

POST-AND-PIER ROOM ADDITIONS



by David Bowyer

This one-room addition sits on a post foundation, surrounded by a parged pressure-treated plywood skirt. The concrete and wood posts have plenty of bearing strength to meet code, but cost less to install than a concrete foundation.

Years ago, I was planning a backyard room addition for a client. The addition was planned for the space occupied by an existing deck, and it seemed like a waste to demolish a perfectly good deck and tear up the yard excavating and pouring concrete. The customer owned a 2,000-sq. ft. condo in Florida that was built 10 feet off the ground on pressure-treated posts set in concrete. He thought he should be able to build a room addition in Illinois the same way, only two feet off the ground.

So I asked my local code official if we could build the room addition right on top of the existing deck. It took him some time to research, but in the end he consented. If the perimeter joist was doubled, and supported by 4x4 pressure-treated posts 4 feet on-center, set in concrete 48 inches deep, the load-carrying capacity of the deck would exceed all applicable load-bearing requirements.

Since then, small room additions built on post-and-pier foundations — pressure-treated posts buried in concrete — have become a big part of my contracting business.

Schedule and Cost Control

Building a post-and-pier foundation has a lot of advantages for me *and* for my customers. The first advantage is that since I don't need to sub out concrete, I am in control of the job schedule from day one. On small concrete orders like 30 linear feet of footing and frost wall, getting busy subcontractors and suppliers to do the job on a timely basis is a real bear. With a post-and-pier foundation, my crew can do all the excavating with a posthole digger, a pick, and a shovel, and we can mix our own concrete whenever we're ready.

Cost is a real factor, too. Often there's a minimum charge just to get concrete people on the site, which really bumps up the square-foot price of a small project. A post-and-pier foundation is far less expensive. For a typical 12x16-foot room addition, I figure I'm saving 25% to 35% on foundation work.

Just as important is the fact that we don't have to figure out how to get a backhoe and concrete truck into the client's backyard, where most small room additions are located. Just having that equipment on their lawn is

**Save time and money on
small room additions by
building on posts instead of
a poured foundation**



Figure 1. The author builds rooms on existing decks (left) with minimal damage to the landscaping. Even trees and shrubs growing right against the original deck are left untouched (right).

traumatic for homeowners, and the damage those big machines can do to septic systems and vegetation is legendary. Excavating a footing trench near an established tree can kill the tree, but when I build a room addition, I don't have to damage a single shrub (see Figure 1).

Finally, a post-and-pier-supported deck is much faster to install than any masonry foundation, and we can set our own standards for accuracy. We don't waste hours and hours of time compensating for an out-of-whack concrete foundation. With a post-and-pier foundation, "plumb, level, and square" are easy for us to control, which makes framing the room that much simpler right from the beginning.

Structural Considerations

Now, I can already hear people saying, "Wait a minute. Don't you need a concrete foundation to support the load?" The fact is, you don't need tons of concrete to hold up a room addition. As a matter of fact, concrete walls and footings are sized to meet concrete's structural limitations. The footing has to be thick and wide to support the weight of the concrete wall itself. And the wall needs to be as fat as it does because a thinner wall won't resist sideways soil pressures.

With a post-and-pier foundation, the soil surrounds the pier completely and all the pressure is directed inward. The weight of the wood framing above is supported not just by the footprint of the pier, but by soil friction around the pier.

My building inspector did the necessary homework and found that in our type of soil piers 4 feet on-center would do the job for single-story room additions.

In your area, you may have to prove to your code official that a post-and-pier system gives good enough bearing strength. If so, there has been enough data accumulated in the pole-building industry that the numbers are pretty well known. The American Society of Agricultural Engineers (ASAE) has created a design standard for post-and-pole foundations known as Engineering Practice Standard EP486, which can be used to engineer foundation systems for any given load requirement. EP486 is incorporated along with other design standards into the ASAE manual *Post Frame Building Design*, which can be ordered for \$39 from ASAE (Dept 1623, 2950 Niles Rd., St. Joseph, MI 49085; 616/429-0300).

Step by Step: Quick and Easy

If there is no existing deck, we start by bolting a ledger board to the house's band joist, setting the deck framing to the same height as the house's floor framing. Next, we frame just the outside perimeter joist of the deck, making a large square and level box, supported on blocks. Then we lay out the post locations 4 feet on-center around the perimeter, and use the layout marks as guides for digging our postholes (Figure 2).

We dig the holes as deep as we can with the posthole digger or power auger, which gets us well below the

3-foot frost line (Figure 3). The holes are about a foot in diameter, and we try to taper them outward a little at the bottom.

If we hit a big tree root or a large rock while we're digging, it's simple enough to move over a foot and dig a new hole. That kind of minor modification won't affect the structure, and it's well worth it to save a tree and save ourselves some time and aggravation.

We attach the posts to the box temporarily with nails. We suspend the posts in the holes, making sure they're plumb, with the bottom of the post 4 to 6 inches above the bottom of the hole.

When we pour concrete into the hole, it completely encases the post up to about a foot below finish grade. We use a premixed, bagged concrete such as Sakrete for our piers, mixing it by hand in a wheelbarrow. You can usually figure on one to one-and-a-half bags per hole.

With the poles in place, we add a second perimeter joist on the inside of the posts, giving a double perimeter with the posts sandwiched between (Figure 4, page 40). The posts and the double band joist are permanently connected together by two or three 1/2-inch carriage bolts that run completely through all three members. Then we lay a 6-mil poly vapor barrier over the ground and frame in the deck with 2x10s or 2x8s, depending on the span. Since there's no easy way to end-nail the joists with the rim joist in place, we use joist hangers.

We insulate the space between the joists with kraft-faced R-19 fiberglass

Post Foundation Details

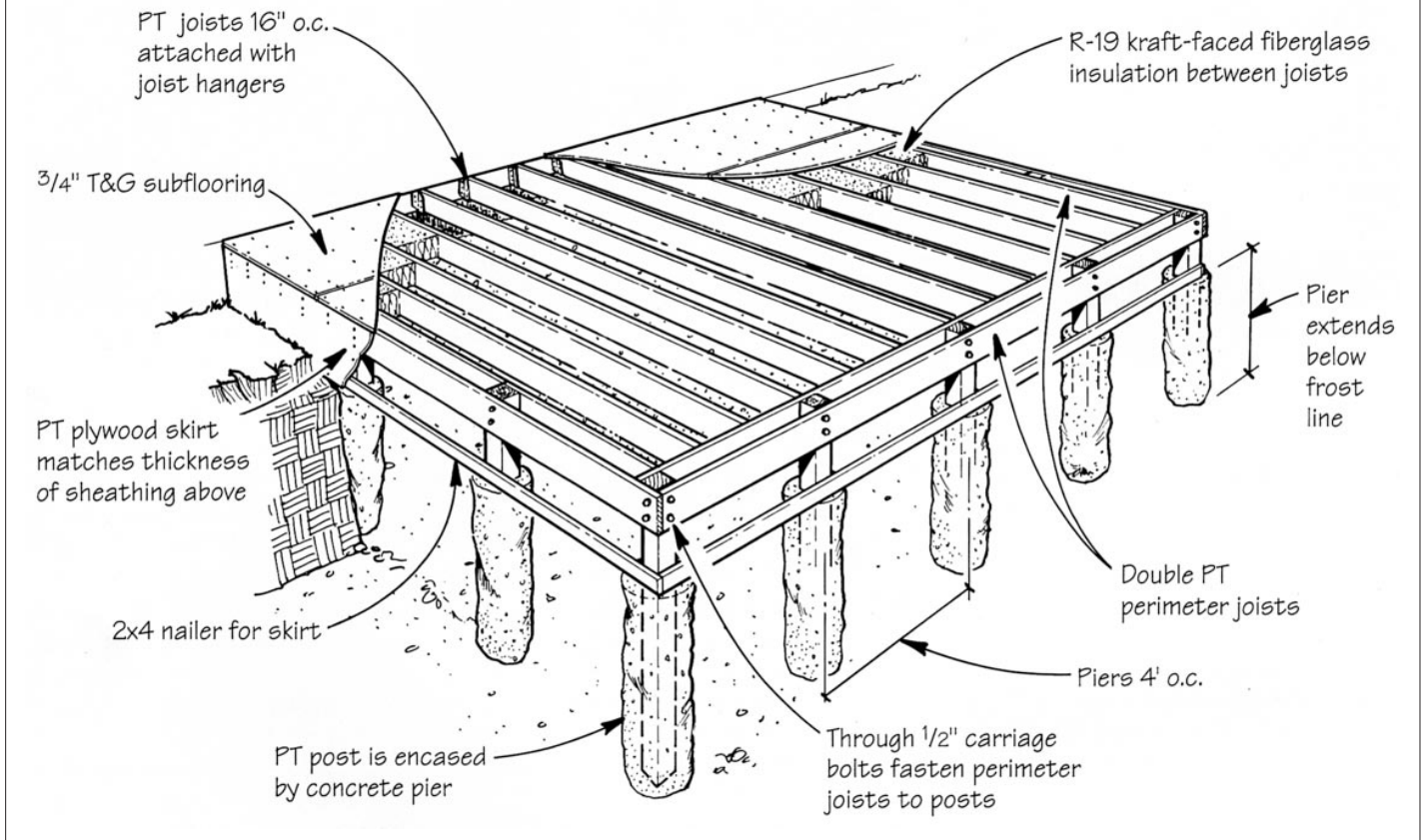


Figure 2. The author avoids the time and expense of excavation, forming, and pouring concrete by using a pressure-treated post and concrete pier foundation system. The friction of the soil against the concrete piers gives enough bearing capacity for single-story additions.

batts, stapling the paper to the top of the joists. A 3/4-inch tongue-and-groove plywood subfloor completes the deck.

Around the perimeter, we install a skirt of pressure-treated plywood, either 1/2 inch or 3/4 inch to match the sheathing used above. The top edge of the plywood nails to the perimeter joist of the deck; the bottom catches a pressure-treated 2x4 nailer about 1 foot below grade. We can then run the siding almost all the way down to grade level for a nice finish look.

There's an ongoing debate about the usefulness of crawlspace vents. I don't put them in unless the building inspector demands it. But if he does, it's a simple matter to saw a hole in the skirt and install a vent screen.

Of course, before you close up the space under the deck for good, you better check to make sure that you've remembered the ground vapor barrier

and that your mechanicals, if any, are in place.

Over an Existing Deck

Where there's already a deck in place that is sound enough to use, some of the framing work is eliminated. We dig down to inspect the posts and footings. Sometimes they're constructed well enough to use, but often we simply ignore them and install new posts and piers 4 feet on-center. We cut out a section of the existing decking big enough to get the posthole digger through, dig our hole, and tack on new posts with nails, pouring concrete around the posts as usual. We double up the existing band joist by spiking on another piece of two-by all the way around, and tie the posts and the band joist together permanently with 1/2-inch carriage bolts.

To insulate the floor, we put a layer of extruded polystyrene foam right over the existing deck boards. We use



Figure 3. A two-man power auger speeds the digging of pier holes.



Figure 4. Here, posts 4 feet on-center and a double rim joist are added around an existing concrete patio (left). The author removed only as much concrete as necessary to dig the postholes. With the PT plywood skirt in place (right), the framed deck is ready to build on.

2x8-foot sheets of foam, the same kind that's used to insulate foundation perimeters. We put in as much foam as it takes to get the subfloor up to a height that will match the inside floors of the house. Usually an inch or two does it, giving us around R-10 in the floor. The $\frac{3}{4}$ -inch AC tongue-and-groove plywood subfloor goes right on top of the foam — we screw through plywood and foam with long screws, right into the original decking underneath.

By the way, my tile and oak-flooring subs love this foam-sandwich subfloor. With no thermal conduction points, no air leaks, and no moisture penetration, they say it's the most thermally stable floor they've seen — they have no worries about thermal expansion or contraction.

Sometimes the joists of an existing deck aren't big enough to pass code requirements for an occupied space. When that happens, I usually install a carrying beam supported by a row of posts and piers under the center of the deck, cutting the span in half. A double 2x10 supported by piers 4 feet on-center is usually plenty.

Whether there's already a deck attached to the house or not, two or at most three days' work by a two-man crew is all it takes to get the platform done, including piers, framing, skirt, and subfloor. From this point on you can frame and finish just as you would over a concrete foundation.

Heat

Almost all heat in my area is forced air, coupled with air conditioning.

When we have to run heat into a room addition, we'll use flexible insulated duct and bring it through the house's band joist from the basement. Cold air returns are usually mounted on the wall of the house.

Often, an addition is designed as a three-season room, but the homeowner may want to use it occasionally during the winter — say when guests come for Christmas. The cheapest solution is to use a couple of small electric baseboard units. Although electric heat is costly, it will only be used occasionally, and then only to make up the small difference between the temperature in the add-on room and the temperature in the house. I think it's the most practical solution.

The choices the customers make determine the cost of their addition. A room with carpeting, sliding glass doors and no heat or air conditioning can come in for \$65 per sq. ft., which is the low end of what I'll look at. I call this the "Chevrolet Biscayne addition" — a no-frills basic structure. Towards the other end, I recently built a room addition with heat and air, oak flooring, custom Pella windows with slim-shades, and Andersen opening skylights, that was about \$125 per sq. ft.

I often give customers three basic proposals to work from: a high-end plan, a low-end plan, and a mid-range option. That way I'm my own competition, and I find that the customers like the feeling of being in control by choosing the appropriate design.

Selling the Job

Since I put that first room addition on an existing deck back in 1989, I've done dozens of them. I handle most of the selling for my company, and I've found that with a few strong referrals from satisfied customers, the advantages of this system make selling jobs much easier than a comparable room addition built on a concrete foundation.

I can reassure the homeowners that we won't have to tear up their entire landscape just to put a room on the house. That always makes them a lot more comfortable.

Best of all, I can give good value for the dollar. I don't usually go into the cost comparison between a post-and-pier foundation and a poured concrete foundation, because the customers almost always prefer the post-and-pier foundation anyway when they find out it means we don't have to tear up their property. But the money saved allows me to offer other options. When they compare my \$25,000 addition to the other guy's, they see that mine has a fireplace and his doesn't, or mine has some nice gable-end windows and his doesn't. And if I can start right away and he can't, that often seals the deal. I don't have to worry about whether the concrete guys can fit me into their busy lifestyle. I can go from signing a contract to ground-breaking to paint within four weeks. That really boosts customer satisfaction. ■

David Bowyer is designer and sales manager for Peacock & Co., a South Bend, Ind., remodeling firm.