

FIX IT UP!

Bruce Turner

Engineering a Solid Foundation

In our last column we talked about the most basic and cost-effective method of earthquake retrofitting your home – namely, bolting the house to the foundation to make sure the house doesn't slide off in a quake. Well, part of the effectiveness of that technique is based on what we're now doing with new engineering requirements about foundations.

Every time there's a major earthquake in California, we get a new building code. That's a good thing, because each quake unleashes an army of engineers who analyze the failures – which structures collapsed and why. The experts completely rewrote the engineering codes after the Loma Prieta earthquake, and it blew minds in the construction trade, because we were being asked to do things completely differently from how we'd done them before. And some of those changes turned out to be failures in the Northridge quake and were changed again. It's a nonstop learning process, and one area where we've learned a lot is in the foundation.

In past years, most houses were either on concrete slabs or perimeter foundations, which are low concrete walls with bases or footings two feet wide sunk a couple of feet into the earth. Today, most new homes in our area are built on pier-and-grade-beam foundations. We drill a pier hole into the earth until we find stable rock or soil – often 12 to 16 feet deep, but I've seen them go 20 or more depending on the soil type – and the holes are then filled with concrete and rebar cages to create a series of columns that just barely stick up above the surface. The piers are designed to intersect with the grade beam (the concrete wall that follows the perimeter of the house) to make a foundation that firmly anchors the home into the ground. This pier-and-grade-beam system will likely do a whole lot better in an earthquake than the average foundation.

This isn't to say that perimeter foundations or slabs don't have a place in the world anymore. For flat lots in seismically stable areas – and there are some on the Coastside – a standard perimeter foundation can work just fine. And slabs remain popular, particularly for commercial buildings, because they're significantly less expensive. My own building is on a slab, and so is the new Cunha Country Grocery we built in Half Moon Bay. Slabs can even be made more earthquake-resistant by supporting them with piers.

So what's the difference? Well, with a pier-and-grade-beam foundation, the wood flooring sits on top of the foundation. With a slab, the foundation is the floor. You can stain the concrete or add a pattern to make it look like tile. But a slab isn't as warm or comfortable to live on as wood, and concrete can crack. Plus retrofitting a house on a slab can be a real pain, because you have to break new holes in the slab. So people building new homes tend to spend the extra 50% for a pier-on-grade-beam foundation instead of a slab.

The most beautiful house in the neighborhood is only as good as the foundation it rests upon – especially in an earthquake zone. Like ours.

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