

# Earthquake may have hit on dangerous fault that worries scientists

**Rong-Gong Lin II, Los Angeles Times, 3-29-14**

The magnitude-5.1 earthquake that rattled Southern California on Friday was a 10-second reminder of a fault that seismologists believe can produce a catastrophic disaster.

The Puente Hills thrust fault is so dangerous because of its location, running from the suburbs of northern Orange County, through the San Gabriel Valley and under the skyscrapers of downtown Los Angeles before ending in Hollywood.

Experts say a major 7.5-magnitude earthquake on the fault could do more damage to the heart of Los Angeles than the dreaded Big One on the San Andreas fault, which is located on the outskirts of metropolitan Southern California.

The size of Friday's quake was considered moderate, but it packed a punch. Residents within 10 miles of the epicenter in La Habra reported toppled furniture, broken glass and fallen picture frames. Several water mains broke, and a rockslide in Carbon Canyon caused a car to overturn, leaving those inside with minor injuries.

Officials said more than a dozen homes were red-tagged because of possible structural damage.

Preliminary checks by the U.S. Geological Survey after the quake indicate that it probably erupted in the area of the Puente Hills fault zone, Caltech seismologist Egill Hauksson said.

In 1987, another "moderate" quake on the fault killed eight people and caused more than \$350 million in damage. The magnitude-5.9 Whittier Narrows quake left old brick buildings in Whittier's downtown area battered and also damaged some freeway bridges. More than 100 single-family homes and more than 1,000 apartment units were destroyed.

Friday night's earthquake was caused by the underground fault slipping for half a second, said USGS seismologist Lucy Jones, prompting about 10 seconds of shaking at the surface.

But a 7.5 quake on the Puente Hills fault could cause the fault to slip for 20 seconds – and the shaking could last far longer.

The Puente Hills fault could be especially hazardous over a large area because of its shape. Other local faults, like the Newport-Inglewood and Hollywood, are a collection of vertical cracks, with the most intense shaking occurring near where the fault reaches the surface. The Puente Hills is a horizontal fault where intense shaking might be felt over a much larger area, roughly 25 miles by 15 miles.

According to estimates by the USGS and the Southern California Earthquake Center, a massive quake on the Puente Hills fault could kill anywhere from 3,000 to 18,000 people and result in up to \$250 billion in damage. Under this worst-case scenario, people in as many as 750,000 households would be left homeless.

One reason for the dire forecast is that both downtown and Hollywood are packed with old, vulnerable buildings, including those made of concrete.

By contrast, the Big One on the San Andreas fault – more than 30 miles away from downtown L.A., on the other side of the San Gabriel Mountains -- would cause as many as 1,800 deaths, according to estimates.

The shaking from a quake in the center of urban L.A. would be so intense that it could lift heavy objects into the air. It has happened before, near the epicenter of the 1989 Loma Prieta earthquake in the Santa Cruz Mountains. There, the shaking was so bad, “we found an upside down grand piano.”

“That’s the type of shaking that will hit all of downtown. And everywhere from La Habra to Hollywood,” Jones added.

The violent motion would be further amplified by the soft soil underneath the Los Angeles Basin and the valleys, which produces a Jello effect as shaking waves wobble off the basin.

Scientists believe the Puente Hills fault has a major quake once roughly every 2,500 years or so but don’t know the last time there was one. The San Andreas has quakes more frequently (both the Loma Prieta and 1906 San Francisco quakes were on this fault).