

Earthquake



Figure 1: Building knocked off its foundation by the January 1995 earthquake in Kōbe, Japan.

Introduction

In an earthquake, huge masses of rock move beneath the Earth's surface and cause the ground to shake. Earthquakes occur constantly around the world. Often, they are too small for people to feel at all. Sometimes, however, earthquakes cause great losses of life and property.

Causes

Most earthquakes are caused by changes in the Earth's outermost shell, or crust. The crust is made up of about a dozen rock masses called plates that are constantly moving. In different places they move apart, collide, or slide past each other. Over time this movement causes great pressure to build up. When the pressure becomes too great, the rock masses suddenly shift along a crack in the crust, called a fault.

The shifting rocks release energy in the form of shock waves. The waves spread through the rock in all directions, causing an earthquake. In the most powerful quakes, people thousands of miles away from the center of the quake can feel the ground shake.

A small number of earthquakes have other natural or human causes. The movement of molten rock beneath a volcano can trigger an earthquake. The pressure resulting from holding vast amounts of water behind large dams can cause minor quakes. So, can underground nuclear explosions and the digging of mines.

Effects

An earthquake may be powerful enough to change the surface of Earth, thrusting up cliffs and opening huge cracks in the ground. Earthquakes can do great damage to buildings, bridges, railroads, and other structures. The violent shaking during earthquakes often causes other Earth movements, such as avalanches.



Figure 2: Crowds watch the fires set off by the earthquake in San Francisco in 1906, in a photo by Arnold Genthe.

Some quakes that happen in or near oceans cause huge, destructive waves called tsunamis to sweep ashore.

Where Earthquakes Occur

Most earthquakes take place along the boundaries of Earth's crustal plates. One great earthquake belt circles the Pacific Ocean along the mountainous west coasts of North and South America and runs through the island areas of Asia. It is known as the ring of fire. The famous San Andreas Fault of California is part of this belt. A second, less-active belt is between Europe and North Africa in the Mediterranean region and includes portions of Asia. A small number of quakes occur in the interior of plates rather than along the edges.

Measuring Earthquakes

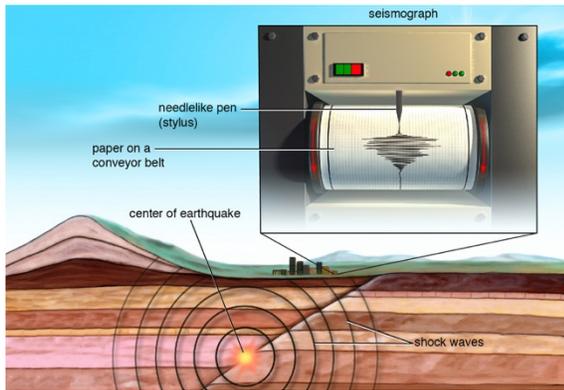


Figure 3: Scientists record the shock waves produced in an earthquake with an instrument called a seismograph. As the machine moves back and forth with the ground, a pen records the movement on a roll of paper.

Scientists record the shock waves produced in an earthquake with an instrument called a seismograph. They measure the strength of a quake in different ways. The Richter scale measures earthquakes based on the amount of energy they release. The weakest earthquakes are close to zero on the scale; the strongest measure about 9. The Mercalli scale measures the amount of destruction caused by an earthquake on a scale of 1 to 12.

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