

Creeping Hayward Fault might ease quake tension

David Perlman, San Francisco Chronicle, 10-16-09

The Hayward Fault is creeping, and that could be a good sign.

Along many segments of the fault, from the hills of Oakland's Montclair Village to the Chapel of the Chimes in Union City, scientists have been busy this week measuring the fault's tiny underground motions to learn more about that most dangerous of all the seismic strands that run through the Bay Area.

That they found the ground creeping means that seismic strain on the fault segment is slowly being released, lowering the chances that a major quake is near.

Creep is a phenomenon common to most earthquake faults, and it provides clear evidence of deep movement on virtually all the lines of unstable ground that mark the web of faults within the San Andreas Fault Zone. The motions are imperceptible, but monitoring them is essential to understanding how the Earth behaves in the intervals between major earthquakes, said James Lienkaemper, a geophysicist with the U. S. Geological Survey.

"We aren't anywhere near predicting earthquakes," Lienkaemper said, "but watching out for creep rates along Bay Area faults is an important part of estimating the likelihood of future quakes."

Armed with a specialized and highly sensitive theodolite that can measure distances as small as the width of a human hair, Lienkaemper and Jonathan Polly, a research technician from San Francisco State University, spotted movements at three sites along the Hayward Fault one day this week and will continue their quest Saturday.

At the intersection of Sunkist Drive and Simson Street in Oakland, not far from Interstate 580, the fault's trace is clearly visible on the pavement where a dark patch of fresh asphalt contrasts with the rest of the older, lighter-hued roadway.

Lienkaemper and Polly set up their theodolite atop a rigid tripod nearby, and aimed it at a tripod-mounted target 100 yards away directly across the fault. The brief reading showed that at that spot the two sides of the fault has crept past each other exactly 4.5 millimeters since Lienkaemper measured it last a year ago.

That's less than two-tenths of an inch, but it could mean that in the past century the fault has crept more than 18 inches. Evidence of the creep's historic effects are visible in many East Bay cities, where bent sidewalk curbs and roadside cracks have been repaired again and again.

The fault creeps at different rates in many spots, said Lienkaemper. Near the Mormon Temple on Lincoln Street in Oakland, his team has measured the rate at 16 millimeters a year - six-tenths of an inch. At other spots where the fault curves slightly, the creep stops abruptly.

"We call that an asperity," Lienkaemper said. "It may not be significant in terms of earthquake probabilities, but it does show that deep underground the fault has patches of roughness."

The San Andreas Fault is creeping at many segments along its 300-mile length, but no signs of creep are evident where the fault runs through the Peninsula.

"That means it's locked there, and strain was probably loaded into it from Loma Prieta and another large quake that struck there in 1838," Lienkaemper said.

A locked fault is more likely to rupture at some unknown time in the future, scientists believe.

Despite the evidence of creep, the Hayward Fault is rated the most dangerous of all the faults in the Bay Area. The most recent estimates for the probability of large quakes in Northern California gives the Hayward Fault, combined with the Rodgers Creek Fault, its northern extension, a 1-in-3 chance of a quake with a magnitude at least 6.7 coming within the next 30 years.