WE SHOULD NOT FEAR EARTHQUAKES AS COMPARED TO OTHER NATURAL DISASTERS

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The majority of the population in the United States has an obsession with the danger of experiencing an earthquake. It is very common to meet someone from the East, South or Midwest, where hurricanes and tornadoes are very common, who states that he or she would not consider living in California because of the fear of earthquakes. However, if one looks at the ***facts,*** the fear of earthquakes is not justified.

During the past 500 years less than 2,000 people have been killed by earthquakes in the United States. This figure is extremely small compared to many other typical causes of accidents. The largest causes of accidental deaths are automobile crashes (over 30,000 each year), fire, wind and many other types of accidents. ***In fact, during the past 500 years, several times more people have died in the United States from insect bites than from earthquakes. Also, lightning has killed more people than earthquakes***.

Tornadoes and minor flooding are natural disasters that kill hundreds of individuals each year. However, most of these isolated incidences are not reported by the local or national news media; whereas, a small earthquake in the San Andreas Fault, which measured four on the Richter Magnitude Scale and caused no property damage or personal injuries, is often reported in the national and international press.

Major hurricanes in the United States, such as Hugo in 1989 that devastated a number of Caribbean Islands and killed 28 people in the U.S., cause significant property damage. In recent years, loss of life from hurricanes has been minimized because the magnitude and time of the hurricane can be predicted. The largest number of fatalities from one hurricane in the U.S. is estimated at 6,000 in Galveston Inland, TX in 1900. In the U.S. wind and floods have caused approximately 100 times more damage and loss of life than earthquakes.

One cannot disregard, however, that one of the largest recorded natural disasters in recent years was the Tangshan earthquake (Richter Magnitude 7.9) in eastern China in 1976 in which over 600,000 people were killed. During the past 50 years a large number of earthquakes, which have occurred outside of the U.S, have killed over 10,000 people per earthquake. Nearly all these earthquakes have occurred in areas of the world with grossly inadequate design and construction standards. It is the general consensus of structural engineers in this country that large death tolls would not occur during a major earthquake. However, the failure of a dam with a large reservoir during an earthquake could cause a large number of fatalities.

Most major structures, which are damaged during earthquakes, are designed by Civil Engineers, which have special training in Structural Engineering. All ground-supported structures are designed in the vertical direction to support their own weight, which is commonly referred to as 1.0g in the vertical direction. The present earthquake design specifications for most structures in the San Francisco Bay Area are less than 50 percent of the weight of the structure or 0.5g applied in the horizontal direction. In aerospace engineering it is common to design structures to carry loads over 10g. Therefore, the common statement, that is often made, that it is not possible to design structures to resist earthquakes is not true. We have the technology to design earthquake resistant structures and it is an economic decision whether or not to obtain this goal. In addition, earthquake resistant design can place limitations on the architectural form of the structure.

Large earthquakes, which occur in urban areas in this country, cause significant property damage and subsequent economic loss to the public. The 1989 Loma Prieta earthquake is an excellent example of indirect cost to the public as a result of damage to freeways and bridges in the Bay Area. - since the earthquake, the cost to the public continues to accumulate. This type of economic damage is very significant and is difficult to evaluate accurately. If this indirect cost is included in an economic analysis, earthquake resistant design can be justified for many structures.

There are a large number of individuals, including myself, who have benefited by this unwarranted fear of earthquakes. After a major earthquake the funding for research and development in seismology and engineering is often increased. *Therefore, we all may be part of a subconscious conspiracy to perpetuate the myth that earthquakes are a significant threat to public safety.*

The 1994 Northridge and 1995 Kobe earthquakes have not changed my opinion. ELW 1998