

Topic Page: [Earthquake](#)

Definition: **earthquake** from *Collins English Dictionary*

n

1 a sudden release of energy in the earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity and resulting in the generation of seismic waves which can be destructive.

Related adjective: **seismic**



Image from: [A Marina District apartment building that was... in Guide to Global Hazards](#)

Summary Article: **Earthquake**

From *Encyclopedia of Environment and Society*

AN EARTHQUAKE IS usually caused by the rupture of a geologic fault, or the seam between two large blocks of land that suddenly move in different directions. The two predominant types of faults are thrust faults and strike-slip faults. A strike slip fault is the most common in the United States; it is where two geologic plates move in opposite directions relative to each other, such as the San Andreas in California. A thrust earthquake occurs when one plate moves under another. In 2004, a great earthquake off the Indonesian island of Sumatra was caused by a thrust fault; the rupture along the fault was greater than 93 miles (150 kilometers). The earthquake and the massive tsunami that was generated by the tsunami killed about 200,000 people in the Indian Ocean basin. In the United States and Canada, the Cascadia fault off shore of British Columbia, Washington, Oregon, and California, could potentially generate an earthquake of magnitude 9.0, and could generate a significant tsunami that could endanger people throughout the Pacific Basin. Nations subject to earthquake hazards include, but are not limited to, Indonesia, Iran, India and Pakistan, Turkey, Greece, Italy, China, Japan, Taiwan, Canada, Mexico, and the United States.

Its moment magnitude number, often mistakenly called the *Richter scale* that is now considered obsolete, reports the *magnitude* (M) of earthquakes. The moment magnitude scale is logarithmic, which means that a magnitude 5.0 earthquake (M 5.0) is about 31 times weaker than an M 6.0 quake, and is 1,000 times weaker than an M 7.0 temblor. The primary danger to people posed by earthquakes is from the structural failure of buildings due to ground shaking. A building can collapse partially or totally when the building loses structural integrity. This is more likely to happen when buildings are built on *unconsolidated soils*, such as sand or clay, which tends to amplify the ground motion. People are killed or injured when buildings or other structures collapse; the major cause of death in the Loma Prieta (San Francisco) earthquake of 1989 was the collapse of an elevated freeway in Oakland.

The San Juan Earthquake

A large earthquake struck Argentina on January 16, 1944, and shook some buildings in Buenos Aires, the capital, but caused little damage. In the far west of the country, the city of San Juan, the capital of a province of the same name, along the border with Chile, was devastated. Initially there were no communications with the area, but when news reached Buenos Aires of the damage, and the death

of about 6,000 people, the population of one of South America's wealthiest cities decided to raise funds to help the victims and families of the dead.

With Argentina having become incredibly wealthy through its neutrality in World War II—it did enter the war on the Allied side in 1945—the *portenos* (urban residents) of Buenos Aires responded generously and established the San Juan Fund. It was coordinated by Colonel Juan Domingo Perón, the Secretary of Labor in the military government, and an ambitious and aspiring politician.

One of the events that Perón organized was an artistic festival, where actors and actresses, along with the military, would raise money, the highlight of which would be a massive gala performance. Perón took center stage himself in a starched white tunic and peaked cap. It was at this event, on January 22, that Perón was smitten by an actress who was performing that evening, and was wearing a black dress, long gloves and a white feathery hat. Eva Duarte was the illegitimate daughter of a businessman from a country town, and had become an accomplished radio actress. Two years later, by which time Perón was president of Argentina, they were married and his wife became better known as Evita Peron. She died in 1952 from cancer, aged 33, and Perón was ousted as president in 1955, although he was president again from 1973 until his death in the following year.

A great deal of experience has been amassed on how to build or locate structures to reduce the risk of building collapse in an earthquake. Engineers know how to design buildings that may be damaged in an earthquake, but retain sufficient structural integrity to allow occupants to escape. Modern steel-frame skyscrapers tend to withstand earthquakes remarkably well. The most dangerous types of buildings are unreinforced masonry buildings, and concrete and steel structures that are not built with seismic safety in mind. The 1906 San Francisco and 1925 Santa Barbara earthquakes in California revealed the problems with unreinforced masonry buildings, but the 1933 Long Beach earthquake damaged or destroyed down many masonry buildings, particularly schools. As a result, the California legislature passed the Field Act, which required that public buildings such as schools be built to withstand earthquake forces. In the years that followed, as experience accumulated with other great quakes (1964 Alaska, 1971 San Fernando), improved building codes and practices were adopted that greatly reduced the risk to human life from moderately large earthquakes.

In the United States, various efforts, notably including the National Earthquake Hazard Reduction Program (NERHP), have promoted research, improved building practices, and better public information about the earthquake hazard. Thus, in the United States, the long-term trend has been fewer casualties, but more property damage in earthquake stricken areas. However, seismologists, engineers, and emergency managers have warned that cities like San Francisco, Los Angeles, and Anchorage have not recently experienced “the Big One,” an earthquake that would catastrophically damage the region. Continued efforts to improve buildings and to manage risk will make that earthquake, when it occurs, much less likely to kill as many people as it would without these measures. Other nations in the world are not so advanced. For example, in the 1988 earthquake in Armenia, then part of the Soviet Union, poor building practices—in particular, in high-rise concrete and steel buildings that would not have been built under American building codes—catastrophically failed, killing 25,000 people and injuring at least 15,000. Recent earthquakes in Indonesia and along the India-Pakistan border have further illustrated the importance of improved building techniques.

SEE ALSO:

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Thomas A. Birkland
State University of New York, Albany

APA

Chicago

Harvard

MLA

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