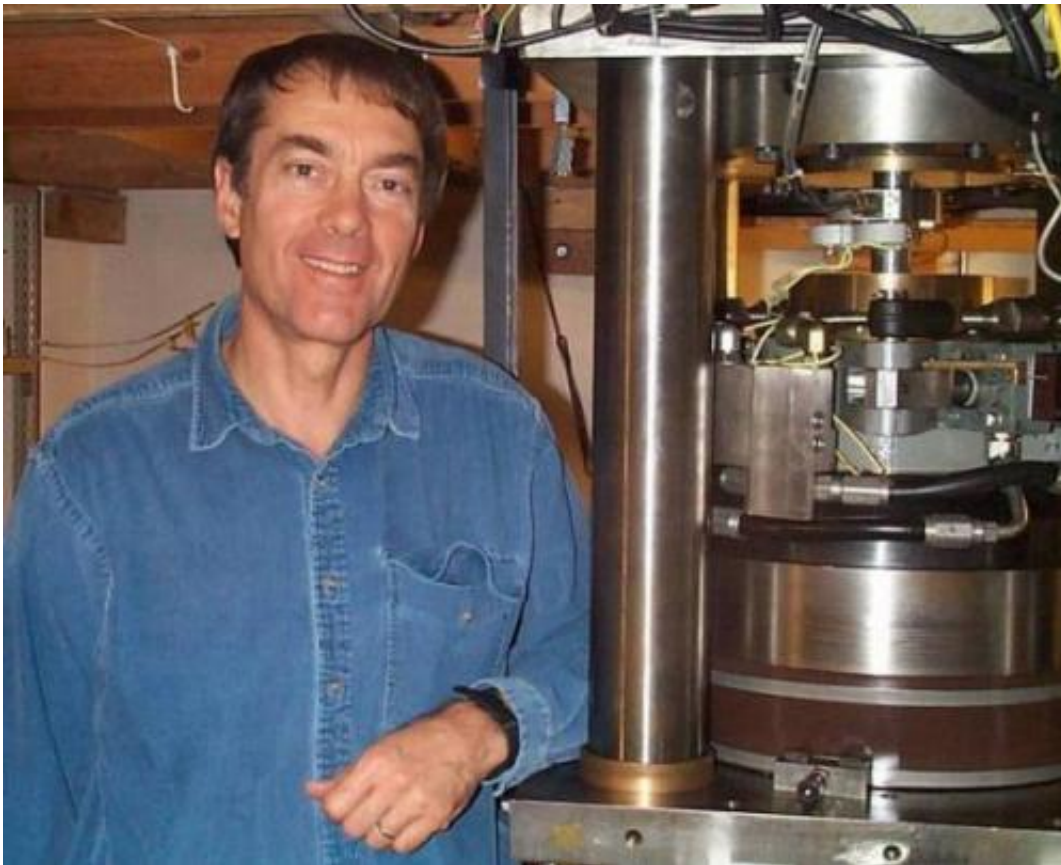


Could New England face a major earthquake?'

February 4 2015, by Kevin Stacey



Terry Tullis and earthquake simulator. “The current frequency of magnitude 3 events in all of New England is a few every year, suggesting that a few events of magnitude 6 might occur every 1,000 years.”

A recent series of small earthquakes in Connecticut posed the question. Geologist Terry Tullis, an earthquake specialist, says the chances of a

damaging quake are remote, but they are not zero. This commentary appeared in the *Providence Journal* on Tuesday, Feb. 2, 2015.

It always surprises the scientist and layperson alike when earthquakes occur in New England. After all, earthquakes typically occur at the sliding boundaries between tectonic plates, and the closest [plate boundary](#) to us is along the Mid-Atlantic Ridge, halfway between North America and Europe.

So what are we to make of events like the recent quakes near Plainfield, Connecticut? Do they presage some kind of a change, a possible "big one" coming to the East Coast?

No, that's not likely.

The last 300 years of history show that such small earthquakes—the biggest Plainfield event was about magnitude 3 on the Richter scale—occur in New England from time to time. The earthquakes do, in fact, result from sliding on small sections of typically unrecognized faults, places of weakness in the Earth's crust left over from hundreds of millions of years ago when New England was an active plate boundary.

Most of these faults are not active now, and they don't connect to each other as they do in other parts of the country, particularly the West Coast. Without such an extensive network of interconnected faults, an [earthquake](#) cannot become large enough to be called a "big one"—a magnitude 8 or higher event.

That doesn't mean, however, that the chance of a damaging earthquake in New England is zero.

In 1755, a quake estimated to be a magnitude 6 event occurred near Cape Ann, just northeast of Boston. The probability of larger

earthquakes in New England is not zero, but is small. A handy relationship that works in all tectonic settings is that, on average, for every 10 earthquakes of a given magnitude, there will be only one of the next largest magnitude. This means that magnitude 6 earthquakes are about 1,000 times less frequent than are magnitude 3 events. The current frequency of magnitude 3 events in all of New England is a few every year, suggesting that a few events of magnitude 6 might occur every 1,000 years.

A Cape Ann-sized earthquake every few hundred years is within reasonable expectations. A [magnitude 6](#) earthquake near Boston or Providence would cause some buildings to fall, especially since areas of Boston and Providence have old buildings constructed on man-made fill above former bay sediments. During the 1989 World Series Loma Prieta Earthquake, much of the damage occurred in the Marina District of San Francisco built on fill, and most of the deaths occurred on a collapsed section of the Nimitz freeway in Oakland, which was also built on fill.

Should the residents of Providence and Boston worry about the possibility of such an earthquake-induced disaster here? Well, yes. Should we do anything about it? That is much less clear and would require an exhaustive and expensive cost-benefit analysis. Even if such a study were made, the inherent uncertainty of a possible earthquake's size, location, and timing would make further action questionable.

What might be worthwhile is to ask whether building codes are up to date. Recent studies have shown the surprising result that if wind-induced stresses are included in design criteria, including modern earthquake code standards adds only a very small additional cost to a new building.

It might be time to take a look at this.

Provided by Brown University

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