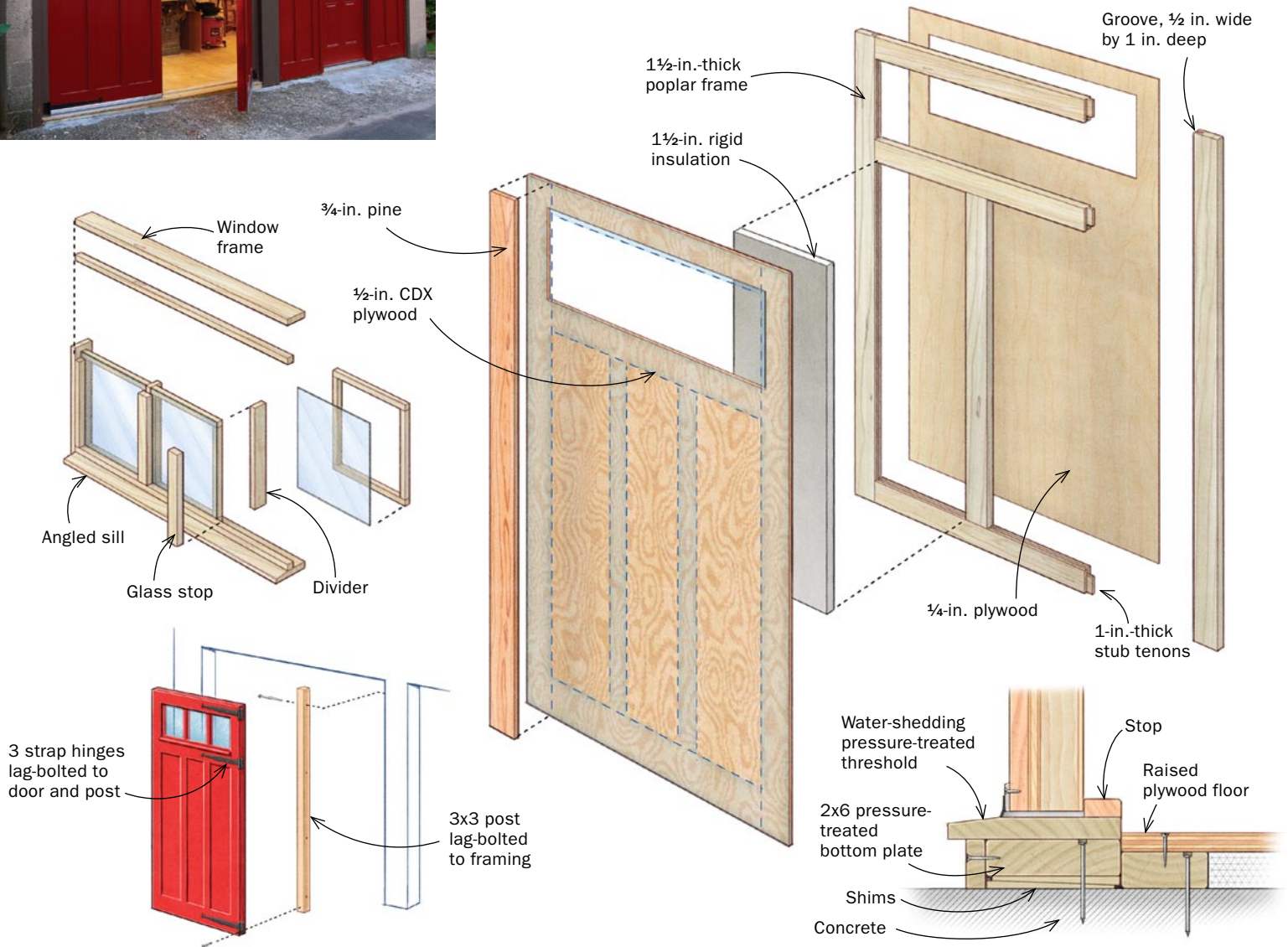
A wood floor is warm and easy on the feet

For the floor, I took a cue from an article on shop flooring by Scott Gibson (“Low-Cost Shop Floor,” *FWW* #160). I glued and nailed pressure-treated 2x4s to the concrete floor, placing rigid insulation in between. The insulation I used was the same thickness as the 2x4s, so I spaced the sleepers 24 in. on center. Normally a spacing of 16 in. would be necessary to prevent the floor from sagging under the weight of heavy machines, but since the rigid insulation has good compressive strength, 24 in. is fine. Before screwing the 3/4-in T&G (tongue-and-groove) plywood in place, I stapled

TWO OPTIONS FOR DRAFTY GARAGE DOORS

MAKE LIGHTWEIGHT CARRIAGE DOORS

Filled with rigid insulation and covered with a frame-and-panel treatment, Pekovich's shopmade carriage doors are an attractive and energy-efficient upgrade over conventional overhead garage doors. Torsion-box construction makes them lightweight yet very strong—and simple to build.

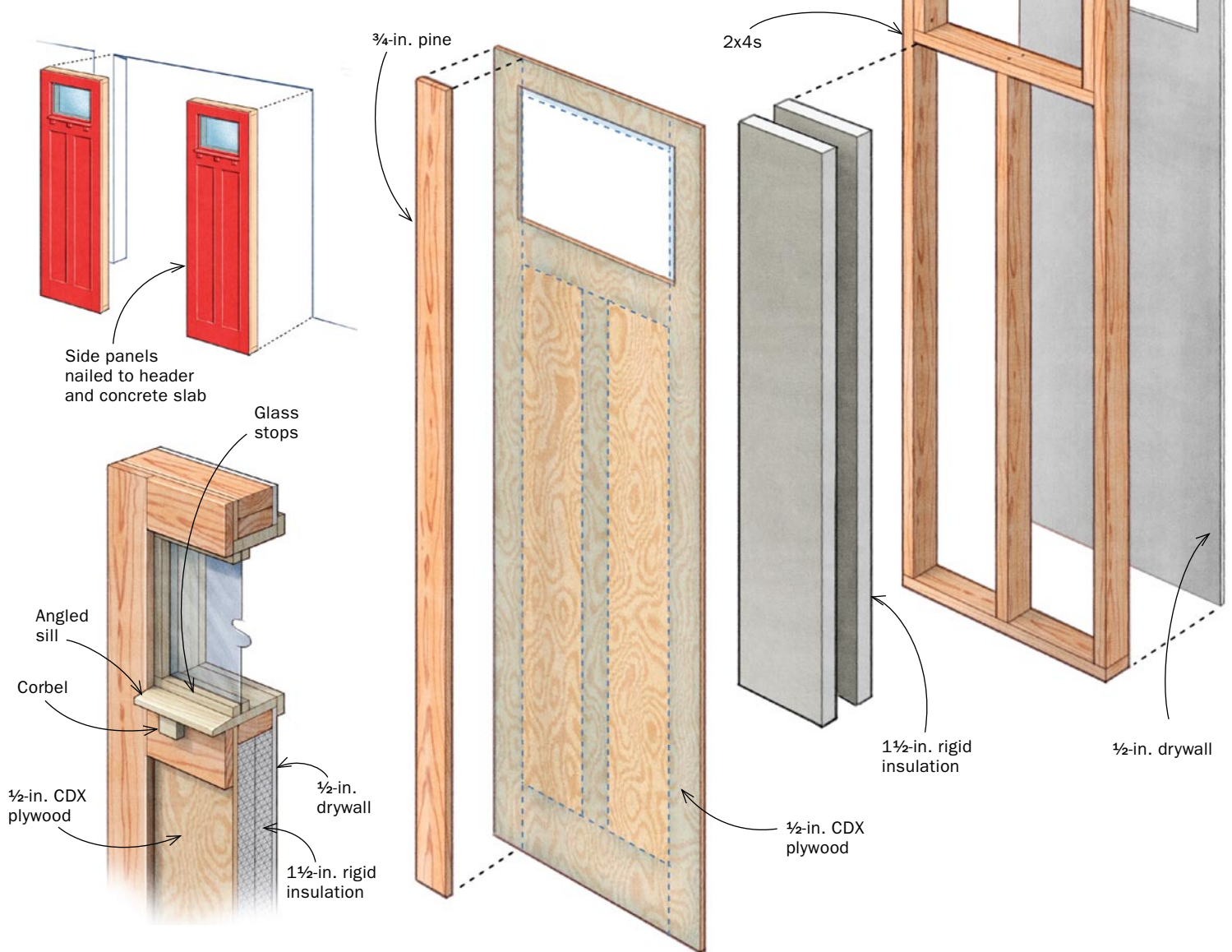


Poplar frame, plywood skin. A groove in the center of the 1½-in. thick poplar stock receives stub tenons formed on the ends of the rails with a dado set (left). Although most of the strength comes from the plywood skins, stub tenons help keep everything square during the large glue-up (right). Once the glue dries, the interior compartments are filled with 1½-in.-thick rigid insulation.

Pine dresses up the plywood. Pekovich applied flat pine pieces to create a frame-and-panel effect and an Arts and Crafts look.

FRAME IN A WALKOUT DOOR

Compared to a garage door, a 3-ft. (prehung) steel entry door makes it easy to come and go and its smaller opening reduces heat loss. Side panels flanking the walkout door were used to shrink the garage's original 8-ft. opening. They also provide additional light and boost curb appeal.



6-mil plastic over the insulation to act as a vapor barrier, just as Gibson recommended.

I moved as much as possible out of the shop by filling an 8-ft. by 12-ft. portable storage container (pods.com) that was dropped off in my driveway before construction started. Unfortunately, some machinery didn't fit, so I had to install the floor in two parts, moving the equipment from one side to the other. Installation would have been easier in an empty shop, but I was able to get the entire floor done in a day. The new floor is warmer, easier to sweep, and much kinder to my feet and joints.

Enclose the ceiling for a brighter, warmer shop

The ceiling posed a challenge. I like the looks and reflected light provided by an enclosed ceiling, but the bottom of my ceiling joists were now only 7½ ft. off my new plywood floor. The space

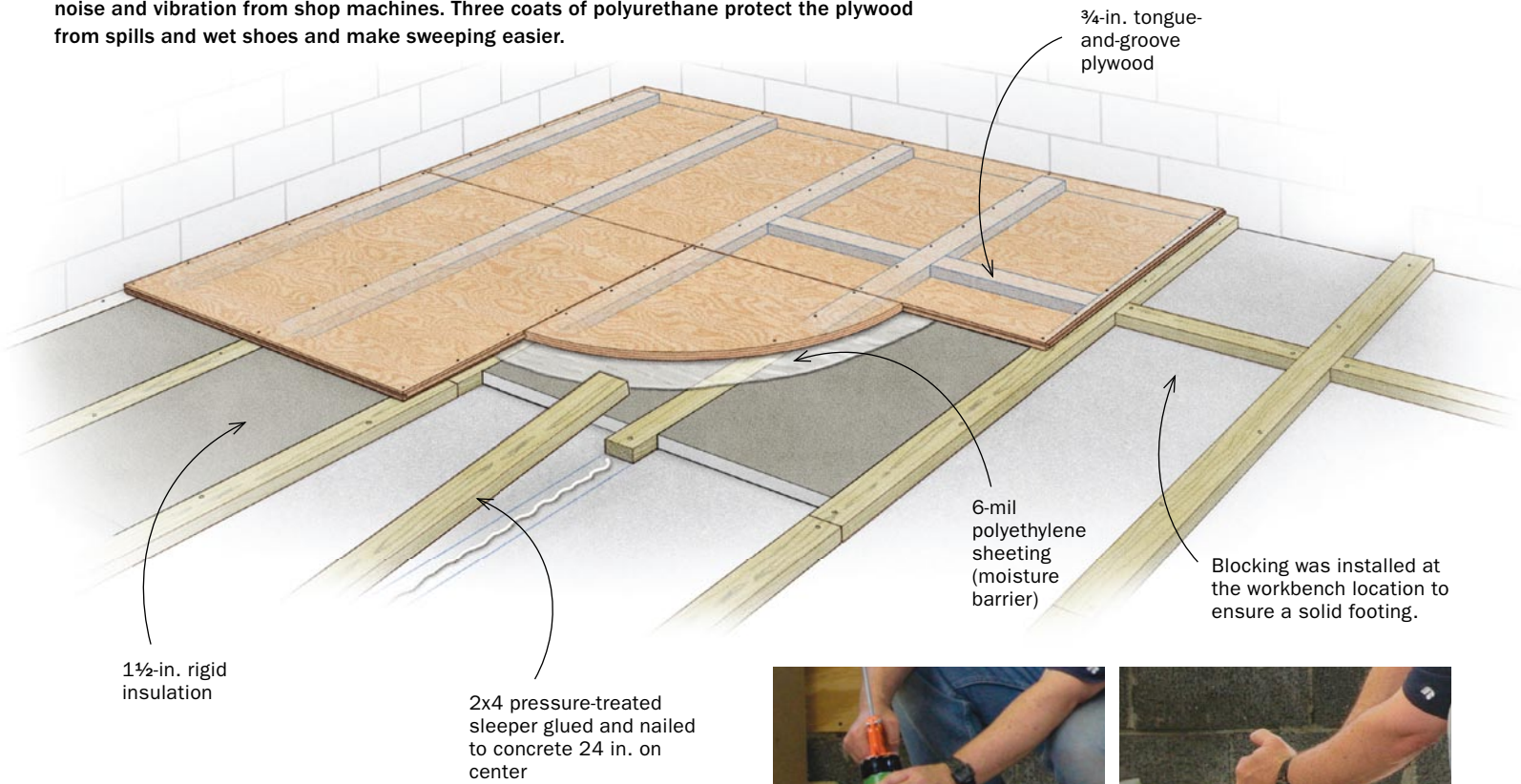
felt more cramped and claustrophobic. My first thought was to spray insulation on the underside of the roof and leave the ceiling joists open. The insulation contractor said I'd still need to cover the insulation with plywood or drywall if the joists were left open, so I decided to look into raising the joists and enclosing the ceiling.

I spoke to the local building department about my situation and an engineer in the department concluded I could raise the ceiling joists 2 ft. without creating structural problems. I had always thought of building inspectors as something best avoided on small home-improvement jobs, but on this project, they were a big help.

Again, I'm a woodworker, not a carpenter, so the idea of raising ceiling joists was a little scary. Fortunately, the actual process wasn't that bad. I was able to reuse the existing joists by cutting them one at a time and nailing them in their new location (some

PLYWOOD FLOOR ADDS WARMTH AND COMFORT

A plywood floor installed over rigid insulation is easier on the knees and helps dampen noise and vibration from shop machines. Three coats of polyurethane protect the plywood from spills and wet shoes and make sweeping easier.



local codes don't allow the reuse of materials, so check first). One smart thing I did was to rent a cordless Paslode framing nailer from my local home center.

The final ceiling is a lofty 9 ft. While the floor plan didn't grow, the shop now has a more spacious feel and by adding some 1/2-in OSB (oriented strand board) on top of the ceiling joists, I have some much-needed storage above the ceiling. To access that space, I installed a fold-down attic ladder and wired a light in the attic. For insulation, I decided to spray the underside of the roof with open-cell foam insulation. Since my rafters are only 6 in. deep, I only was able to achieve an R20. But since foam practically eliminates air movement, which experts say is the real nemesis in heat loss, it should perform very well.

When it came time to reinstall the lights, I decided on an upgrade. I replaced my three old 8-ft. two-bulb fixtures with nine 4-ft. four-bulb fixtures, effectively tripling the amount of light in the shop. With the addition of the white ceiling and walls, my shop now glows like a beacon.

Basement approach to wall insulation

The walls of a typical frame-construction garage are easy to insulate. But the walls of my shop are concrete block, so I used an insulation method more suited to a basement shop, but with a modern twist. Rather than frame out the concrete wall in the typical fashion with studs on edge and the insulation in between, I took a different approach.

On the advice of Rob Wotzak, an expert on green construction at *Fine Homebuilding*, I started by covering the masonry wall

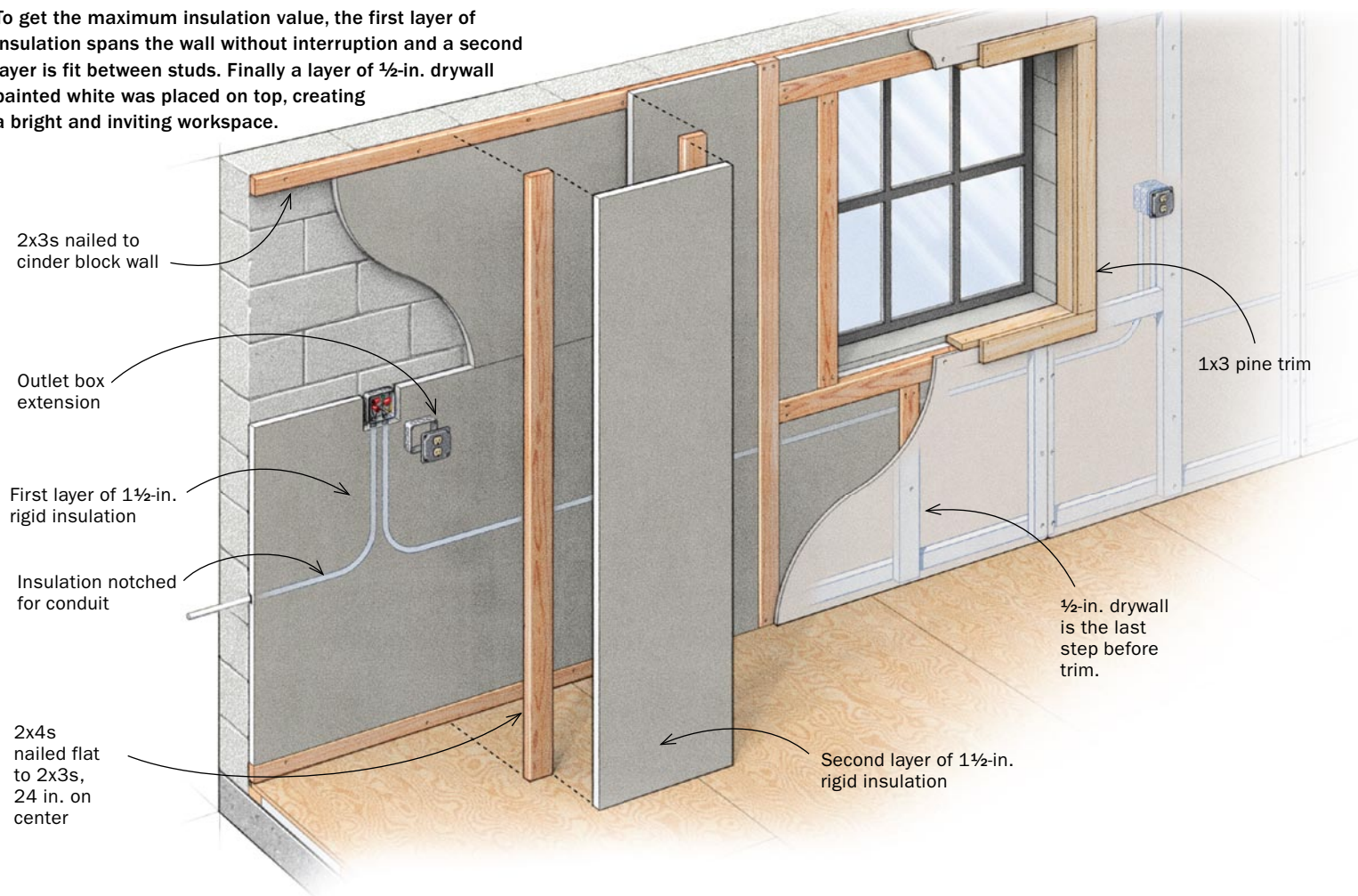


Simple process. Working from one wall toward the opposite wall is an easy way to ensure the 2-ft. by 8-ft. foam panels and 2x4 pressure-treated sleepers fit tightly together. After applying a generous bead of construction adhesive (left), Pekovich uses fasteners from a powder-actuated tool to keep the sleeper in position while the glue sets (right). Then the whole floor is covered with a layer of 6-mil polyethylene and 3/4-in. tongue-and-groove underlayment-grade plywood (bottom).



HOW TO INSULATE CONCRETE WALLS

To get the maximum insulation value, the first layer of insulation spans the wall without interruption and a second layer is fit between studs. Finally a layer of ½-in. drywall painted white was placed on top, creating a bright and inviting workspace.



with a continuous layer of rigid insulation, wedging it between a top and bottom plate that I nailed to the block wall. Over that, I attached the studs flat against the insulation, nailing them to the plates. From there, I installed a second layer of insulation between the studs and finished with drywall. Installing the studs on edge would have created a thermal bridge from the block wall to the drywall, reducing the insulating properties of the wall. The continuous layer of insulation between the block wall and studs acts as a thermal break and should result in lower heating bills. The finished wall is only 3½ in. thick but boasts an R-value over 20.

A true transformation

What started as a long-overdue insulation job ended up as completely transformed workspace. In replacing the doors, I wasn't looking to beautify my home, but the result is a quaint backyard shop that's bright and inviting.

It's not just the shop that has had a makeover. I've also picked up a few new skills. I've done some serious framing and remodeling. I've acquired new drywall skills and an appreciation for those people who do it well. Basic wiring is no longer a mystery to me. But, as much as I've enjoyed the new challenges, I'm happy to put my tool belt aside and get back to woodworking. □

Michael Pekovich is Fine Woodworking's art director.



Wall insulation in two layers. With 2x4 nailers already installed top and bottom, the first layer of insulation is put up horizontally and then studs are turned sideways and placed on top. A second layer of insulation is fit between the studs. Use spray foam to seal any gaps between the framing and insulation.