IQRA NATIONAL UNIVERSITY

ENGINEERING GEOLOGY

Lecture 02

Earthquake

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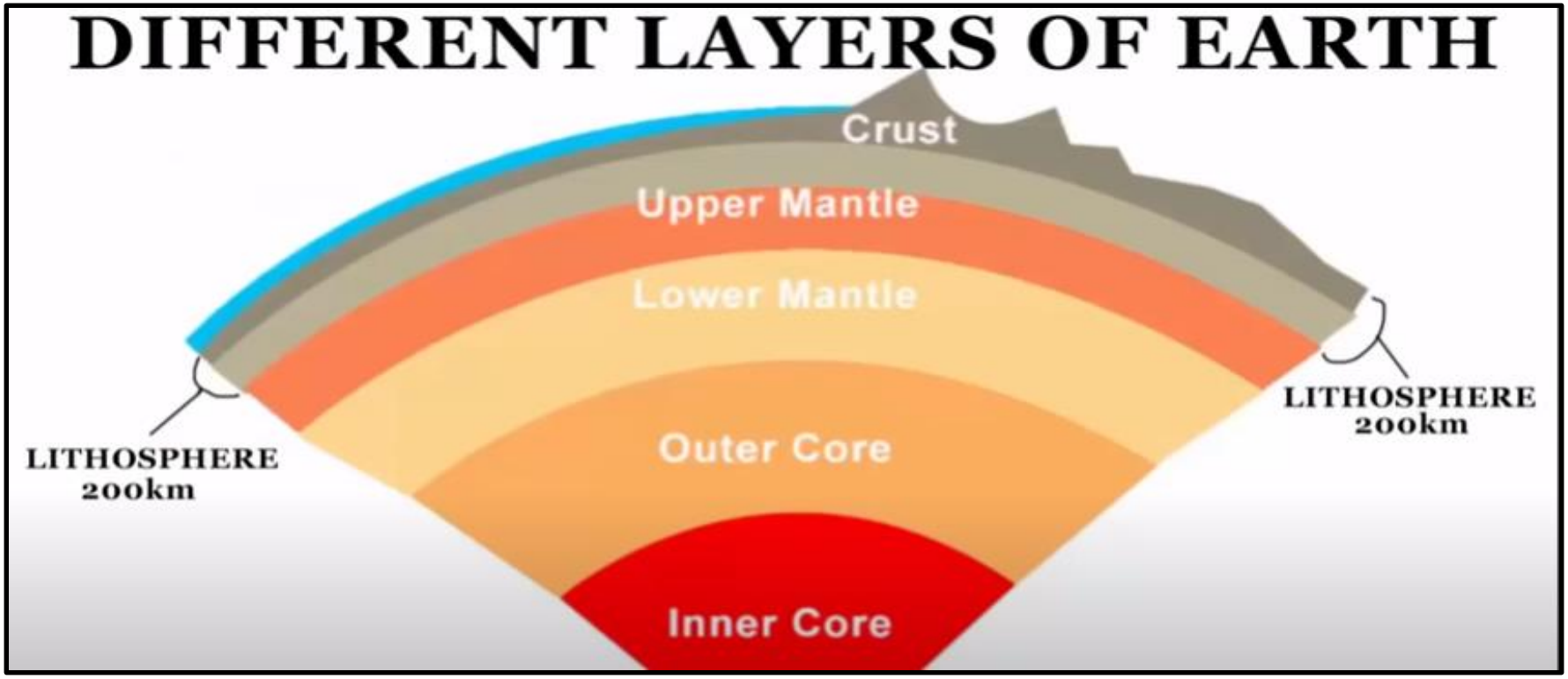
What is an earthquake?

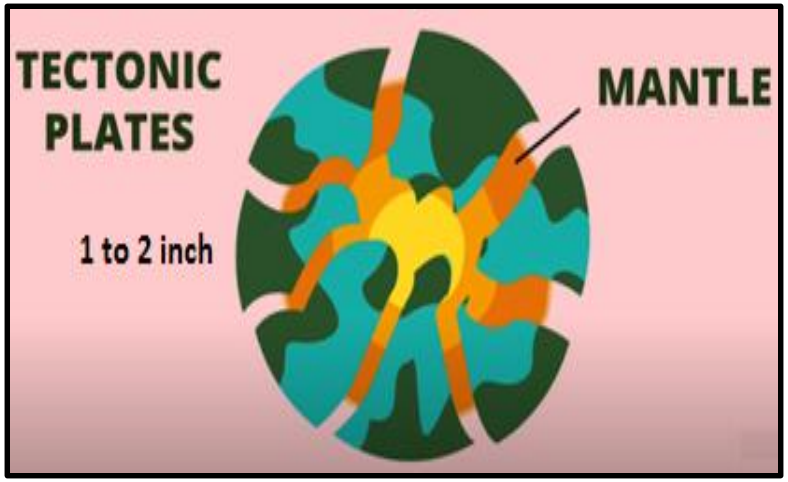
An **earthquake** is an intense shaking of Earth's surface. The shaking is caused by movements in Earth's outermost layers.



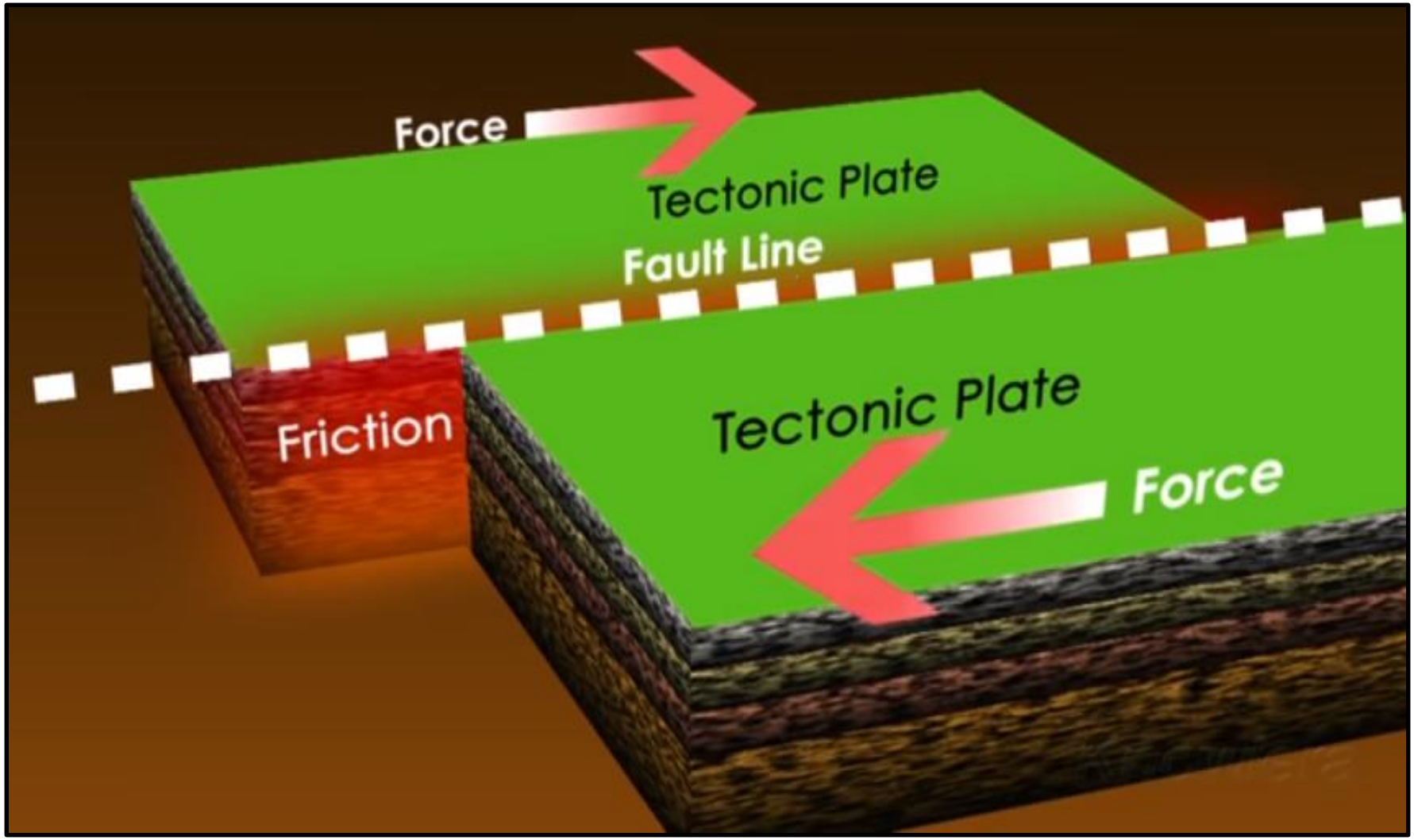
Results in;

what causes them to happen?

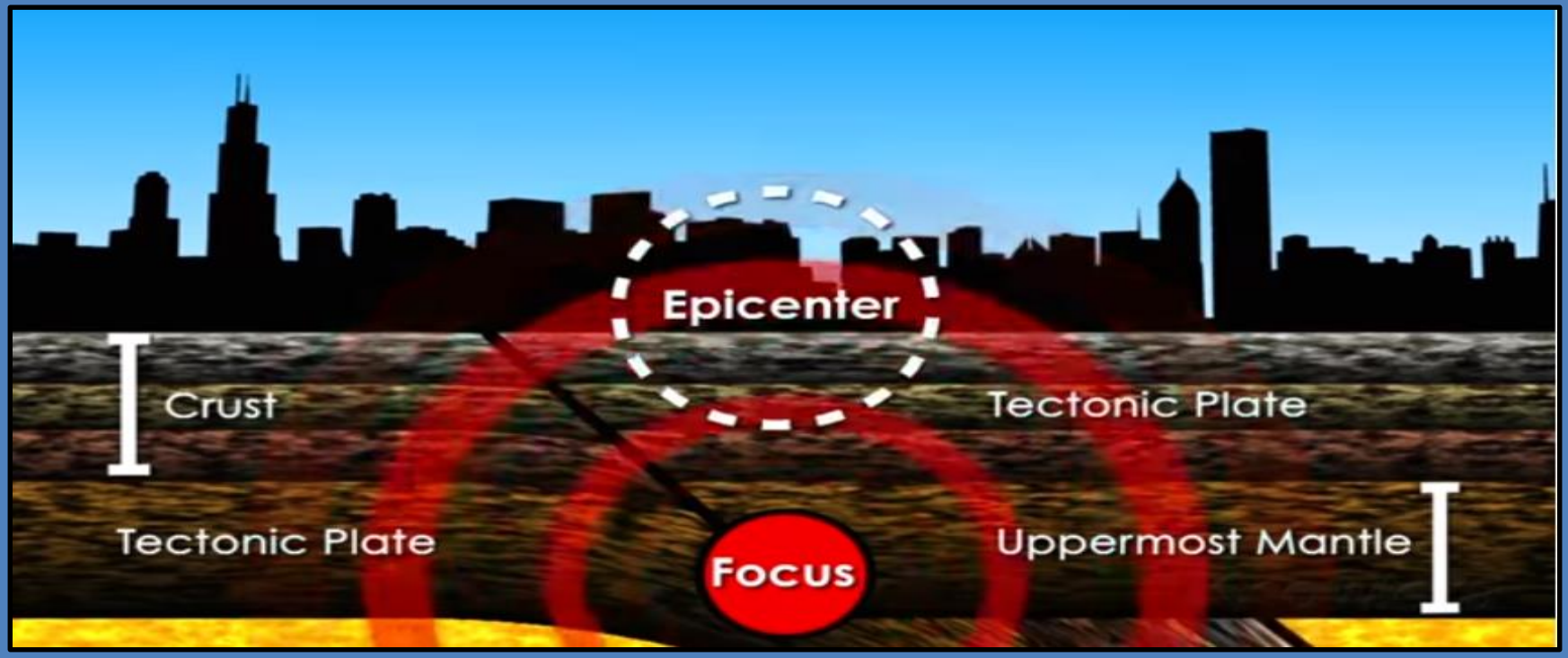
An earthquake is caused by a sudden slip on a fault.
The tectonic plates are always slowly moving, but they get stuck at their edges due to friction. When the stress on the edge overcomes the friction, there is an earthquake that releases energy in waves that travel through the earth's crust and cause the shaking that we feel.

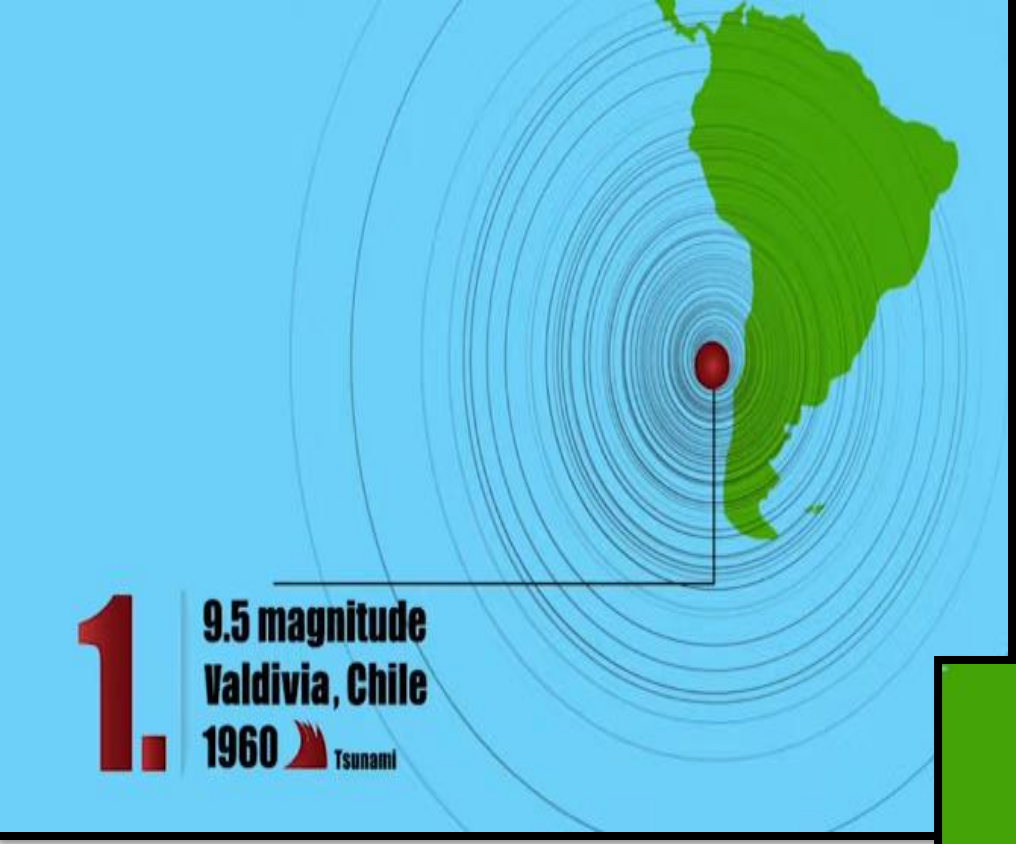


Tectonic plates movement




EPICENTRE
HYPOCENTRE


Epicenter
Crust
Tectonic Plate
Tectonic Plate
Focus
Uppermost Mantle

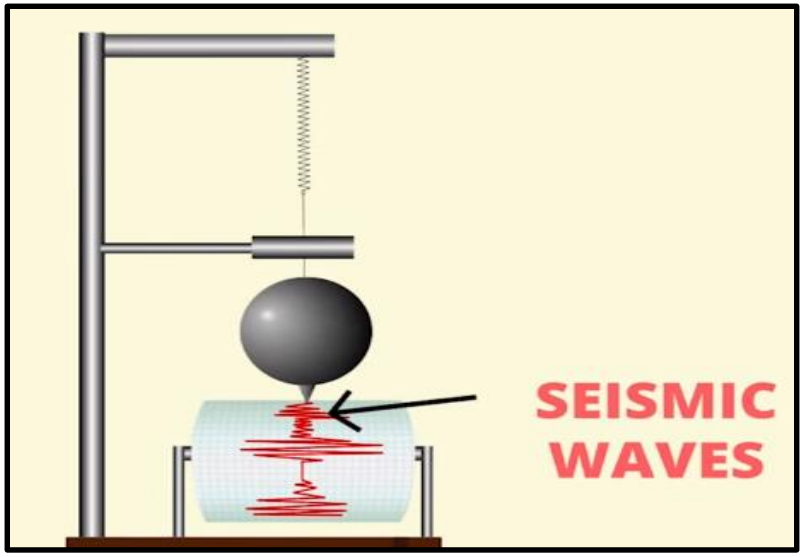

1.
9.5 magnitude
Valdivia, Chile
1960
Tsunami

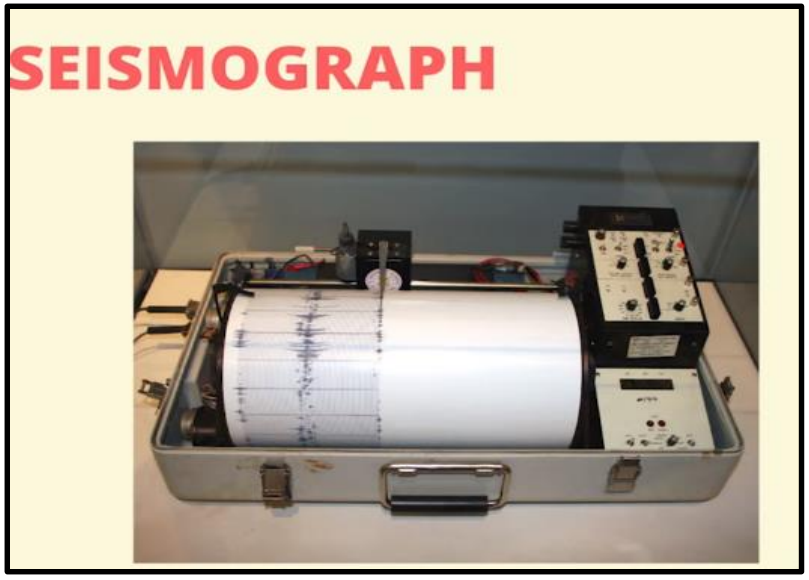

2.
9.0 magnitude
Japan
2011
Tsunami

Geologist uses a device that can sense a waves created by the movement of tectonic plates.

These waves are known as seismic wave and the device is called seismograph.

A scale used according to magnitude of shocks is known as Richter scale.





Richter scale

The Richter magnitude scale measures the amount of seismic energy released by an earthquake.

Richter Magnitude	Earthquake effects
0-2	Not felt by people
2-3	Felt little by people
3-4	Ceiling lights swing
4-5	Walls crack
5-6	Furniture moves
6-7	Some buildings collapse
7-8	Many buildings destroyed
8-Up	Total destruction of buildings, bridges and roads

How these Seismic waves moves?

There are several different kinds of seismic waves, and they all move in different ways. The two main types of waves are

body waves and

surface waves.

Body waves

Body waves are those waves which travels through the interior of the earth.

Body waves further divided into Two Types;

Primary waves

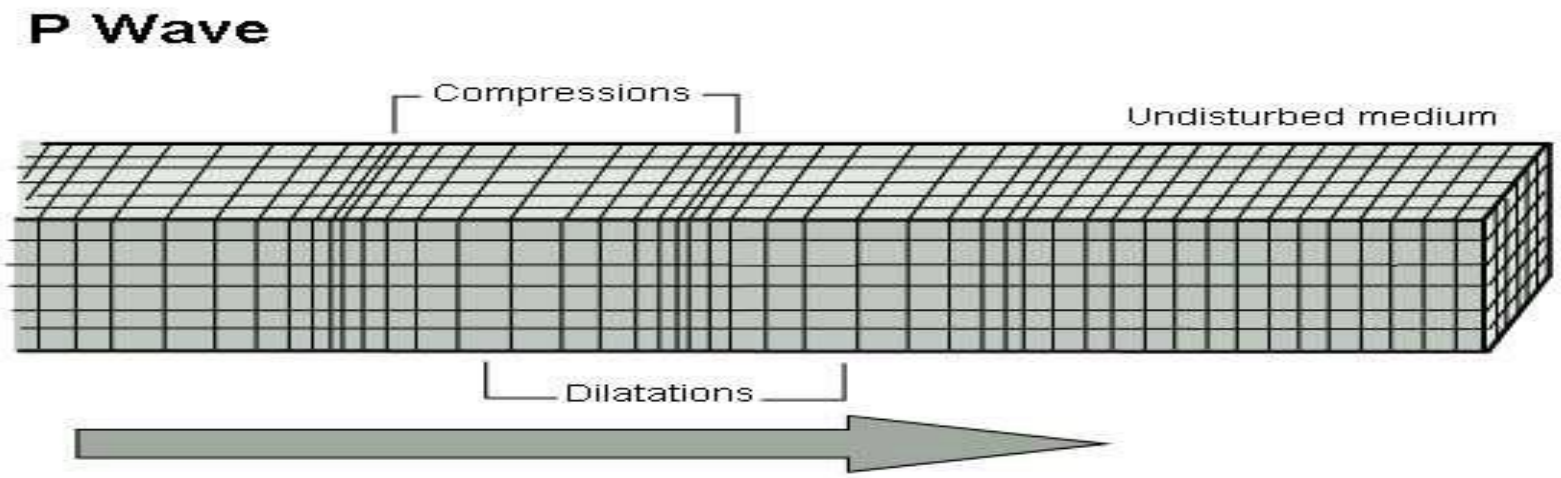
Secondary waves

P-waves

The first kind of body wave is the P wave or primary wave.

They travel through the Earth's interior and can pass through both solid and molten rock. They shake the ground back and forth.

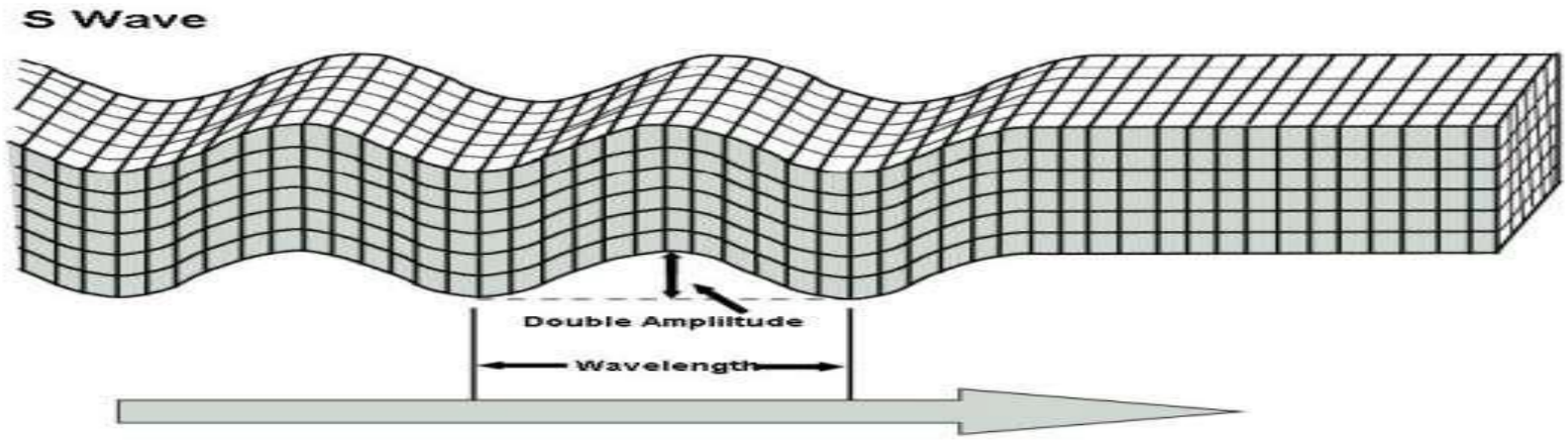
Typical speeds are 330 m/s in air, 1450 m/s in water and about 5000 m/s in granite.



S-waves

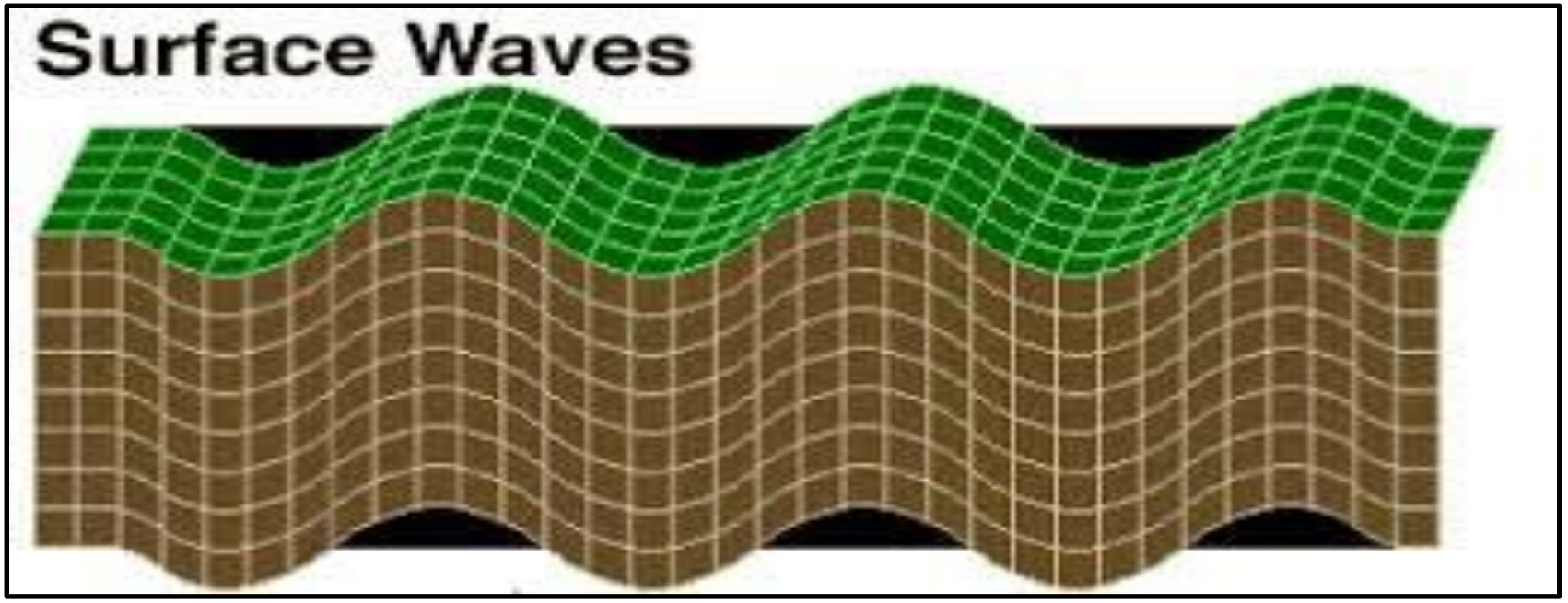
The second type of body wave is the S wave or secondary wave, which is the second wave you feel in an earthquake.

S-waves lag behind P-waves as they travel 1.7 times slower. However they do more damage because they're bigger and shake the ground vertically and horizontally.



Surface waves

Surface waves are those waves which travels through the surface of the earth.



General tips

MAKE A PLAN

Gathering your family will be top on your list.
Choose a meeting place and an out-of-area contact person to relay messages.

SECURE YOUR HOME

Make sure your house is as shakeproof as possible by retrofitting weak spots, strapping down heavy furniture and securing loose objects.

GET A KIT

Store supplies to get your family through at least the first three days after a quake.

DROP, COVER & HOLD ON

When a quake starts, drop down where you are and cover your head.
If you're near heavy furniture, take cover underneath and hold on tight.

CHECK FOR HAZARDS

When the shaking stops, check for injuries and for damage to home electrical wires, gas lines, walls, floors and water pipes.

STAY CONNECTED

Surviving a quake is a community effort. Get to know your neighbours now, and work together with local organizations to prepare.

END OF THE LECTURE