SD could be hurt by New Zealand type of quake

Gary Robbins, San Diego Union-Tribune, 2-23-11

Seismologists aren't sure exactly what would happen. But they say that the sort of magnitude 6.3 earthquake that hit Christchurch, New Zealand, killing more than 75 people, could cause significant damage in the San Diego area. The greatest risk would be to unreinforced masonry buildings that have not undergone earthquake retrofitting.

"The lesson here is we still have unreinforced structures and that they could be destroyed if we had this kind of earthquake," said Tom Rockwell, a geologist at San Diego State University.

The Christchurch quake appears to have been caused by an oblique fault, one that scientists say involves movement that runs both perpendicular and parallel to the strike of the fault. It is significantly different than the Rose Canyon fault, which runs through San Diego. Rose Canyon is a strike-slip system, meaning that one side of the fault moves horizontally in relation to the other.

But both types of faults can destroy unretrofitted, unreinforced masonry buildings. And there are about 7,800 of those buildings statewide, including some in San Diego County. Most are mixed-use and commercial structures located in or near the downtown of cities. There are also 14,200 unreinforced masonry buildings that have been retrofitted. But their structural integrity isn't entirely known. Some of the masonry buildings damaged in Christchurch had been retrofitted before the quake.

"This is very sobering for us because many of our cities face a much higher seismic risk than Christchurch," said Fred Turner, a senior structural engineer at the California Seismic Safety Commission.

Robert Yeats, an emeritus professor of geology at Oregon State University, said by email, "San Diego, like the rest of California, has strong building codes, but so does Christchurch. Unlike Christchurch, we know much more about where San Diego's faults are, including the Rose Canyon fault in La Jolla and faults in the harbor. The California Geological Survey has maps locating the faults. Some of these are active and subject to earthquakes.

"I think that a 6.3 in San Diego, say downtown, could be as damaging as the Christchurch earthquake, with losses of life in the hundreds, but not in the thousands, as they would be in a developing country.

"San Diego has not had a bad earthquake in the past couple of centuries, so the recent history is lacking, in contrast to LA or San Francisco. For that reason, there is a feeling of safety that is not warranted."

Susan Hough, a seismologist at the U.S. Geological Survey, said, "As Christchurch just showed us, a M6.3 can be bad. Peak shaking intensities above 1g (acceleration of gravity) were recorded at three instruments from the NZ earthquake. The strongest (188%g) was higher than the peak recorded shaking in Northridge.

"Not all earthquakes of a given magnitude are created equal: shaking is worse if a quake is especially shallow, and it can be worse depending on the details of how the fault breaks. For example, magnitude reflects overall energy release, but some earthquakes release energy relatively faster than others, and so generate more damaging shaking. I'm sure seismologists in New Zealand area already hard at work to dissect the data from this quake. I

'In any earthquake, we know that older, unreinforced masonry buildings are especially vulnerable. Older buildings downtown would be a concern. But some of the damage in NZ was to relatively new buildings. In California, the ubiquitous multi-unit dwellings (condos/apartments) with so-called tuck-under parking are also known to be vulnerable -- as was demonstrated in Northridge."