

The Caltech Associates Find Out if Los Angeles Can Survive the “Big One”

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Los Angeles, Calif.—How would the tall buildings that shape the skyline of Los Angeles survive a major earthquake? Dr. Swaminathan Krishnan, Assistant Professor of Civil Engineering and Geophysics, answered that question for the Associates of the California Institute of Technology at a dinner at the Regency Club in West Los Angeles on September 16.

Krishnan leads an earthquake engineering simulation research group in Caltech's Seismological and Earthquake Engineering Research Laboratories. His group uses a computer application to reproduce the earthquake process, starting with fault rupture and the creation and spread of seismic waves. The application then models the structural response of a sample building and estimates the loss due to damage or destruction of the building.

Since the San Fernando and Los Angeles basins have more than 650 buildings that are ten stories or taller, Krishnan's group wants to determine what would happen if the “big one” were to hit. Using the lab's computational tools, Krishnan has replicated a 7.9 magnitude earthquake that occurred on the San Andreas fault in 1857 with rupture initiating in Parkfield, California, and moving southeastward a distance of about 360k (220 miles), with strong seismic waves directed toward the Los Angeles basin. Guests at the Associates event viewed simulations of the effects on two 18-story steel-framed buildings. The first building was designed according to the 1982 Uniform Building Code (UBC) and the second building was redesigned according to the stricter 1997 UBC code. The projections illustrated the movement of each building during the quake as well as the damage and estimated mean economic loss for the greater Los Angeles area.

“Dr. Krishnan's lecture was very insightful and a little alarming. I used to work on the 52nd floor of a building downtown and currently work on the 33rd floor of a building in Century City,” said new Caltech Associates member Harry Suh. “He mentioned two different earthquake building codes, and I'm worried that my building might have been built under the earlier codes and might not be as structurally safe.”

When asked why he attended the Caltech Associates dinner Suh said, “It's such a relevant topic to Los Angeles residents, where the probability of a large scale earthquake is high. The most alarming thing is to hear that the California Aqueduct, [the Los Angeles Aqueduct, and the Colorado River Aqueduct] run across the fault line and if we were to have an earthquake we could lose our water source. If anything...I will be stocking up on water this weekend.”

Many residents of southern California hear that the “big one” is coming, but don't understand the possible outcomes if it were to happen. The Great Southern California ShakeOut, a simulation of a potential 7.8 magnitude earthquake on the San Andreas Fault, is scheduled for 10:00 a.m. on November 13th. Krishnan's research was used by ShakeOut to determine what

an earthquake of this magnitude would cause in terms of deaths, injuries, damage and other losses. ShakeOut has been organized to help raise awareness and help southern Californians prepare for the big earthquakes in our future.

To learn more about earthquake research at Caltech, visit mr.caltech.edu/media/earthquakeinfo. For more information about events and lectures with the Caltech Associates please visit associates.caltech.edu/ or contact the Associates at 626-395-3919.

About the Associates: Founded in 1926, the Associates is a support organization for the California Institute of Technology (Caltech) with over 2,300 members throughout the United States and abroad - a diverse cross section of members of the local & business community, Caltech alumni and faculty, and philanthropists.

The Associates of the
California Institute of Technology
M/C 5-32
1200 E. California Blvd.
Pasadena, CA 91125
Contact: Julia J. Cody
(626) 395-2926
jjcody@dar.caltech.edu
associates.caltech.edu

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