

Quake activity might rise in San Diego

Gary Robbins, San Diego Union-Tribune, 5-26-10

A new study says the Rose Canyon fault might produce earthquakes in clusters that occur over comparatively short periods of geologic time, rather than periodically, possibly making the system more of a threat to San Diego than once believed.

"San Diego may have recently entered a renewed period of activity," San Diego State University geologist Thomas Rockwell says in a paper being presented this week at the Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics.

The study does not say that a quake is imminent on the fault, part of which extends through La Jolla and central San Diego. Scientists cannot forecast temblors. But the Rockwell paper raises questions about the nature of the system.

"Paleoseismic trenching in La Jolla and downtown San Diego indicate that the most recent surface rupture occurred only a few hundred years ago, sometime after about AD 1523 but prior to the establishment of the (San Diego) mission in 1769," writes Rockwell, who also works with Earth Consultants International.

"Displacement in this earthquake may have been as much as 3 (meters) based on 3-dimensional trenching. Using this displacement and slip rate, the average return period should be on the order of 1,500 to 3,000 years, suggesting that San Diego may be safe for the near future.

"However, limited observations suggest that the Rose Canyon fault behaves in a clustered mode, where earthquakes are clustered in time, rather than in a quasi-periodic fashion. If correct, and considering that the rupture in the past few hundred years appears to have been the first large earthquake in more than five thousand years, San Diego may have recently entered a renewed period of activity."

The Rose Canyon fault, which helped form Mt. Soledad and San Diego Bay, likely began moving for the first time during the late Pliocene, or roughly 2.5 million years ago, say scientists. But Rockwell's paper focuses on more recent events, geologically speaking. He looked at the Holocene, which dates back roughly 12,000 years. But a combination of field work and related research produced a more refined, but still incomplete, look at the fault.

Rockwell says that if the fault produces quakes on a quasi-periodic basis, "the conditional probability of the occurrence of another (magnitude) 7+ Rose Canyon rupture has a likelihood of less than 1 percent when the lapse time of only a few hundred years is used.

"In the second scenario, the probability increases dramatically if we have entered another cluster, because the interval between events within a cluster is much shorter than the long-term average.

"Additional work on the discrete timing of each Holocene surface rupture is warranted to better constrain the behavior of the Rose Canyon fault, as well as to assign more realistic probabilities for the occurrence of future large earthquakes in America's Finest city."