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Not My Fault: A new deadliest quake of the year

Lori Dengler/For the Times-Standard
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A new name has topped the leaderboard. The November 26th earthquake in Albania now rates as the deadliest earthquake of 2019. The magnitude 6.4 earthquake occurred at 3:54 am local time in Albania and was located in Durrës County Northwestern Albania, only 20 miles from the capital and largest city Tirana. The USGS estimates that over 1.7 million people experienced "strong" to "severe" shaking. The death toll in the Albanian quake currently stands at 51 with 3000 injuries and over 4000 people made homeless.

There are several reasons why this earthquake might not be on your radar screen. It's far away in a country most know little about and where you might assume they have poor construction standards. No question that the main culprit in Albania was construction not designed to withstand earthquake shaking. The casualty toll is almost entirely attributable to eight buildings that collapsed and, even from media photographs, it is easy to spot the lack of reinforcement in the rubble. A finger has been pointed at the early post communist building boom of the 1990s with rampant corruption and lack of inspections. Earthquake engineering teams are currently on site evaluating the causes of failure.

But don't be quick to dismiss this as irrelevant to us. Whatever construction deficiencies are identified, one factor stands out. It only takes a few bad buildings to turn an earthquake into a disaster. The overwhelming majority of buildings in Albania, even many with substandard construction, withstood the shaking. It took only a few to become deadly.

A similar story unfolded in New Zealand in 2011 when a magnitude 6.3 struck a built environment very similar to that in California. The 6.3 was an aftershock of the much larger M 7.1 Canterbury earthquake nearly six months earlier. The 7.1, about twenty times stronger in terms of energy release, caused only two serious injuries, no deaths and significant damage to several buildings in the historic district. The 6.3 killed 185. The difference? Location. The main earthquake was over 20 miles from the Christchurch city center and the 6.3 was nearly beneath it. Like Albania, most buildings rode out both earthquakes relatively unscathed. But the extremely high accelerations and ground failure produced in the urban environment was enough to damage a number of structures. A five-story and a seven-story building collapsed, accounting for two-thirds of the casualties.

The buildings that collapsed in New Zealand have particular bearing on California. They were both multistory reinforced concrete structures built in the 1960s according to the building codes in place at the time. It isn't difficult to find similar buildings in any California City. Building codes are constantly reviewed and revised as more is learned about how structures respond to shaking. But they aren't retroactive. Only a few select categories of buildings (schools, hospitals, public safety) are required to meet current standards. We've recognized unreinforced masonry (brick) buildings as a problem for decades. These continue to be a great concern in Oregon and Washington, but in California, there are few such buildings left. It is the older reinforced structures of the 50s and 60s that have become my biggest concern. It only takes one or two to fail to create a community disaster.

The media constantly hammers us with "the Big One" and how it is right around the corner. It is easy to be dismissive of the relatively modest sixes and put all attention on earthquakes of magnitude 8 and larger. This would be a mistake. First, there are about 140 M6 sized quakes for every one in the M8 or larger range. And second, M6s can occur virtually anywhere on the planet while the 8s are limited to a few specific areas, many of which are offshore and far from population centers.

NOAA's National Centers for Environmental Information keeps databases on the impacts of earthquakes and other natural disasters. A search of the Significant Earthquake Database is a quick way to compare the human costs of different sized earthquakes. Since 1950, just under 20,000 deaths have been attributed to shaking impacts in magnitude 8 and larger earthquakes (note – I am not including tsunami casualties). In contrast, M6s have racked up nearly 175,000 deaths in that same period, about nine times as many. All of the California earthquake deaths of the past 40 years were caused by quakes in the M6 range. On the North Coast, only two earthquakes produced fatalities – a 6.2 in 1932 and a 6.6 in 1954.

There is not a spot in California where you can't tuck in a magnitude 6 earthquake. Not an earthquake twenty or thirty miles away, but directly beneath you. Earthquakes are caused by faults and in an active tectonic setting like

California, faults are everywhere and we keep finding new ones. Just this week a Berkeley group reporting finding a new fault in Monterey Bay by sending pulses into optic cables (https://news.berkeley.edu/2019/11/28/underwater-telecom-cables-make-superb-seismic-network/). As Albania shows, it doesn't take a really big earthquake to produce a big impact. Our best line of defense is to identify weak structures and do something about them before that next earthquake comes.

Note: Take additional care to be aware of your surroundings this holiday season. If you are out of town, pay attention to what emergencies could arise and what to do about them. If you have out of town visitors, tell them what to do if an earthquake interrupts your festivities. Point out the tsunami and other beach hazard signs and remind everyone never to turn their back on the ocean. Enjoy holiday concerts and gatherings but take a moment to check out the exit routes – even in places you think you are familiar with. And it's always a good idea to carry a flashlight, water, warm clothing and food in your car. You never know when you might be stranded.

Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. Questions or comments about this column, or want a free copy of the preparedness magazine "Living on Shaky Ground"? Leave a message at (707) 826-6019 or email Kamome@humboldt.edu

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