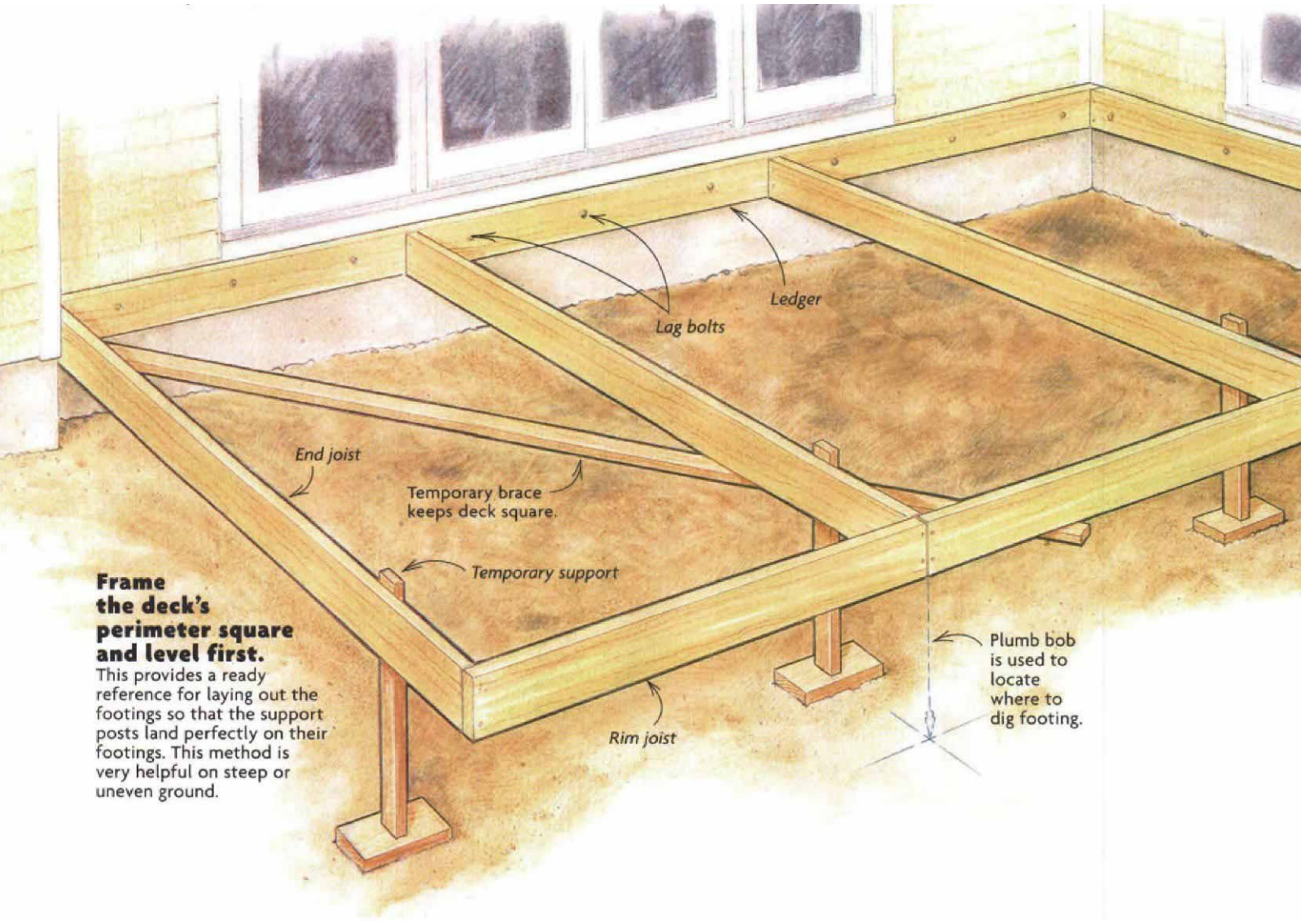
Getting a Deck off to a Good Start

Framing the perimeter first helps to ensure that the posts will land squarely on their piers

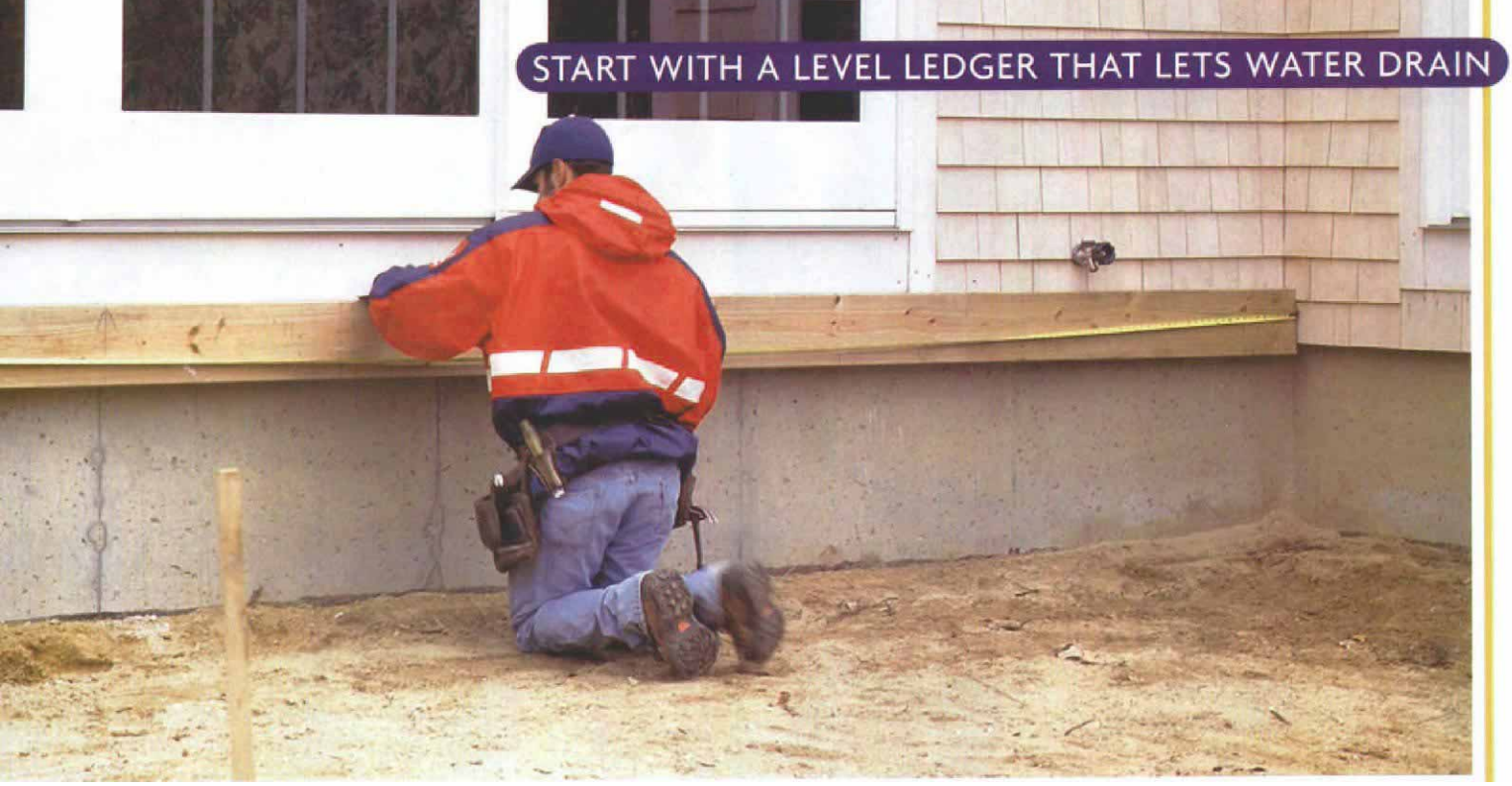
BY PETER J. BILODEAU

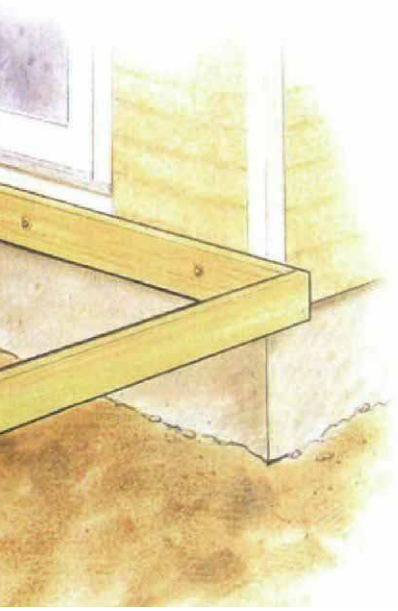


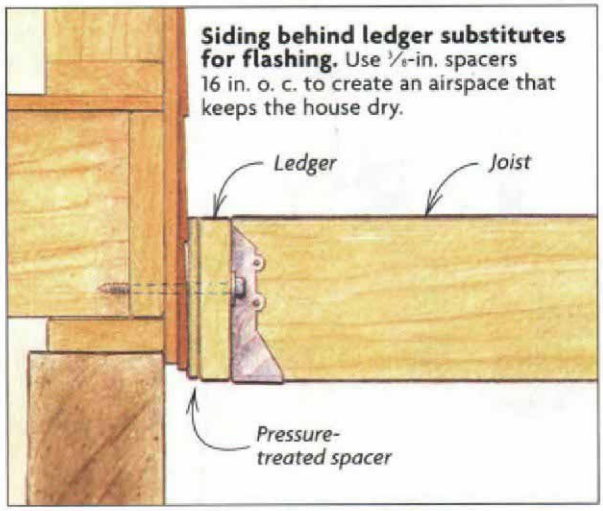
Frame the deck's perimeter square and level first. This provides a ready reference for laying out the footings so that the support posts land perfectly on their footings. This method is very helpful on steep or uneven ground.

Drawings: Dan Thornton

START WITH A LEVEL LEDGER THAT LETS WATER DRAIN

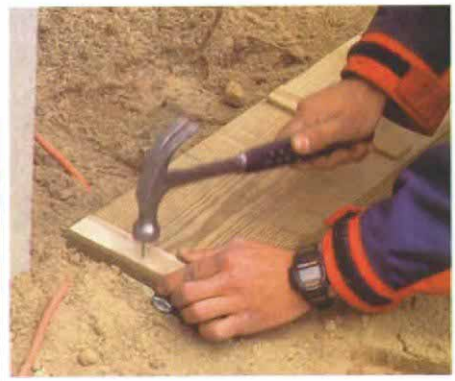






Siding behind ledger substitutes for flashing. Use ⅛-in. spacers 16 in. o. c. to create an airspace that keeps the house dry.

Locate the deck lower than the house floor. Creating a step from the deck into the house helps to keep rainwater from getting under the threshold.



Strips nailed to the back of the ledger create airspace. The author applies the ledger directly over the siding. Airspace lets water drain.

Lag bolts hold the ledger to the house. The author lays out joist locations before lag-bolting the ledger to the house so that joists won't fall atop the bolts.

Building a square, level deck with all its support posts landing dead on their intended footings is Carpentry 101. But a quick survey of local job sites makes me think that some carpenters skipped that course.

The most obvious problem I see is posts that almost miss their supporting piers. If only part of the post lands on the pier, the deck isn't supported as designed. And even if a misfit doesn't create a structural problem, it looks cobbled together.

Out-of-square decks can be more of a problem for carpenters than for homeowners. Miters in the railings won't be at 45°, and joints in the deck boards won't land squarely on the joists. These flaws can be worked around, but they shouldn't have to be. Besides, squaring up a deck is easier than fine-tuning a bunch of miter joints.

When decks are built out of level, it's either because the carpenters screwed up or because they wanted the deck to slope away from the house to allow water runoff. But I like decks to be level because the railings look better. Newels installed on a sloping deck may not look plumb, even when they're dead perfect, because they don't meet the deck at 90°.

What about water runoff? Most decks are built so that the decking runs parallel to the house. Water runs the width of a board, then

BUILD THE DECK AS A LEVEL AND SQUARE PLANE

drips between the deck boards to the ground. On a level deck, some small amount of water may follow the bottom of the joist toward the house, but my detailing of the rim joist ensures that it won't get as far as the wall.

There isn't room here to detail the entire process of building decks. Instead, I'll explain how I frame the perimeter level and square, and land the posts perfectly on their piers. A well-begun deck is a deck that's easy to finish well.

Set the deck below the floor of the house

I step the deck down, usually 6½ in., from the threshold of any door leading onto it (top photo, p. 99). If a door is level with the deck, it's difficult to keep rain or melting snow from running under the door and ruining the floor of the house. Also, if the deck is level with the house floor, the threshold may present more of a trip hazard. With an obvious step, however, people are more likely to notice this change in floor level.

The houses I build are normally sided with cedar, a rot-resistant wood. I've had good success installing a pressure-treated ledger, typically a 2x8, directly over the siding. I nail ⅜-in. by 1½-in. pressure-treated shims on 16-in. centers to the back of the ledger be-

The end and center joists are propped level to support the rim joist. Because these joists hang from the ledger, which also is level, they establish the entire deck as a level plane.

Nail the rim joist to the end and middle joists. A second rim joist will go on after the posts are up, strengthening the assembly to support the joists.

fore securing it to the house (center photo, p. 99) to make a space for water to drain.

Because most of the decks I build are on houses I've built, I'm certain the bottom course of siding is level. So I measure up from there and snap a chalkline that establishes the top of the ledger. If I'm unsure about whether siding is level over the width of a deck, I check the level with a transit.

After cutting the ledger to length, I nail it to the house with 16d galvanized nails. I use only enough nails to keep the ledger from falling off until I lag-bolt it home. Before drilling the ledger for lags, I lay out the joist spacing. Then I drill and screw in a ⅜-in. by 6-in. galvanized lag and washer every 16 in. between the joist layout and about 3 in. from the top of the ledger (bottom photo, p. 99). On houses with 12-in. joists, this layout puts the lags safely into the rim joist. If the house has 10-in. joists, I lower the lags about 1 in. and drive them into the mudsill.

Frame the perimeter before you pour the piers

I cut and install the two end joists next. The deck featured in this article fits into an alcove between two wings of a house, so leveling the first end joist was simple. I butted it to the ledger, had my helper watch the level and nailed the joist to the house.

The second end joist was more typical because the wing of the house alongside it was only about 2 ft. long. I tacked one end to the ledger, and with my helper reading the level, I nailed a temporary leg near the end of the joist. I complete the end joist's attachment to the ledger by using Simpson Strong-Tie (800-999-5099; www.strongtie.com) L70 angle connectors.

Next, I nail the rim joist to the end joists. This deck was longer than the stock I had for the rim joist. Therefore, I installed a joist in the middle of the deck, supported level with a temporary leg, to join the two pieces of the rim joist together (top photo, facing page). I located this joist so that the joint would be above a footing and a post.

I cut the rim-joist pieces to length and nail them to the two end joists and to the center joist (photo bottom left, facing page). Now the deck's perimeter and height are established. After the posts are set, the rim joist will be doubled, and the joists will be attached to it with joist hangers.

At this point, I square up the deck by measuring diagonally from corner to corner (photo bottom left). I push the rim joist one way or the other until the measurements are equal, then brace the deck square by nailing a long 2x4 diagonally below the joists (photo bottom right). I nail the brace below the joists so that it won't interfere with joisting and decking.

Drop a plumb bob from the rim joist to locate the piers

After the deck is square, I locate and dig the holes for the footings. Their spacing depends on the size of the deck, but 6 ft. apart is typical. I extend the support posts above the deck to serve as newels. This spacing provides good support for the railings, too.

Stretching a tape along the rim joist, I mark the post centers on its back and drop a plumb bob to locate the footing centers. With stakes driven into the ground, I mark the centers of the where the footings will go.

The depth of the holes has to be below the frost line. Here on Cape Cod, that means 42 in., but you should check local codes. If the holes are dug in a finished lawn, I shovel soil onto plywood or a tarp to ease cleanup.

I make the holes fairly wide, about 2 ft. in dia., because the footing needs a big footprint to spread out the load from a deck (top photo, p. 102). Once the holes are dug, I mix bagged gravel-mix concrete in a wheelbarrow. I pour 8 in. of concrete in each hole and smooth it with a scrap of wood.

Cape Cod is generally blessed with a firm, sandy soil that is easily dug yet doesn't cave in. Digging footing holes here is easy enough

Squaring the deck takes a long tape and a helper. The rim joist is adjusted until the deck's diagonals are equal (photo below). A 2x4 nailed diagonally under the joists holds the deck square (photo right).

Dig a wide hole to accommodate the footing. An 8-in. thick concrete footing will support the deck. For precise positioning, the hole is located with a plumb bob and dug after the rim joist is nailed on.

that the deck framing doesn't really interfere. If you live someplace where digging is difficult, though, you may want to attach the rim joist temporarily to lay out the footings, then remove it to dig.

Backfill around the Sonotubes

Once the concrete is firm enough that backfilling the hole won't contaminate the concrete with soil, I get my plumb bob (photo bottom left). Because the stakes locating the footing centers were removed to dig the holes, I have to plumb down again from the rim joist to mark the centers of the footings. With the centers marked on the footings, I position the Sonotubes, tubular cardboard forms, that form the piers to grade.

I use 12-in. Sonotubes under 4x6 posts. Occasionally, I'll use 10-in. Sonotubes if 4x4 posts are to be used. These sizes leave plenty of room for the post and its anchor to sit comfortably on the concrete.

Measuring from the footings to 1 in. above finished grade tells me the height of the Sonotubes. After cutting one to length, I

After placing the concrete. The plumb bob is again used to mark the center. Depending on the anchoring hardware, a dot marks the spot for a bolt or is simply a reference for setting the post.

A cardboard tube forms the pier. A 12-in. Sonotube rests on the footing and brings the concrete to grade. The plumb bob is a reference to keep the Sonotube plumb and centered during backfill.

center a Sonotube on its footing and backfill. I hang the plumb bob over the center of the Sonotube when backfilling; this way, keeping the pier plumb is easy. Keep in mind that the Sonotube doesn't have to be exactly in the middle of the footing, just fairly close. Then I fill the Sonotube with concrete mix and smooth the top with a trowel.

Taller decks need secure anchoring

If the deck is to be 24 in. or higher off the ground and in a windy spot, wind lift is a concern. In these cases, I fasten posts to concrete with Simpson Strong-Tie AB46 post bases (photo bottom left). These post bases affix to the concrete with ½-in. by 6-in. galvanized foundation anchor holts placed in the centers of the piers (photo right, facing page). Just ¾ in. of anchor bolt sticks out.

For lower decks, I set the post on an aluminum post foot such as the Simpson Strong-Tie AP series (photo bottom right). The post foot elevates the post base above the concrete, reducing the chance of rot. (Even pressure-treated wood can rot; sometimes the preservatives don't reach the centers of larger timbers. Cutting into the center of a board often exposes untreated wood.)

When using post feet, I anchor each post to the concrete with two 2-in. by ¾-in. galvanized angle brackets. The brackets are held to the concrete with ¼-in. by 2-in. expanding masonry anchors and to the posts with 16d galvanized nails.

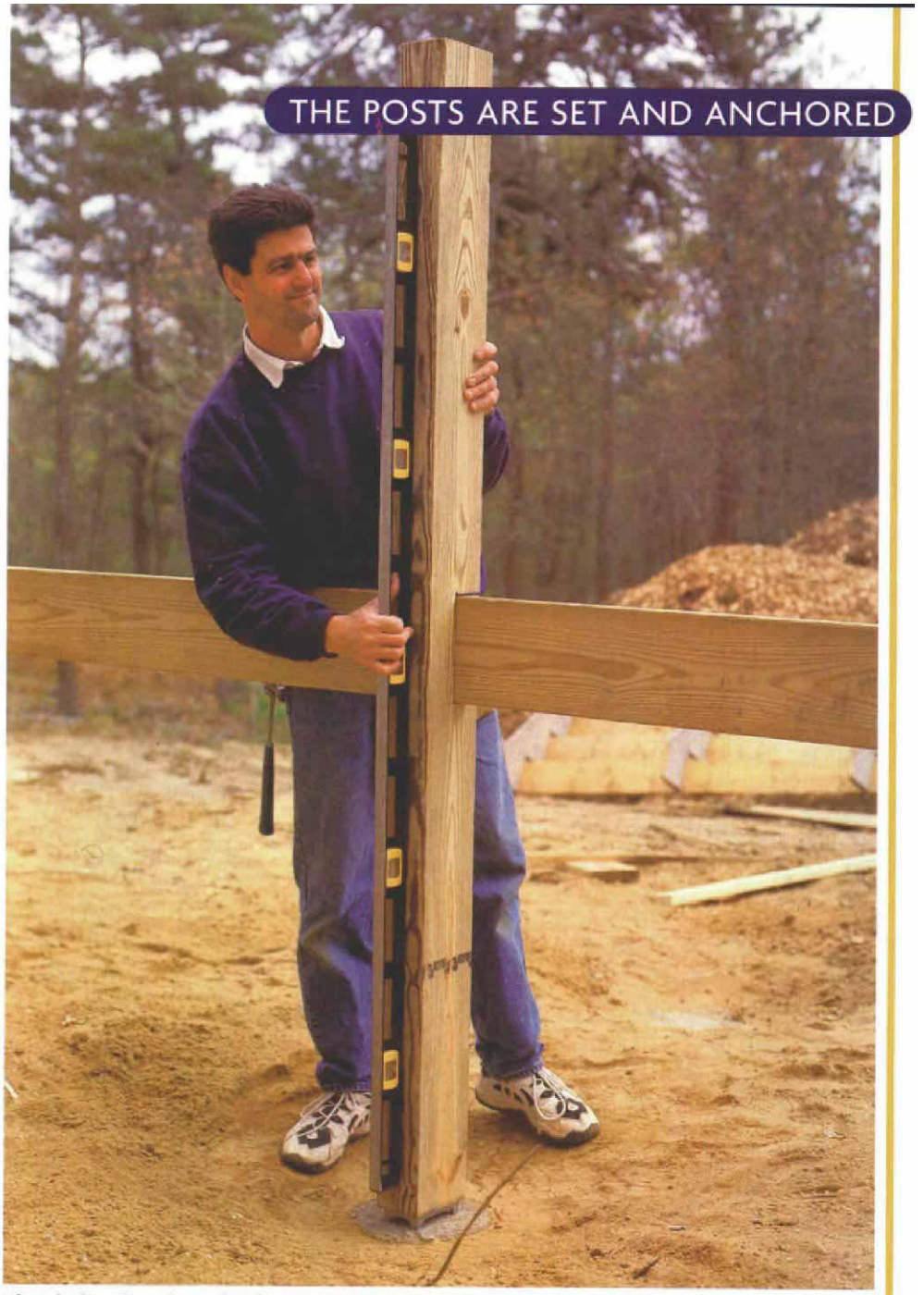
Determine the post height by measuring between piers and joist

Setting the posts—actually connecting the deck to its footings—is the final step in laying out a deck. I check that the end and rim joists haven't dropped out of level and adjust the temporary legs to level the joists if necessary. Once the perimeter of the deck is level, I place the anchoring hardware on the concrete and measure from the hardware to the bottom of the rim joist.

I mark the height on the posts and notch them to fit around the rim joist (top photo). Corner posts are notched to receive the end joists as well as the rim joist. Because the end joists are single members, this notch is only 1½ in. deep. If railings are needed, I cut the 4x6s now to accommodate the required railing height. Two ½ -in. carriage bolts hold each post to the rim.

Now the deck is ready for joists, decking and rails. It is level and square, and the posts fall exactly on their footings. □

Peter J. Bilodeau is a builder from Osterville, Massachusetts. Photos by Andy Engel.



Plumb, level and on the footing. Notched to support the rim joist, this 4x6 post continues above the deck and will eventually support the railing.

Anchor resists strong uplift. This anchor allows the post to be tweaked plumb before the nut is tightened.

If uplift is unlikely, cheaper hardware anchors the posts. A cast-aluminum base keeps the post off the ground.