

CH2. - EARTHQUAKES (pp. 30 - 71)

Catastrophic Earthquakes - Lessons Learned

1. The consequences of an earthquake depend on a combination of factors: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. The most dangerous earthquakes tend to be \_\_\_\_\_ in depth.

3. Building \_\_\_\_\_ and zoning regulations can greatly reduce earthquake damage to buildings, but only where these codes exist and are \_\_\_\_\_.

2.1 4. A measure of the amount of energy released during an earthquake is called the \_\_\_\_\_.

5. A measure of the effects of ground motion on people and their structures is called the \_\_\_\_\_.

6. *Moment magnitude* is determined from an estimate of the \_\_\_\_\_ that ruptured along a fault plane during an earthquake, the amount of movement or \_\_\_\_\_ along the fault, and the \_\_\_\_\_ of the rocks near the focus of the quake.

7. Although some news reports still refer to the " \_\_\_\_\_ *Scale*," it is no longer in common use by \_\_\_\_\_.

8. Magnitude scales are \_\_\_\_\_, where ground displacement during a magnitude 6 is \_\_\_\_\_ as great as during a magnitude 5 earthquake.

9. Magnitude 6 - 6.9 quakes are called \_\_\_\_\_, 7 - 7.9 are called \_\_\_\_\_, and 8 - 8.9 are considered \_\_\_\_\_ earthquakes.

10. Great earthquakes occur about \_\_\_\_\_ per year, while magnitudes less than 3 are too

small to be \_\_\_\_\_.

11. An instrument that records ground motion is called a

\_\_\_\_\_.

12. Though an M7 quake produces ten times as much \_\_\_\_\_

as an M6, the M7 releases \_\_\_\_\_ times as much energy!

13. The Modified Mercalli scale is used to indicate earthquake \_\_\_\_\_.

14. The Mercalli scale is based on how people perceive the shaking during the quake, and also

on the extent of \_\_\_\_\_ to manmade \_\_\_\_\_.

15. In parts of the U.S. west, seismograph networks produce high quality information immedi-

ately after an earthquake. Called instrumental \_\_\_\_\_, this information

rapidly produces maps showing intensity and potential damage called

\_\_\_\_\_ maps, which are vital to emergency personnel.

2.2 16. Earthquakes usually occur along the \_\_\_\_\_ of lithospheric plates, but can also occur within plates.

17. Movement along faults is slowed by \_\_\_\_\_ between the rocks. The long-

term rate of movement is called the \_\_\_\_\_.

18. Faults not visible at the surface, called \_\_\_\_\_ faults, make risk evaluation difficult.

19.

<b>Fault Classification</b>	<b>Last Known Movement</b>
<b>Active</b>	~ 10,000 years
	~ 2,000,000 years
	> 2,000,000 years

20. Gradual movement along a fault, is called \_\_\_\_\_,

producing \_\_\_\_\_ earthquakes, which are not felt.

21. When primary or \_\_\_\_\_-waves reach the surface and are transmitted to the air, some

people may \_\_\_\_\_ them, but the sound is more likely from vibrating \_\_\_\_\_.

22. The complex rolling motions of \_\_\_\_\_ - waves, including L - waves, cause much of the damage to buildings, bridges and roads near the \_\_\_\_\_.

2.3 23. The three factors that determine the shaking you will experience:

1. earthquake \_\_\_\_\_

2. your \_\_\_\_\_ in relation to the epicenter and fault

3. local \_\_\_\_\_ and \_\_\_\_\_ conditions.

24. The deeper the focus of the earthquake, the \_\_\_\_\_ shaking that will occur.

25. The least intense shaking generally occurs where the ground consists of \_\_\_\_\_.

Unconsolidated sediments generally slow seismic waves and transfer their energy upward toward the surface, causing \_\_\_\_\_ shaking. Stream deposits of sand and gravel, called \_\_\_\_\_, often have a high \_\_\_\_\_ content. In an earthquake, these deposits can become fluid, called \_\_\_\_\_.

2.4 26. The idea that there is a drop in elastic strain after a quake, followed by an increase in strain, is called the \_\_\_\_\_.

27. Stress can produce temporary deformation along a fault called \_\_\_\_\_ strain. When strain is released as a fault ruptures, elastic \_\_\_\_\_ occurs, replacing deformation with displacement.

28. A typical quake has 3-4 stages:

1st Stage: a long period of \_\_\_\_\_.

2nd Stage: accumulated elastic strain produces \_\_\_\_\_.

3rd Stage: sometimes, small \_\_\_\_\_ may occur just before:

4th Stage: the \_\_\_\_\_ and its \_\_\_\_\_.

29. An aftershock is a \_\_\_\_\_ earthquake that occurs anytime from a few \_\_\_\_\_ to a \_\_\_\_\_ or so after the mainshock.

2.5 30. Geographic regions at highest risk in the U.S. include the Pacific coastal areas, Hawaii, and the territories of \_\_\_\_\_.

31. \_\_\_\_\_ earthquakes have also occurred far from plate boundaries.

Areas of the U.S. where such large events have occurred include

\_\_\_\_\_.

2.6 32. Earthquakes are often linked with other natural hazards including liquefaction, regional changes in land \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

and \_\_\_\_\_.

2.8 33. Humans have caused earthquakes by building \_\_\_\_\_ for reservoirs, injecting liquid \_\_\_\_\_ deep into the ground, and through nuclear \_\_\_\_\_.

2.9 34. The reason quakes often cause great damage and loss of life is that they

\_\_\_\_\_.

35. The United States Geological Survey's maps of seismic hazard give us information on the

\_\_\_\_\_ of earthquakes happening. This information is

helpful in establishing \_\_\_\_\_ restrictions and

\_\_\_\_\_ rates.

36. Short-term prediction of earthquakes may someday be possible, based on such observa-

tions as ground \_\_\_\_\_, areas in active zones that have not experienced activity in a long time (called seismic gaps), and \_\_\_\_\_

and \_\_\_\_\_ phenomena.

37. A warning system in the planning stages would use \_\_\_\_\_ waves to

warn distant areas as much as minutes in advance immediately after a quake begins.

2.10 38. Steps we can or should take to adjust to quake hazards include:

1) Locating critical facilities such as \_\_\_\_\_  
\_\_\_\_\_ in low-risk areas.

2) Adopting, and \_\_\_\_\_, building codes with quake-resistant design.

3) Inspecting and strengthening \_\_\_\_\_.

4) Public \_\_\_\_\_, training and drills.

- 5) Increased \_\_\_\_\_ and relief measures. Barely \_\_\_\_\_ of Californians have earthquake insurance, and unlike flood insurance, there is no federally subsidized \_\_\_\_\_.
39. A home safety check should include checking \_\_\_\_\_ and \_\_\_\_\_ for reinforcement and the security of \_\_\_\_\_, such as \_\_\_\_\_, that could fall over.
40. Knowing what to do during an earthquake includes teaching your family to “\_\_\_\_\_ under sturdy furniture, and \_\_\_\_\_.”
41. It’s safer to be \_\_\_\_\_ than \_\_\_\_\_ during a quake, but if you are indoors, do not stand in a \_\_\_\_\_ or other building structure which could collapse. Move to an inner corner, away from breaking \_\_\_\_\_ and from large or high objects that could \_\_\_\_\_.
42. An earthquake can last from seconds to about \_\_\_\_\_.
43. Injuries are more likely if you try to \_\_\_\_\_ to a different location or if you try to \_\_\_\_\_ the building. Once the shaking stops, turn off the \_\_\_\_\_, and do not \_\_\_\_\_.
- Move outdoors, away from power lines, buildings or \_\_\_\_\_ that might fall.
44. Though quakes are generally less likely in the eastern U.S., we need to be aware because quake-resistant construction is less \_\_\_\_\_ here.