

Times Standard

Not My Fault: Drop, Cover, and Hold On is still the best thing to do when the ground shakes

Lori Dengler for the Times-Standard

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Everyone can ShakeOut on October 19!



DROP, COVER, AND HOLD ON



NO TABLE OR DESK



LIMITED MOBILITY



IN BED



IN A STORE



THEATER OR LECTURE HALL

A pair of magnitude 6.3 earthquakes hit Western Afghanistan a week ago Saturday. A third M6.3 struck on Tuesday. Located near the city of Herat, 12 villages near the epicenter were demolished and Herat and surrounding areas experienced significant damage. As I write, the death toll nears 1300 making the Herat earthquakes the third deadliest of the year and adding to 2023's position as the worst seismic year since 2010.

The images from these three deadly quakes bear similarities: the rubble of fallen brick walls, survivors sifting through dusty debris in search of loved ones, and little sign of government response. In all three cases, the culprit was weak buildings.

Traditional adobe, mud, stone, or brick buildings have no resistance to side-to-side motion. Peoples in earthquake-prone areas have known this for centuries. So why do they keep rebuilding structures in the same way? The most prominent reasons are cost and the availability of building materials.

One glance at the epicentral areas of all three earthquakes shows the treeless arid environment. Mud and stone are the most available building materials and have provided shelter for millennia. When damaged in earthquakes, the rubble is gathered and rebuilt into similar structures.

Culture and tradition also play a role. In 2005, I was part of a post tsunami survey studying the 2004 Indian Ocean tsunami. Three weeks before I arrived, a magnitude 8.6 aftershock occurred. It didn't produce as large a tsunami, but the ground shaking was significant, many structures toppled and nearly 1000 people died as a result of the shaking damage.

My team visited Simeulue Island, Indonesia near the M8.6 epicenter and saw firsthand the aftermath. The typical structures on Simeulue use reinforced brick columns at the corners infilled with unreinforced bricks to form walls. It's the same framed infill structure I saw in Peru on a tsunami study four years earlier and is common in many of the less developed parts of the world. The walls easily topple in earthquakes.

When we arrived in Simeulue, people were busy collecting the bricks and old rebar from collapsed structures and reusing them to build new homes and shops. I asked a man why he was using the same construction techniques that had not withstood the last earthquake. His response – these are the materials we have, and this is how we have always built our homes.

Turning the corner on vulnerable traditional structures is a challenge but there have been a few efforts that recognize the importance of tradition, cost, and availability of materials. In the 1970s a project began in Peru using bamboo to reinforce adobe walls using inexpensive materials. The effort, led by the Catholic University of Peru, demonstrated that bamboo and polymer mesh applied to adobe walls could substantially reduce collapse.

Geohazards International has been a leader in promoting earthquake resilient communities throughout the world through a number of projects including framed infill structures (<https://www.geohaz.org/all-projects/framed-infill-network>). The organization works with local leaders and educators to adapt solutions to their region.

These efforts have shown that the problem of traditional building vulnerability can be addressed but have yet to be adopted widely or endorsed by the relief/response community. The odds are that the next 1000+ fatality quake will happen in a part of the world with buildings that don't withstand shaking.

But not necessarily. A large enough earthquake located in a populated area where many but not all buildings are well designed could still reach casualty numbers in that neighborhood. That area could be in the U.S. California has made great progress in retrofitting or removing unreinforced brick buildings. I cheered when the Lloyd building in Eureka was toppled by a demolition crew and not in an earthquake. But there are still many older concrete buildings that need retrofitting.

On the North Coast we are unlikely to see dozens let alone hundreds of casualties in even the largest of quakes. I'm not just being optimistic. We've experienced more strong quakes in the past 170 years than any other part of the lower-48 states. In all of those earthquakes, only two deaths were caused by shaking damage.

I've even run HAZUS simulations of ground shaking for larger earthquakes. HAZUS is the FEMA software used to assess losses immediately after an earthquake or for hypothetical future ones.

By maxing out all the parameters (like a SpinalTap amp setting of 11), the program estimated 32 deaths in Humboldt and Del Norte, tsunami impact not included.

Anyone who experienced recent quakes knows that death tolls are an incomplete indicator of impact. In our area, damage to roads, bridges, and infrastructure is inevitable. Injuries and nonstructural damage can affect any of us. Economic consequences of closed businesses can ripple through the region affecting undamaged areas.

There are many ways to lessen the post-quake bite. The easiest is to avoid becoming an injury statistic. That means not moving while the ground shakes. For the able bodied, Drop to the ground, Cover the back of your neck with your arm, slide beneath a nearby table/desk and Hold On. Other situations? Check out <https://www.earthquakecountry.org/step5/>.

I am worried that deadly quakes like Afghanistan send the wrong message of what to do during earthquakes. Survivor accounts of how they raced outside while others perished might encourage you to do the same. DON'T. You don't live in a stone building.

DO participate in ShakeOut this Thursday. Practice your own Drop, Cover Hold On drill at home, school, work, or wherever you may be. You should get a county alert notification at 10:19 AM about ShakeOut. IF you are signed up for alerts. If you have the MySHake App, you'll get a text at the same time.

More on ShakeOut and how to register at <https://www.shakeout.org/>

Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. The opinions expressed are hers and not the Times-Standard's. All Not My Fault columns are archived online at <https://kamome.humboldt.edu/taxonomy/term/5> and may be reused for educational purposes. Leave a message at (707) 826-6019 or email Kamome@humboldt.edu for questions and comments about this column. Downloadable copies of the North Coast preparedness magazine "Living on Shaky Ground" are posted at <https://rctwg.humboldt.edu/prepare/shaky-ground>.