

Home Smarts

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Installing Deck Footings

Q. I'm replacing my old deck with a new one, complete with new footings and posts. One corner of my old deck would move up several inches in the spring, then move back down as the weather warmed, but it never quite settled to the previous level. What causes this weird seasonal levitation, and can I prevent it when I build my new deck?

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A. Your deck has a bad case of frost heave. In the winter, the ground freezes from the top of the soil downward. The depth of frost penetration depends on the soil type, the severity of the winter, the amount of water in the soil and the depth of an insulating blanket of snow.

Frost depth varies by region. In Minnesota, the frost depth is 42 in., whereas a warmer state like Missouri may have a frost depth of only 1 ft. When you contact the local building department to get your building permit, ask what the frost depth requirement is and the required size and shape of the footings. Then dig the footing holes so that the bottoms of the footings are at or below the frost depth.

The mechanics of frost heave are complex, but here's a quick primer. Water in the surrounding soil collects and freezes into thin



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layers of frost called "ice lenses." When water freezes, it expands about 9 percent—think of how ice cubes are domed above the original water level in an ice cube tray. Ice exerts a pressure of about 50,000 lbs. per sq. in.—enough force to lift even a large building. A puny little deck on inadequate footings doesn't stand a chance.

The reason buildings and decks don't always return to their original height is that surrounding dirt sometimes fills in under the footing while it's lifted. Heavy clay soils don't drain well, so they tend to have more frost heave problems than sandy, well-drained ones. But even if footings are deep enough, ice lenses can latch onto the rough surfaces of wood and concrete and lift footings and posts from the side. That's why concrete piers poured in waxed cardboard tubes and smooth wooden posts work well for below-grade support.

A CONCRETE POSTSCRIPT:

If you're pouring more than a few footings, order premixed concrete from a ready-mix company. You'd be shocked at how many bags of concrete mix you'd have to mix by hand to fill a form tube. There's typically a chart on the tube indicating how many bags you need. If you want to do the job on your own schedule, rent a portable concrete mixer, or just buy one and sell it when you're done. You can buy a serviceable mixer for as little as \$200.

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Here's how to get a solid, frost-proof footing:

When you pour concrete footings, hold the cardboard concrete form tube about 12 in. up from the bottom of the footing. Do this by nailing the sides of the tube to the center of a tic-tac-toe grid of 2x4s at the top of the hole. Then dump concrete through the tube into the bottom of the hole. After the wide part at the bottom of the hole has filled, the tube will fill too.

■ Flare the sides on concrete footings so the footings will resist heave in harsh winters when frost penetrates especially deep. Greater width at the bottom will also distribute weight over a larger area.

■ To direct runoff water away from the posts, mound soil around the posts after the backfill settles.

TIPS FOR DIGGING A HOLE



CARVE OUT A SOIL DIVOT WITH A SPADE
Carve out a round plug to outline the posthole. That'll get you started in exactly the right spot. Throw the dirt onto a tarp to protect your lawn.



LOOSEN EARTH WITH A TILE SHOVEL
Unless you have very soft soil, you'll work way too hard digging with just a clamshell digger. Loosen the soil and carve away at the sides with a tile spade. It'll easily slice through small roots.



USE A RECIP SAW ON LARGE ROOTS
Don't kill yourself chiseling out roots. Just use a recip saw with a long, coarse blade and poke it right into the soil and cut off the roots.

