

Puente Hills fault focuses shaking toward downtown Los Angeles

Rong-Gong Lin II, Los Angeles Times, 3-20-10

Seismologists say one reason why the Puente Hills thrust fault is so dangerous is that it focuses shaking toward downtown Los Angeles, rather than away from it.

The fault's shape and direction make it different from the one that triggered the Northridge earthquake in 1994. The rupture on the Northridge thrust fault directed its strongest shaking north, toward sparsely populated mountains -- sparing Los Angeles from greater catastrophe.

A similarly powerful earthquake in 1995 in Kobe, Japan, however, was far more destructive because the strongest shaking was felt in the densest neighborhoods. While 61 people died in the magnitude 6.7 Northridge quake in 1994, about 6,400 people died the magnitude 6.9 Japanese earthquake.

Think of the Northridge and Puente Hills thrust faults as covering broad, rectangular areas created by two overlapping blocks of the Earth's crust. The surface of the fault plane cuts through the buried rocks like an angled sheet of paper, with the highest edge slanting upward in one direction while the other slants deeper into the Earth.

The deepest part of the Northridge thrust fault begins in the south, and creeps up to the surface to the north, Caltech seismologist Kate Hutton said. As a result, the worst shaking in the Northridge quake was directed north of the San Fernando Valley, away from downtown.

In contrast, the deepest part of the Puente Hills fault falls under Whittier, about 9 miles deep. It rises as the fault approaches downtown L.A. and USC; at Dodger Stadium, the fault is only 2 miles below.

Because of that, the direction of the Puente Hills fault focuses shaking toward L.A.'s urban core.

"How do you get people to understand that Northridge was actually a little earthquake?" seismologist Lucy Jones told The Times in 2005. "Puente Hills would be so much worse than Northridge."