Earthquake Epicentre Assignment Aftermath

Loma Prieta Earthquake

The 1989 Loma Prieta Earthquake took place near Monterey Bay, south of San Francisco. It was a severe event with 63 people killed and nearly 4000 seriously injured. The cost of the damage was estimated at $6 billion in 1990 dollars.

One of the most horrific consequences was the collapse of several sections of the Nimitz Freeway in Oakland. This was a double-deck freeway. Spans of the upper section collapsed onto the lower section, crushing many cars and their occupants.

A great deal of the damage to buildings was caused by waterlogged soil liquefaction as a result of the earthquake waves.

Many residential buildings had parking garages at street level. Some of these building collapsed as the support structures in these garages failed.

This event is version 1 of the Earthquake Epicentre Assignment.

Northridge Earthquake

Version 2 of the assignment is the 1994 Northridge earthquake which shook the Los Angeles area. This event had ground accelerations of nearly 2 g. 57 people were killed and nearly 9000 seriously injured. There were hundreds of cases and 3 deaths reported from respiratory fungal diseases caused by all the airborne dust generated in the earthquake. This event also resulted in the collapse of elevated freeways, as well as houses. There was also flooding and fires from gas lines and water pipes. Luckily the earthquake occurred at night so there was little traffic on the roads.

An elementary school teacher, Makiko Yoshihara survived the Northridge earthquake. She decided to return home to Kobe, Japan less than a year later.

Kobe Earthquake

Version 3 of the assignment is the Great Hanshin earthquake that devastated Kobe, Japan in 1995, almost exactly 1 year after the Northridge earthquake. This event resulted in nearly 6500 deaths, many from fires that were started as a result of the collapse of buildings. Although almost the same magnitude as the northridge earthquake, the damage and loss of life was far worse.

The catastrophic devastation caused by this earthquake resulted from differences in building construction to some degree, but the configuration of the sediment under the city also played a part. The city is situated over a deep sediment-filled basin. To the north is a mountain range of hard, volcanic rock. The epicentre was under the basin. Seismic reflected off the volcanic rocks at the edge of the basin back towards the epicentre. This produced bands of constructive and destructive interference as the incoming and reflected waves overlapped. This, in turn, produced bands of catastrophic destruction (constructive interference) right next to bands of building that survived much better.

Makiko Yoshihara, inspite of living only a few kilometres from the epicentre, survived this second quake unscathed. At the time of the interview that I saw, it seemed that she had given up on trying to move to avoid earthquakes.

The Akashi Kaikyō Bridge was under construction at the time. It had to have an additional 1 metre added to its plan as a result of the earthquake. One hope that the engineers have planned for future changes to the width of the strait.