

**English Exam (A)**

*In the following selection, the writer writes against the threat of a mega disaster that will hit super cities in the future if protective measures against earthquakes are not imposed.*

**"Super Cities" Vulnerable to Killer Quakes**

1 Unless protective measures are taken, once every century or so when the Earth trembles in a violent release of constrained tension, buildings will tumble, streets will collapse, and pipelines will snap, leaving upwards of a million people crushed beneath the rubble.

2 That is the conclusion of Roger Bilham, a geological scientist at the University of Colorado at Boulder who studied the potential impact of earthquakes on the world's rapidly expanding city populations in the 21<sup>st</sup> century.

3 To avoid such catastrophes, earthquake-resistant construction practices must be adopted and enforced around the world, said Bilham, who is a fellow in the university's Cooperative Institute for Research in Environmental Sciences. "Most countries have earthquake resistant codes," he said. "The problem is often a matter of enforcing them."

4 Many of the world's largest so-called "super cities" with populations of 2 million to 15 million are located near fault zones that have caused major earthquakes in the past. Population in many of these cities is expected to continue expanding. According to Bilham, nearly half of the modern super cities are located within 120 miles (200 kilometers) of a major plate boundary or the site of a historically damaging earthquake. Some of the more vulnerable cities include Tehran, Iran (population 6.7 million), Jakarta, Indonesia (9.1 million), and Mexico City (18.2 million). "These cities are at great risk because of the large population, low quality construction in places, and potential for frequent earthquakes," Bilham told National Geographic News.

5 Earthquake experts from around the world tend to agree with Bilham's suggestion that the consequences of a major earthquake in the region of one of the world's major cities would be dire. "As population grows, and it is growing in earthquake-prone regions, we are susceptible to large earthquakes causing huge numbers of deaths," said Andy Michael, a geologist with the U.S. Geological Survey's Western Earthquake Hazard Team in Menlo Park, California.

6 Prior to the 17<sup>th</sup> century, few cities had populations greater than 1 million people, said Bilham. By 1950 there were 43 super cities. Today, there are nearly 200 super cities and that number could double before world populations stabilize. According to Bilham's study, which was to be presented on May 2<sup>nd</sup> in San Juan, Puerto Rico at the Seismological Society of America's annual meeting, roughly 8 million people have died as a result of building collapses in the past thousand years.

7 Bilham's calculations show that each year an earthquake kills 100 people, every two years an earthquake kills 1,000 people, every five years an event kills 10,000 people, and every century an earthquake kills 500,000. "But the 500,000 people is probably an underestimate because the size of these huge cities doubled in the last century and are expected to double again in the next century," he said in a statement. "We have never had such a devastating mega-quake before because it simply wasn't possible. But now we have more target cities that are bigger than ever before."

8 People in earthquake-prone cities of the western U.S. like Los Angeles and San Francisco live in flexible wood frame houses and earthquake-resistant building codes are enforced, said Bilham. "Earthquakes in the U.S. kill few people but cost a lot in cosmetic repairs. Earthquakes in developing countries tend to respond with widespread fatalities," he said. The problem in much of the developing world is that