

Area Residents Should Ready For Big Quake, Says Geologist

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Santa Cruz area residents should take preventive steps, like stabilizing mobile homes and minimizing construction in vulnerable areas, to prepare for the major earthquake that will inevitably shake the region, a local geologist suggests.

Explaining that an earthquake will eventually relieve the tension building along the local region of the San Andreas Fault since 1906, UCSC Professor of Earth Sciences Gary Griggs advises that people take, but not become obsessed with, precautions.

Criticizing what he calls the "Band-Aid approach," stocking up the garage with axes, shovels and food to use after a temblor occurs, Griggs suggests measures to minimize damage before the quake occurs.

"You can't gear your life around it," Griggs says, "but you can take certain precautions to lessen damage and life loss when it occurs."

Most people have only hazy ideas of the possibility and danger of earthquakes in the Santa Cruz area, according to Griggs.

"It is very hard for the average homeowner to perceive a hazard like an earthquake that can be very catastrophic but that occurs only infrequently.

"Unless you're 80 years old, you don't remember an earthquake."

But another earthquake comparable in magnitude to the 1906 San Francisco earthquake will occur, according to the geologist.

"It could be this year, it could be in 10 years or in 50 years."

Griggs explained why scientists know a quake will strike, but cannot predict its date.

In the Santa Cruz area, the San Andreas Fault runs through mountains along the Skyline Ridge, Holy City and Redwood Estates.

The San Andreas Fault is part of a line separating two huge blocks of the earth's surface: the North American plate and the Pacific plate.

Along this division, the two plates creep in different directions at about one or two inches per year.

This creeping tendency, when unrelieved by an earthquake, builds up in the form of stress and eventually causes a temblor, according to Griggs.

"Since 1906, along the north San Andreas Fault area in Santa Cruz and San Francisco, there has been no significant movement or major quake.

"One or two inches of stress per year has been accumulating for 74 years. There may be 10 or 12 feet of accumulation that wants to be released.

"It could happen tomorrow or in 10 or 50 years — but it will happen.

"One difficulty of looking ahead to earthquakes in California is that there is only about 100 years of record, which is short in terms of geological time when you're talking about tens of thousands or millions of years.

"At Caltech, Clarence Allen looked at the earthquake history of countries with long historic records," Griggs continued.

China has well-documented records of earthquakes going back 3,000 years, and Japan's records go back 2,000 years, according to Griggs.

These records tell when the earthquakes occurred and how many towns were destroyed.

"Allen found that in China and Japan there were long periods of time when a seismic area would be very quiet.

"In China, there would be 800 years of very low seismicity and then 300 very active years.

"In California, we don't know if the past 100 years were active or quiet, so we should be very cautious" in predicting quakes, he said.

A 1978 study attempted to look back beyond the 100 years of records of California seismic activity.

The researcher found a portion of the southern San Andreas Fault where an earthquake had occurred in 1857.

The researcher cut through the earth with a bulldozer, using radiocarbon dating to determine age of the earth's layers.

He dug down to a layer that was about 1,400 years old. He determined when earthquakes had occurred by observing liquefaction's effects.

Liquefaction is the process that produces quicksand, according to Griggs.

"In an earthquake, material like sand that is saturated with water loses its ability to absorb the water and it turns to liquid and objects sink into it.

"Most large earthquakes produce some liquefaction," he said.

When liquefaction occurs, some sand generally squirts up before it turns to liquid.

By observing these types of configurations of sand topping liquefied sand, the researcher could determine when earthquakes had occurred along the fault line in Southern California since 565 A.D., Griggs said.

"In the southern part of the San Andreas Fault — which may be similar to the northern part — he found that earthquakes occurred every 50 to 300 years and that the average time span between quakes is 160 years, said Griggs."

This research indicates that major quakes don't occur every five or 10 years, but that 50 or 100 years are required

before enough tension builds to cause a quake.

"This research is invaluable to give people a 'sense of place,'" or perspective on when to expect an earthquake, Griggs commented. People also need to know what to expect, he said.

When Californians hear of massive devastation in temblors in foreign countries, they tend to project such scenarios to their state, Griggs said.

"In Algeria, Central America and Italy, buildings are totally different," according to the geologist.

"They are built of unreinforced masonry, brick and adobe. They are stones stacked on top of each other with no steel reinforcing and nothing holding them together very well.

"In California, we usually have light, flexible kinds of buildings."

However, mobile homes, popular in the Santa Cruz area, are not usually constructed to withstand earthquakes, Griggs said.

Most mobile homes are placed on cement blocks without being attached to the ground, Griggs said.

When earthquakes strike, they often fall over, frequently puncturing gas, water and sewage lines.

The homes are easily anchored to the ground, however, Griggs said.

Griggs suggests that mobile-home owners be aware of

the dangers.

He also suggests that area residents take care not to build more than necessary close to fault lines or on other areas particularly vulnerable to quakes.

"The material you're sitting on is more important to the amount of shaking than how close to the fault you are," the geologist explained.

In the 1906 quake, the largest recorded temblor to hit Santa Cruz, the most serious damage was near the San Lorenzo River, where the quake caused liquefaction of the loose sediment, and around downtown.

Terraces above downtown and areas on the west side and near East Cliff Drive were less affected because they are on bedrock, which doesn't respond as much to the shaking, according to Griggs.

The geologist suggests building on the most stable ground, whenever possible.

What Griggs does not suggest is stockpiling everything one might possibly need in an earthquake.

This type of action is alarmist, he says, and besides, people would probably run outside when an earthquake struck rather than fiddling with axes and canned goods.

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