

Q. What are the types of Earthquake waves?
Discuss Them.

Ans. Earthquake Waves

Earthquake waves, also known as seismic waves, are the waves of energy caused by the sudden breaking of a rock within Earth or an explosion. This energy travels through the Earth and is recorded by seismographs.

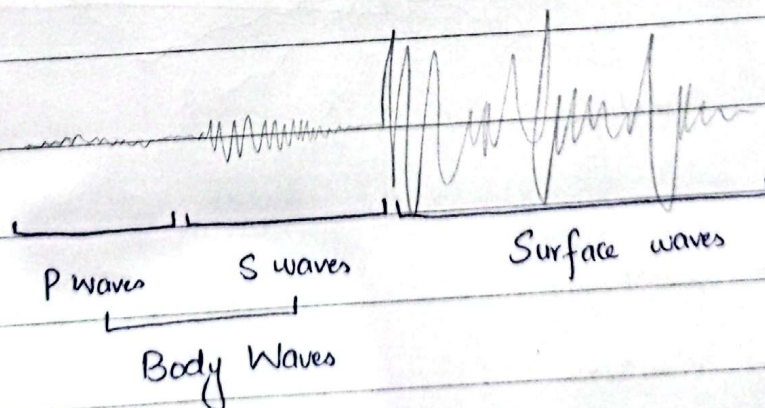


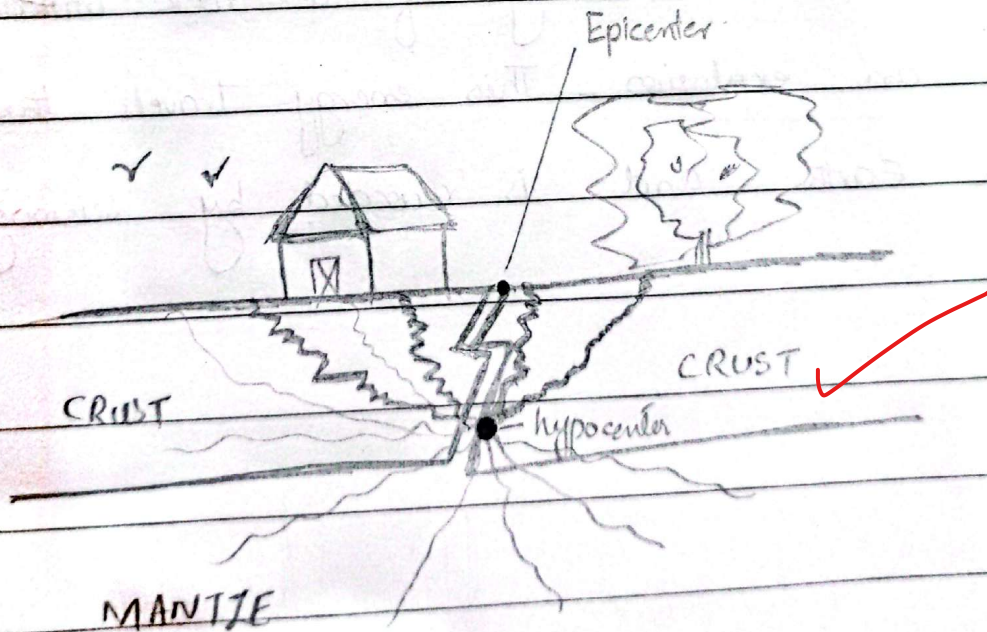
Fig # 1: Seismogram showing different
Earthquake wave types

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1. Body Waves

Body waves are the type of seismic energy waves that travel through the body of the Earth, i.e. inner crust and outer mantle. Body waves are further sub-divided into primary and secondary body waves.



~~~~~ — S waves

~~~~~ — P waves

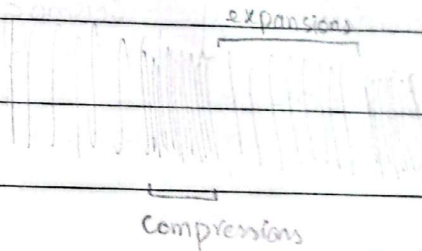

a- Primary Waves or P-Waves

Primary waves are generated from the hypocenter and travel in all directions.

These are compressional or longitudinal waves, that are very fast, they travel with a speed of 4-7 km/s. They are the first to reach the surface and are recorded first by seismographs.

direction of wave →

direction of ground particles →



b- Secondary Waves or S Waves

Secondary waves are shear or transverse waves and are slower in speed than P waves.

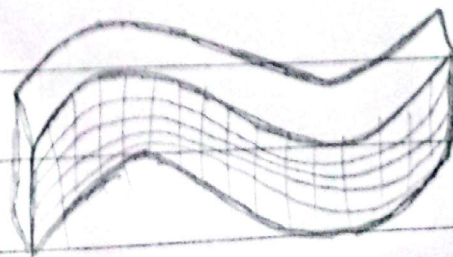
They travel at 60-70% speed of the speed of P-Waves - They can only travel through solids.

They are recorded second on the seismogram.

direction of wave →

direction of ground particles ↑↓

particles



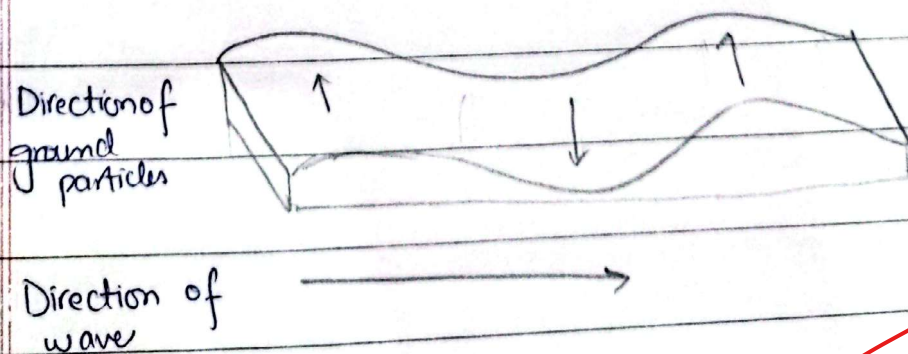
2. Surface Waves

— When primary and secondary waves reach the surface of the Earth, they generate surface waves, which travel just under the surface.

These are complex waves, and ~~a~~ cause most damage. Surface waves can be further sub-divided into Love waves and Rayleigh waves.

a- Love Waves (L-Waves)

Love waves cause the ground to ~~move~~ side waves in a horizontal plane ~~perpendicular~~ to the direction of travel. Its shearing motion damages foundations of buildings.



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b- Rayleigh Waves (R-Waves)

These are the slowest waves - They waves roll along the ground like ocean waves.

Particles move both horizontal and perpendicular vertical in a direction parallel to the wave direction.

