Earthquake Essay, Research Paper

Earthquake

The San Francisco Earthquake of 1906 was ranks as one of the most significant earthquakes of all times. The quake occurred on April 18, 1906 at approximately 5:12 a.m. (local time.) Rupturing the northernmost 430 kilometres of the San Andreas fault from northwest of San Juan Bautists to the triple junction at Cape Mendocino. The foreshock, a minor shock before the earthquake occurred with enough force to be felt throughout the San Francisco Bay area, the great earthquake occurred some 20 to 25 seconds later. The epicentre was somewhere near San Francisco. The violent shocks broke loose the strong shaking which lasted between 45 to 60 seconds. The earthquake was so strong it was felt from southern Oregon to south of Los Angeles, and inland as far as central Nevada. The fracture created by the quake extended as far as 80 kilometres inland from the fault trace. This earthquake and the fire that followed forced a quarter of a million people out of their homes and unto the street flexibility of many of the city’s wooden buildings meant that there was a low death rate tool of only a few hundred people.

The process known as plate tectonics is what caused the great earthquake in San Francisco. This process occurs during continental drift. It occurs when two large segments of continental crust collide (very slowly) over millions of years. One land mass is forced underneath the other. To relieve the stress, mountain ranges are often formed in the overriding land mass while earthquake prone zones are formed below. An earthquake occurs when two neighbouring slabs in the earth’s crust suddenly slip, one in one direction and, the other in the opposite direction. The crack along which they slip is called the earthquake fault (a fault is a thin zone of crushed rock, any length, from centimetres to thousands of kilometres.) It can be straight up and down or tilted over an angle. This seems to occurs suddenly, but as mentioned before, the forces that cause them build up over many years. The rock layers accumulate stress, which may cause them to bend. When the stress limit is reached, the layers crack. California consists of two major plates- the Pacific Plate and the North American Plate. The primary boundary between these two plates is the San Andreas fault which is approximately 650 miles long and about 10 miles deep. The fault stretches along from San Juan Bautista (south of San Jose), north-northwest up to Point Arena on the Pacific Coast. Wherever the fault cut some linear feature (such as a road, line of trees, or fence) the two sides would be offset by up to 6 metres. The Pacific Plate (west side of the fault) moves north-westward past the North American Plate at about 2-3 inches per year. The result of this slow movement are many tiny shocks and a few moderate earth tremors.

Prevention in an Earthquake (especially as big as the one that occurred in 1906) is virtually impossible. There is no way to prevent an earthquake from occurring, although there are ways in which you can minimize the damage. When living in an earthquake zone (Earthquake zones are all around the pacific ocean) you have to be aware of what to do and how to react during a quake. More than 90 years ago when the San Francisco earthquake occurred, nobody was ready. No one expected the earthquake to be so immense. With a magnitude of 8.3 on the Richter scale, the earthquake caused a great deal of destruction. Fire department and hospitals, as well as the ordinary person all weren’t prepared for such a disaster. One way to help minimize the intensity of one big earthquake is to set of a series of smaller ones. Seismologists have suggested drilling three deep wells along a fault line that is building pressure for an earthquake. Water would be pumped out of wells 1 and 3, causing increased friction of the rock and locking the fault in those locations. Water would be pumped into well 2, lubricating the fault. The idea is to trigger of a small earthquake between two locked areas to relieve some of the pressure. Later a fourth well would be built and same steps repeated until the strain of a major fault would be relieved and a major earthquake prevented (this technique has still never been put to use, or been tested out for that matter because nobody want’s to pay for the damage the small earthquake might cause.) However, in the 1906 earthquake, it had been estimated that 80% of the destruction was caused not by the ground movement but by the fire that followed. The fire was not even triggered by the earthquake but by a woman attempting to cook a restorative breakfast on a damaged gas stove (four hours after the shock). The city, damaged by the quake, with it’s water mains badly fractured could not resist the blaze which destroyed most of San Francisco’s business district. Liquification is the process when water saturated sandy soil takes on the properties of a quicksand after violent underground shaking. This caused great destruction to the waterfront buildings in San Francisco. There is a commonly repeated phrase that states “earthquakes don’t kill people, buildings do”. The reason this phrase is so (unfortunately) true, is because even today, not enough of our architects are fully schooled in earthquake design. Although there is a few very simple rules to make earthquake -resistant buildings (not earthquake proof.) First the simple and more symmetrical the building the better. A box shaped building is better than a “U” or “L” shaped building (in which different wings may vibrate at different periods.) The building should be ductile rather than brittle (steel in construction is very important because it’s very good for bending – brick structures tend to break.) The most important rule is to lash the whole building together, everything should be interwoven so nothing can detach itself (bridge spans, balconies, and stairways are not properly attached to the rest of the structure.)