

Scientists detail impact of 'Big One'

Experts create crisis scenario for 7.8-magnitude California quake

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LOS ANGELES — The "Big One," as earthquake scientists imagine it in a detailed, first-of-its-kind script, unzips California's mighty San Andreas Fault north of the Mexican border. In less than two minutes, Los Angeles and its sprawling suburbs are shaking like a bowl of jelly.

The jolt from the 7.8-magnitude temblor lasts for three minutes — 15 times longer than the disastrous 1994 Northridge quake.

Water and sewer pipes crack. Power fails. Part of major highways break. Some high-rise steel frame buildings and older concrete and brick structures collapse.

Hospitals are swamped with 50,000 injured as all of Southern California reels from a blow on par with the Sept. 11 attacks and Hurricane Katrina: \$200 billion in damage to the economy, and 1,800 dead.

Only about 700 of those people are victims of building collapses. Many others are lost to the 1,600 fires burning across the region — too many for firefighters to tackle at once.

A team of about 300 scientists, governments, first responders and industries worked for more than a year to create a realistic crisis scenario that can be used for preparedness, including a statewide drill planned later this year. Published by the U.S. Geological Survey and California Geological Survey, it is to be released Thursday in Washington, D.C.

Researchers caution that it is not a prediction, but the possibility of a major California quake in the next few decades is very real.

Last month, the USGS reported that the Golden State has a 46 percent chance of a 7.5 or larger quake in the next 30 years, and that such a quake probably would hit Southern California. The Northridge quake, which killed 72 people and caused \$25 billion in damage, was much smaller at magnitude 6.7.

"We cannot keep on planning for Northridge," said USGS seismologist Lucy Jones. "The science tells that it's not the worst we're going to face."

USGS geophysicist Kenneth Hudnut said scientists wanted to create a plausible narrative and avoided science fiction like the 2004 TV miniseries "10.5" about an Armageddon quake on the West Coast.

"We didn't want to stretch credibility," said Hudnut. "We didn't want to make it a worst-case scenario, but one that would have major consequences."

The figures are based on the assumption that the state takes no continued action to retrofit flimsy buildings or update emergency plans. The projected loss is far less than the magnitude-7.9 killer that caused more than 40,000 deaths last week in western China, in part because California has stricter building code enforcement and retrofit programs.

The scenario is focused on the San Andreas Fault, the 800-mile boundary where the Pacific and North American plates grind against each other. The fault is the source of some of the largest earthquakes in state history, including the monstrous magnitude-7.8 quake that reduced San Francisco to ashes and killed 3,000 people in 1906.

In imagining the next "Big One," scientists considered the section of the San Andreas loaded with the most stored energy and the most primed to break. Most agree it's the southernmost segment, which has not popped since 1690, when it unleashed an estimated 7.7 jolt.

Scientists chose the parameters of the fictional temblor such as its size and length of rupture and ran computer models to simulate ground movement. Engineers calculated the effects of shaking on freeways, buildings, pipelines and other infrastructure. Risk analysts used the data to estimate casualties and damages.

A real quake would yield different results from the scenario, which excludes possibilities such as fierce Santa Ana winds that could whip fires into infernos.

The scenario: The San Andreas Fault suddenly rumbles to life on Nov. 13, 2008, just after morning rush hour. The quake begins north of the U.S.-Mexican border near the Salton Sea and the fault ruptures for about 200 miles in a northwest direction ending near the high desert town of Palmdale about 40 miles north of downtown Los Angeles.

Scientists chose the scenario because it would create intense shaking in the Los Angeles Basin and neighboring counties — a region with nearly 22 million people.

The scenario will be released at a House Subcommittee on Energy and Mineral Resources meeting in Washington.

Here are the major elements:

— 10 a.m.: The San Andreas Fault ruptures, sending shock waves racing at 2 miles per second.

— 30 seconds later: The agricultural Coachella Valley shakes first. Older buildings crumble. Fires start. Sections of Interstate 10, one of the nation's major east-west corridors, break apart.

— 1 minute later: Interstate 15, a key north-south route, is severed in places. Rail lines break; a train derails. Tremors hit burgeoning Riverside and San Bernardino counties east of Los Angeles.

— 1 minute, 30 seconds later: Shock waves advance toward the Los Angeles Basin, shaking it violently for 55 seconds.

— 2 minutes later: The rupture stops near Palmdale, but waves march north toward coastal Santa Barbara and into the Central Valley city of Bakersfield.

— 30 minutes later: Emergency responders begin to fan across the region. A magnitude-7 aftershock hits, but sends its energy south into Mexico. Several more big aftershocks will hit in following days and months.

Major fires following the quake would cause the most damage, said Keith Porter, of the University of Colorado, Boulder, who studied physical damage for the scenario.

The quake would likely spark 1,600 fires that would destroy 200 million square feet of housing and residential properties worth between \$40 billion and \$100 billion, according to the scenario.

Once the shaking stops, emergency responders would do a "windshield survey" that involves rolling through neighborhoods to tally damage and identify areas of greatest need, said Larry Collins, captain of the Urban Search & Rescue Task Force at the Los Angeles County Fire Department.

Collins said the scale of the disaster means firefighters would not be able to put out every flame.

"We're going to have to think about out-of-the-box solutions," he said.

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