

These are California's 5 biggest vulnerabilities from a major earthquake

Brenda Gazzar and Kevin Smith, Daily Breeze, 3-17-16

Dr. Lucy Jones won't tell government officials what they should do to prepare for a catastrophic earthquake. But she's happy to point out the potential consequences of their choices.

Being ready for the inevitable Big One takes more than being able to respond. It's also about working in advance to minimize damage and having the pieces in place to recover and rebuild a broken community afterward, according to the internationally recognized U.S. Geological Survey seismologist.

"We tend to only think about do you have enough water stored, do you have your food instead of, 'Why don't you keep your house from being damaged in the first place?' and then you wouldn't need all those supplies," said Jones, a science advisor for risk reduction.

Southern California has made some headway in earthquake preparedness on several fronts in recent decades. But in light of its many vulnerabilities, a major temblor could still endanger not only thousands of lives but the region's economic viability and future as well.

A magnitude 7.8 earthquake on the southernmost San Andreas Fault is expected to cause some 1,800 deaths, injure 50,000 people and cause \$213 billion in economic losses, according to a 2008 "ShakeOut Scenario" compiled by the USGS and other agencies. It would make the 6.7-magnitude Northridge quake that rocked the region more than two decades ago seem miniscule in comparison.

Collapsing buildings

Southern California is vulnerable because of thousands of older buildings that are at particular risk of collapse. All non-reinforced masonry buildings within 15 miles of the San Andreas Fault would be completely destroyed, killing many people inside, according to the ShakeOut report.

The city of Los Angeles began requiring retrofitting of these buildings, which typically have brick or stone walls without reinforcing steel inside them, in the early 1980s. This is believed to have saved lives during the '94 Northridge quake. Meanwhile, two women died in Paso Robles when one of these buildings collapsed during the 6.5-magnitude San Simeon earthquake of 2003.

But about half of California cities, including major cities such as San Bernardino, have voluntary rather than mandatory retrofitting programs for these buildings, Jones said.

San Bernardino has about 95 such buildings, including the historic Andreson office building on E Street, said Mark Persico, the city's community development director. Persico said the city is now looking at whether it can offer certain federal funds to help property owners with some of the upfront costs of retrofits.

"We realize it's a public safety concern and a public safety issue," Persico said. "With not a strong retail or real estate market in San Bernardino, we are aware it's a big cost for property owners to take on."

There are other problematic buildings throughout the region as well. Among them are soft first-story buildings, which have open parking or commercial space on the first floor and housing on higher floors built prior to recent codes. One such building, the Northridge Meadows apartment complex, collapsed during the 1994 earthquake and killed 16 people. Reinforced concrete buildings, such as the Olive View Hospital that collapsed in the Sylmar quake of 1971, are also considered dangerous.

With Jones' guidance, Los Angeles recently passed mandatory retrofits for both those type of buildings. Los Angeles became the first city in Southern California to require mandatory retrofits for soft-first story buildings. As of February, it was the first and only one in the country to have requirements for reinforced concrete, she said.

"It took me a year at City Hall and an incredible political commitment on the part of Mayor Eric Garcetti for this to happen," she said. "He's not been politically hurt. If anything, he's been politically advanced by taking on this issue so other jurisdictions are starting to look at it now."

As far as new buildings, the problem is that they are often built only to life-safety standards, which means they won't kill anyone but will still be a total financial loss, Jones said.

Broken pipes, aqueducts

A major quake would cripple Southern California's water system largely due to aging infrastructure, according to Jones.

Some water pipes in Los Angeles, for example, are more than 100 years old and "are breaking without earthquakes." In addition, much of the water system throughout the region is made with AC piping, which is very brittle.

A significant number of cities would be forced to "lay down a completely new water system" in the event of such a quake. That would cost billions of dollars for Los Angeles alone, she said. Jones recently spent a year with Los Angeles Mayor Eric Garcetti's office to help create his "Resilience by Design Report" to better protect residents from earthquakes.

The ShakeOut study estimated that the worst hit areas may not have water on tap for six months. However, that was when officials thought they could fix all damaged aqueducts within that time frame. It was later determined it would actually take up to 18 months to repair them, Jones said.

Los Angeles is now moving to retrofit the Los Angeles Aqueduct, one of several that supply the region with imported water, so that it would work well enough in the wake of such a quake, Jones said.

LADWP is in the process of identifying cost-effective retrofits and other mitigation efforts for the more-than-a-century-old aqueduct.

A task force was also formed last year by the utility, Metropolitan Water District of Southern California and the California Department of Water Resources to study and address potential impacts such a seismic event would have through a regional lens.

Meanwhile, LADWP has been installing earthquake resilient pipe in "key areas" of the city as part of a pilot project outlined in the resilience plan, according to a spokeswoman.

No power for weeks

Damage to the region's electric grid is another big concern, according to Don Daigler, director of SCE Business Resiliency for Southern California Edison.

"We anticipate that we would see widespread outages across most of our service territory," he said.

"They could range all the way up to two weeks in duration. The bulk of the power would start coming back on within 24 to 72 hours, but we could see some outages lasting up to two or three weeks."

Daigler, a former planning director with FEMA, said SCE is prepared for the worst.

"In 2014 we started developing an all-hazards plan," he said. "It's a plan that would prepare you for the worst set of planning factors you'd have to worry about. We used the earthquake scenario that was built out for the ShakeOut to drive that plan."

Daigler said Edison has performed several drills and exercises to determine what kinds of improvements would best help the utility in the event of a big quake. The company ultimately developed an incident command system that standardizes how response actions would be handled.

"It's the same standard that all state and emergency management uses to gain access to federal grants," he said. "We've also done seismic upgrades to our infrastructure. We continue to look at the survivability of the infrastructure."

Freeways, roads

Surprisingly, the region may be in the best shape when it comes to transportation, Jones said, because "we always prepare for the last earthquake that happened."

After freeways came down in San Francisco in 1989 and in Los Angeles in 1994, "We got the political will to really rebuild those," she said.

And CalTrans, which is responsible for the design, construction, maintenance and operation of the state's highway system, has spent many billions of dollars on seismic retrofitting of the state's freeway infrastructure.

However, many bridges are owned locally by cities or counties that don't have the funds to upgrade, she said.

The risks are real as there are lots of inter-dependencies within the region's infrastructure. A building that collapses, for example, creates debris on the road. And when water pipes break, they can undermine the road bed and wash things out, Jones said.

"That disruption to the transportation system leads to a lot of consequences," Jones said in a 2013 presentation to the American Geophysical Union in San Francisco. "It is very difficult to get to work and it's difficult for emergency responders to get to the people who need help."

Hospitals

Many hospitals in Los Angeles County are now in compliance with state seismic requirements through building upgrades or establishing new buildings, said Cathy Chidester, director of L.A. County's Department of Health

Services-Emergency Medical Services agency. The agency, with federal funds, helps hospitals prepare for all kinds of disasters.

Thirteen major hospitals across the county have been designated as disaster resource centers that coordinate emergency preparedness planning and training for up to 12 umbrella hospitals in their region. The program has become a model for other regions around the nation, Chidester said.

Among its tasks, the agency is helping hospitals prepare for a surge in patients when disaster strikes so they can care for more patients than they are licensed for, said Roel Amara, the agency's assistant director, who is in charge of disaster programs.

Emergency Medical Services has developed a new program entitled "50 in 15 minutes," which means hospitals should be able to take care of 50 patients within 15 minutes after a major incident. They are in the process of rolling out the program in coordination with the state, Amara said.

The agency has also started helping hospitals develop their business continuity and recovery planning to help them return to normal status following a devastating incident.

"We work on areas that we think may be weak," Chidester said. "Compared to where the hospitals were 15 or 10 years ago, we're light years ahead."