Plates, Types of Wave, Scale, Seismic Zone of Earth

Earthquake

When the Lithospheric plates move, the surface of the earth vibrates. The vibrations can travel all round the earth. These vibrations are called earthquakes The place in the crust where the movement starts is called the focus. The place on the surface above the focus is called the epicentre.Vibrations travel outwards from the epicentre as waves.Greatest damage is usually closest to the epicentre and the strength of the earthquake decreases away from the centre. Earthquakes occur when the ground is subjected to so much force that it fractures or breaks. Earthquakes occur all the time all over the world, both along plate edges and along faults. Most earthquakes occur along the edge of the oceanic and continental plates. The earth's crust (the outer layer of the planet) is made up of several pieces, called plates. Earthquakes usually occur where two plates are running into each other or sliding past each other.

Distribution of Earthquakes:

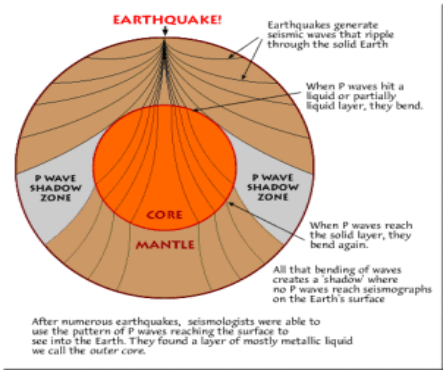
The Pacific Ring of Fire accounts for about 68 per cent of all earthquakes and these are closely linked with the phenomenon of plate tectonics. Chile, California, Alaska, Japan, Philippines, New Zealand and the mid-ocean areas have had many minor and major earthquakes in this belt. Mountains here run along the border of continents and nearly parallel to the depressions in oceans. The sharpest break in relief in this belt is the cause of earthquake.

The mid-world mountain belt extends parallel to the equator from Mexico across the Atlantic Ocean, the Mediterranean Sea from Alpine- Caucasus ranges' to the Caspian, Himalayan mountains and the adjoining lands. This zone has folded mountains, large depressions and active volcanoes.

The remaining 11 per cent of the shocks are recorded outside these two belts. Only a few occur along the fracture in African lakes, Red Sea and the Dead Sea zone. For geographical distribution of earthquakes. For an account of earthquakes in the Indian sub-continent, Physical Aspects in Indian Geography section.)

Earthquake or Seismic waves

These waves occur in lithosphere, i.e. up to 200 km of depth from the surface of Earth.
These waves are recorded on a seismograph. It shows different types of waves.
There are two type of waves: A) Body waves; B) Surface waves.

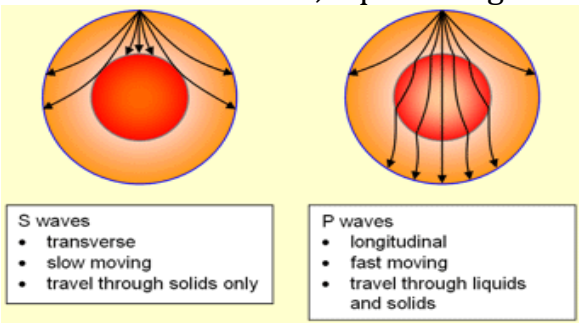


- **Body waves** are generated by the energy released at the focus /hypocenter. They move in all directions through the body of Earth. They interact with the surface rocks and generate Surface waves, which move along the surface. Body waves are further divided in two types: P – waves and S – waves.
- **Surface waves** move along the surface.The velocity of these waves vary with the material through which they travel, the more denser the material, the higher the velocity of these waves. They change their direction as they reflect and refract after coming across materials of different densities.

Let us look into the characteristics of each of these waves in brief. The following are points from standard textbook so they are reliable source for study and revision:

1. P- waves:

- These waves are known as Primary waves as they are first one to arrive at the surface.
- Their characteristics are similar to Sound waves, as they travel through all three mediums- solid, liquid and gases.



- P-waves have a tendency to vibrate parallel to the direction of wave propagation. this causes density differences in the material through which they travel.
- These waves are responsible for stretching and squeezing of material.
- Shadow zone: these are specific areas where waves are not reported on the seismograph. P-waves appears as around the Earth at 105-145 degrees away from the epicenter.

2. S- waves:

- These waves arrive after some time delay, hence they are called secondary waves.
- An important characteristic of these s-waves is that they travel only through solid medium. This is important because this information helped in understanding the structure of interior of Earth.
- The direction of vibration of these S – wave is perpendicular to the direction of wave propagation, thereby creating crests and troughs in material of their transmission.
- Shadow zone: Beyond 105 degrees from the epicenter no S-waves are reported.