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## **Seismically speaking, your chimney may face ... A SHAKY FUTURE**

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The fireplace may be the traditional gathering-around place, but if not maintained properly it could lead to tragedy in an earthquake.

That's because in homes built before 1940 -- about 36,600 in San Diego County -- today's structural protections against earth movement were absent, according to Jim Crawford.

He owns **Authentic Fireplaces**, a company that specializes in repairing old chimneys, a business his grandfather and father were involved in as well.

The old chimneys were built out of unreinforced masonry and are prone to collapse in a severe shake.

"They have no seismic protection, no steel, no quake straps, no steel rebar," Crawford said. "The taller the chimney, the more the hazard."

He estimated only about 20 percent of San Diego's pre-1940 homes have been reinforced or replaced. He does between 12 and 20 chimney rebuilds per year at a cost of between \$12,000 to \$15,000.

"I'm very safety oriented," he said. "I don't want chimneys to fall over on people's cars and garages. I've seen it all. I've seen a chimney on a car, halfway through a roof."

Crawford said it is sometimes difficult to determine if a chimney is structurally unsafe because any cracks might be masked by paint and patched repairs.

"An older masonry fireplace needs to be inspected before it's put into service," he said. "If you buy a home built before 1940, you want to have the system checked."

If the chimney is still standing straight and appears structurally sound, he said, it can be realigned and upgraded rather than replaced. That costs between \$2,000 and \$3,000. The upgrade would include a new

liner in the firebox and spark arrester on the top.

"It's an internal upgrade for fire safety but not seismic (safety)," he said.

Complete seismic safety requires demolishing the chimney and rebuilding it from the ground up.

"A lot of them are beyond repair and are structurally unsound," he said. "You can't do a partial repair."

If the structure is not replaced, Crawford said it still should be inspected periodically and its inside cleaned.

"The national fire code says you should inspect all chimneys and sweep them when necessary," he said. "The rule of thumb is once every 50 fires or every cord of wood."

Besides chimneys, house foundations also sometimes need to be repaired or replaced to ward against quake damage, said Larry Teves of Craftsman Foundation Repair in Normal Heights.

He said homes built before 1949 were not required to have their wood frames bolted to the foundation. There is no requirement to retrofit homes with unbolted foundations, but he said major remodels often require upgrades to foundations.

If the concrete stem wall around the house is in good shape, he said it costs only \$3,000 to \$5,000 to drill bolts into the wall and strap the foundation to the frame. But if the concrete suffers from water intrusion and is no longer strong enough to support a bolt, it might cost 10 times as much to build a new stem wall and then bolt the frame to the foundation.

"When we do replace foundations on old homes, the current code calls for foundation bolts, reinforcing steel and a more substantial foundation," he said.

He said his work generally involves foundation replacements rather than retrofits.

"It's kind of an optional thing," he said of retrofits. "It's a smart thing to do, but people don't have that kind of money lying around. They're not worried about earthquakes. People that are (worried) get insurance first. That does make sense. Having said that, it would be great if every house were strapped down."

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