



Researchers: 'Super-shear' could aid quake preparedness

By Benjamin Spillman

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Shaking from a major rupture along the San Andreas fault could actually be offset by a little understood force known as "super-shear," say scientists at the California Institute of Technology.

Their research, published in the March 19 issue of the journal *Science*, indicates that if super-shear were to occur during a fault line rupture it could suppress ground-shaking forces emanating perpendicular from the San Andreas.

"That is probably good news," said Hiroo Kanamori, a Caltech geophysics professor who participated in the research. Super-shear is the idea that during an earthquake the ground could rupture along a fault faster than the shear wave, or seismic wave, the quake creates.

The phenomenon reduces motion perpendicularly from the fault, which is the most destructive motion in an ordinary earthquake, Kanamori said. It also creates a shock wave, similar to a sonic boom, and scientists don't know how much damage such a shock wave would create.

In fact, the effect could result in more intense seismic forces along the fault and complicate efforts to produce earthquake warnings, said George Meyer, a retired College of the Desert geology professor and earthquake expert. "Along the fault we'd be dealing with either massive amounts of compression or tension," Meyer said. "That would then cause more damage than would otherwise occur." That means super-shear, if it were to occur, could have mixed results for the Coachella Valley and elsewhere in the fault zone. "If you live close to the fault it might very well be bad news," Meyer said.

The entire San Andreas fault system is more than 800 miles long, and its southern portion extends into the Coachella Valley. Locally, the fault zone generally runs just north of Interstate 10, close to Desert Hot Springs, Thousand Palms, Indio, Coachella, Mecca and Thermal. "The further you are from the fault the better it would be," Meyer said.

Ken Hudnut, a U.S. Geological Survey geophysicist, warned against applying the Caltech research too haphazardly to damage or ground-shaking forecasts. "We've known for a long, long time that being close to a fault is not a good place to be," he said. The real significance of the Caltech work, he added, is that it might convince more scientists to account for super-shear when creating computer simulations of earthquakes.

"Eventually, building designs could be done on the basis of these types of computer simulations," Hudnut said. Based on the experiment, researchers said it would take a fault rupture longer than 62 miles and an earthquake magnitude around 7.5 to create a super-shear.

In California, the only fault capable of producing super-shear is the San Andreas, Kanamori said. He said he isn't sure whether it would result in more or less ground-shaking overall. "This is still being debated," he said. "We're not committed to one view or the other."

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