

## **Northridge Earthquake Anniversary: Despite retrofits, are homes any safer now?**

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The 1994 Northridge earthquake — which shook Southern California 20 years ago Friday — caused \$20 billion in damage, much of that to buildings.

About 82,000 residential and commercial units were affected. Some homes were outright destroyed because they were not bolted to their foundations, and the shaking caused them to slide off.

Since then, cities have encouraged homeowners to voluntarily retrofit their dwellings. But there is no mandatory state standard for such work, and some engineers estimate as many as half of all retrofits wouldn't survive a strong quake.

"I don't think that a general contractor has an in-depth understanding of the engineering required to make a home earthquake resistant," said Amy Bach.

Bach works for United Policy Holders, a nonprofit organization that educates and advocates for insurance consumers.

She says the contractors who usually retrofit homes are not licensed by the state specifically for that kind of work, so consumers can't tell the experts from the novices.

She adds that city inspectors who examine a retrofit upon completion look to make sure contractors followed the plans they initially laid out. But if those plans are not seismically sound, the work could still pass inspection and still not make the home any safer in an earthquake.

Contractor Ken Compton has seen this first hand. His company, Seismic Safety, was once called on to inspect retrofit jobs done by other contractors. He says of the 13 homes he looked at, 12 were done incorrectly.

"Not only had they been retrofitted, they were retrofitted with city permits and city approval from the building department. And it was still wrong," Compton said.

Data on exactly how many retrofit jobs are sub-par is hard to come by. But several experienced seismic experts interviewed for this story believe the problem is widespread.

A study by the Assn. of Bay Area Governments looking at homes in the Bay Area found that the majority

of retrofit jobs surveyed in the wake of the Loma Prieta earthquake were incomplete see page 8 of the study embedded below; story continues below the window.)

#### Quake-risk homes

Janiele Maffei is with the California Earthquake Authority, a state created agency in the wake of the Northridge quake to offer earthquake insurance to Californians.

Maffei says Northridge taught engineers a lot about the risk of unbolted homes. “We saw that there is a tremendous amount of damage,” she explained.

She says many houses built before the 1950s relied on gravity alone to keep them sitting on their foundations. That means a strong quake with vertical and horizontal motions could knock them right off their foundations, rendering them uninhabitable.

Maffei estimates that as many as one in 10 homes in L.A. might have this type of vulnerability.

To help address this, the CEA helped create a pilot program last year to encourage people to “bolt and brace” their homes, a common retrofitting technique that — when done correctly — solves this problem. The program offers grants of up to \$3,000 and a 5 percent reduction on premiums to those who participate.

But even Maffei admits there are a lack of standards when it comes to how home retrofits should be performed.

“There is no entity saying you must do the retrofit in accordance with something,” she said.

#### The missing piece

All of this really bugs Peter Yanev, head of the retrofitting company called Yanev Associates and author of the book “Peace of Mind in Earthquake Country.”

“So many people think they are safe, and they are not,” he said. “It might have been so easy to do it right. That’s very annoying.”

Yanev’s company retrofits large facilities like power plants and factories. He says the missing piece in most home retrofits is a structural engineer. Most large projects start with engineers who draft up custom retrofit plans, then contractors simply execute those plans.

“Chances are without the engineer you are going to wind up spending a lot more money and having to do more than you need to,” he explained. “And sometimes ... you don’t get what you need.”

But hiring a private engineer is expensive and could double the cost of a retrofit. Yanev says many professional engineers are also more interested in working higher profile and higher paying jobs involving large structures.

#### Pre-engineered ideas

The California Earthquake Authority recognizes this problem, and they've set out to address it. In conjunction with the retrofitting pilot program, the CEA is working with engineers to create blueprints of best practices for retrofitting homes.

The CEA's Janiele Maffei call these retrofitting blueprints "pre-engineered ideas."

"The idea is to provide guidelines that will make it cost-effective," she said.

Los Angeles and San Francisco both have some retrofitting guidelines already in place, but they are limited in the types of vulnerabilities they cover. Maffei says her group plans to build on those.

Within a few years the CEA plans to have quality guidelines ready for all kinds of single family homes.

Then, they'll push state lawmakers to make these new plans the official standard across the state.

Have you retrofitted your home against seismic risk? Are you confident it's now safe? Let us know on our Facebook page, on Twitter "@ " mention @KPCC) and in the comments below.