

Dinamika dan rekayasa gempa

Apakah yang dimaksud dengan
Rekayasa Gempa



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- **REKAYASA** Gempa berhubungan dengan pengaruh suatu **GEMPA** terhadap manusia dan lingkungan
- **REKAYASA** Gempa mempelajari cara cara mengurangi pengaruh gempa terhadap manusia dan lingkungan (dalam hal bidang Teknik sipil : terhadap **KONSTRUKSI**)
- **GEMPA** adalah hal yang terjadi di seluruh dunia, telah terjadi berjuta juta tahun yang lalu dan akan terus terjadi di masa yang akan datang... mungkin dengan intensitas yang lebih besar.

Bahaya yang berkaitan dengan gempa disebut “Seismic Hazards”

1. Ground Shaking (Gerakan Tanah)
2. Structural Hazards (bahaya terhadap struktur)
3. Liquefaction (Likuifaksi)
4. Landslides (Longsor)
5. Lifeline Hazards (Kerusakan fasilitas kehidupan)
6. Tsunami Hazards (Tsunami)

Ground Shaking

- When earthquake waves reach the ground surface, they produce shaking that may last from seconds to minutes.
- It is considered to be the most important of all seismic hazards because all the other hazards are caused by ground shaking.
- The strength and duration of shaking at a particular site depends on the size and location of the earthquake and on the characteristic of the site (filter).



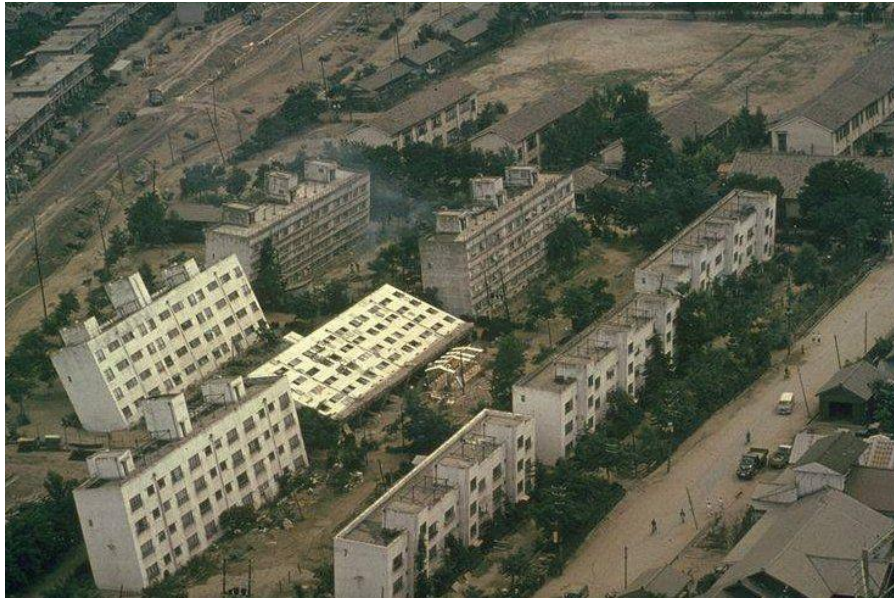
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Photo by David McGeary

Structural Hazards



- The leading cause of death and economic loss in many earthquakes.
- It can be due to the collapse of unreinforced structures or falling objects within a structure which have caused casualties in many earthquakes

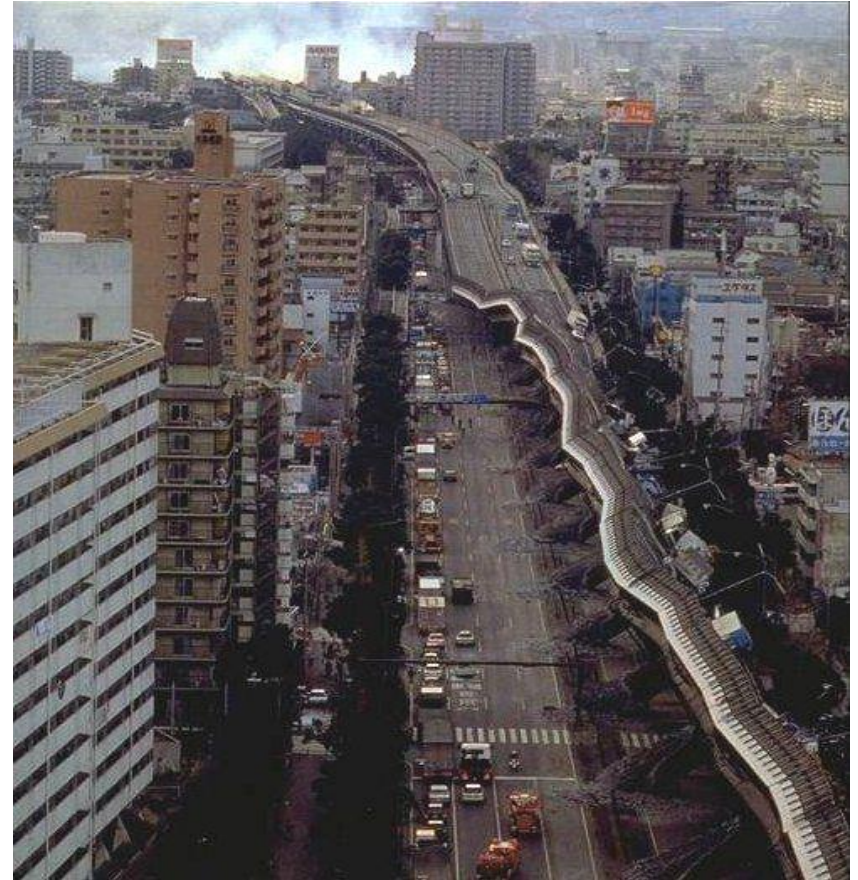


Liquefaction



- In this phenomenon, the strength of the soil is reduced, often drastically, to the point where it is unable to support structures or remain stable.
- Liquefaction only occurs in saturated soils, hence, it is most commonly observed near rivers and other bodies of water.

Flow Liquefaction



Cyclic Mobility



Landslides



AP / Daniel A. Anderson

- Earthquake induced landslides can bury a entire town or a village.
- It can result from liquefaction phenomena or the failure of slopes that were marginally stable under static conditions.

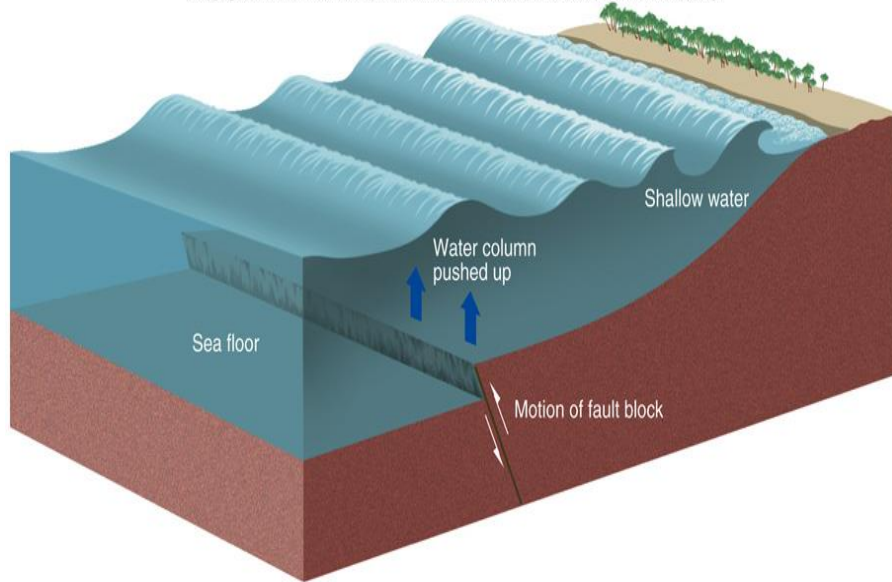
Lifeline Hazards



- A network of facilities that provide the services required for commerce and public health such as electrical power, transportation, water and gas distribution.
- Lifeline failures not only have severe economic consequences but can also hamper emergency response and rescue efforts following an earthquake.

Tsunami Hazards

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- Rapid vertical seafloor movements caused by fault rupture during earthquakes can produce long-period sea waves called tsunami.
- In the open sea, they have height of less than 1m and wavelengths of several hundred km, but as it approaches the shore the decreasing water depth causes its speed to decrease and the height of wave to increase.



Satellite image of Banda Aceh Shore, Indonesia, before the tsunami (June 23, 2004)

Satellite image of Banda Aceh Shore, Indonesia, after the tsunami (December 28, 2004)



EARTHQUAKE AFTERMATH



Sejarah penting Gempa di dunia

TUGAS: Coba tuliskan laporan mengenai gempa yang terjadi akhir akhir ini di Indonesia. Harus mencakup: Waktu (tanggal); Lokasi; Magnitude; Bahaya; dan Komentar

Year	Location	Magnitude	Comment
1960	Chile	9.5	Probably the largest earthquake ever recorded
1964	Japan	7.5	Caused intense interest in liquefaction phenomenon
1976	China	7.8	The most deadly earthquake in history (700,000 death)

Referensi

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12	Kegempaan.....	263
12.1	Ruang lingkup kegempaan	263
12.2	Persyaratan teknis perancangan kegempaan.....	263
12.2.1	Persyaratan ketahanan gempa	263
12.2.2	Persyaratan spektrum respons desain.....	266
12.2.3	Persyaratan spektrum respons desain berdasarkan evaluasi spesifik-situs	273
12.2.4	Persyaratan desain gempa pada fondasi.....	275
12.2.5	Persyaratan gempa untuk dinding penahan	277
12.2.6	Persyaratan gempa untuk bendungan	278
12.2.7	Persyaratan gempa untuk lereng	278
12.2.8	Persyaratan gempa untuk struktur tertanam (<i>buried structure</i>).....	279

Persyaratan perancangan geoteknik

Terimakasih

