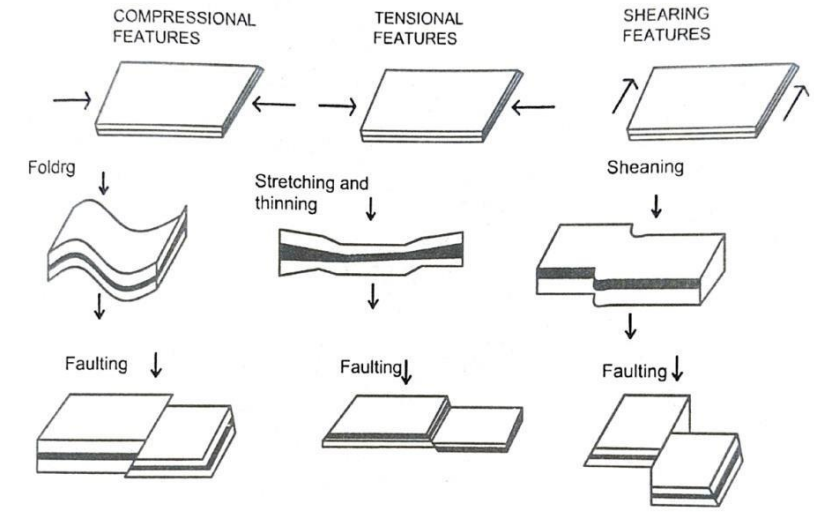
3.3 FAULTS

Faults are well defined cracks along which the affected rock masses on either side have suffered relative displacement. This displacement may occur in any direction, due to rotational movement of fractured blocks.

The faults may be vertical or inclined.

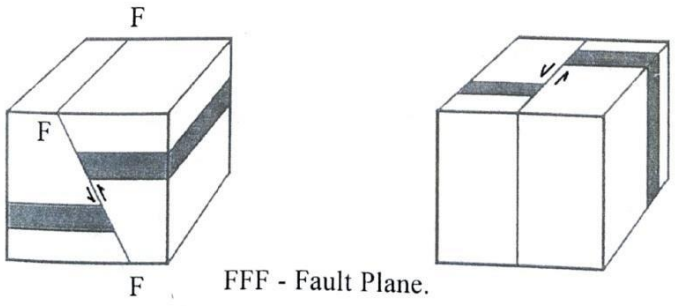
Forces responsible for formation of Faults:

- ✓ Tensional force
- ✓ Compressional force
- ✓ Shear force



AN INCLINED FAULT

A VERTICAL FAULT



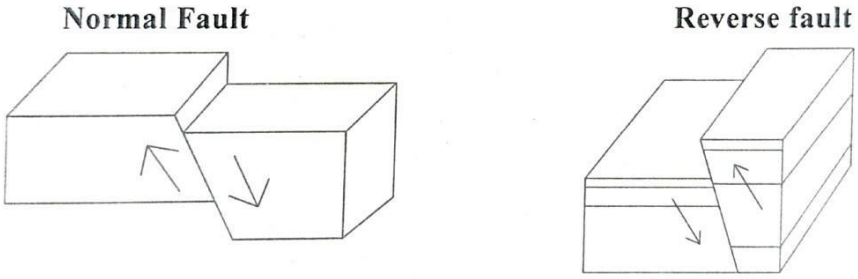
FFF - Fault Plane.

Types of Faults:

1. **Normal fault and reverse fault:**

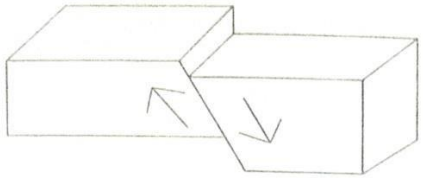
A vertical or an inclined fault along which the hanging wall side appears to have a moved relatively downwards in comparison with the adjoining foot-wall side is said to be a normal fault.

A vertical or an inclined fault along which the foot wall side appears to have been shifted downwards in comparison with the adjoining hanging wall side is said to be a reverse fault.



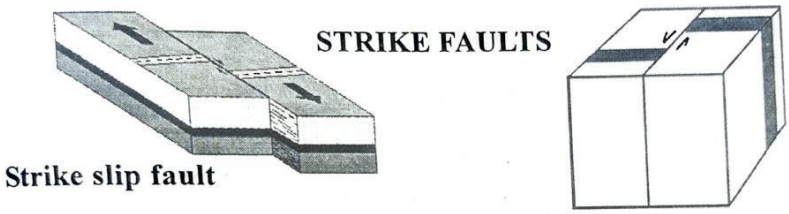
2. Dip fault and strike fault / strike slip fault:

A vertical or inclined fault striking parallel to the direction of dip of the country rocks is known as dip fault.



Normal fault & Dip fault

A vertical or inclined fault striking necessarily parallel to the strike of rock beds forming the country is called strike fault.

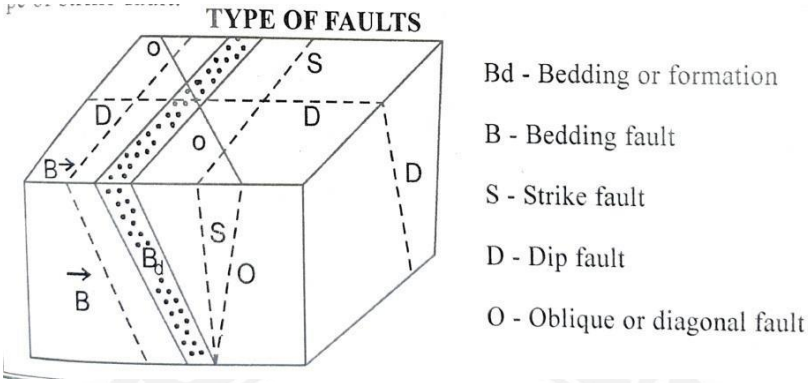


3. Oblique or diagonal fault:

A vertical or inclined fault striking in any direction other than the directions of dip and strike of the country rocks is described as an oblique or diagonal fault.

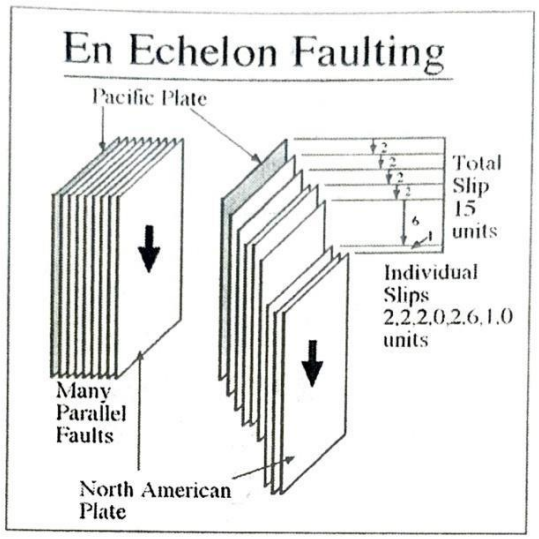
4. Bedding fault:

A bedding fault necessarily runs parallel to the bedding planes of the country rocks.



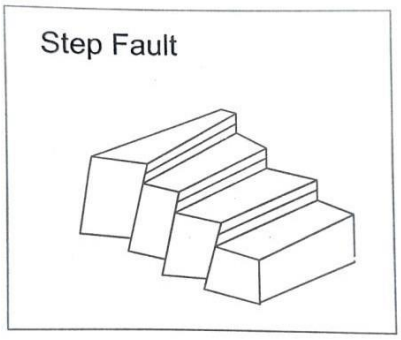
5. Parallel faults and Enechelon faults:

A series of faults having the same dip and strike constitute a group of parallel faults.



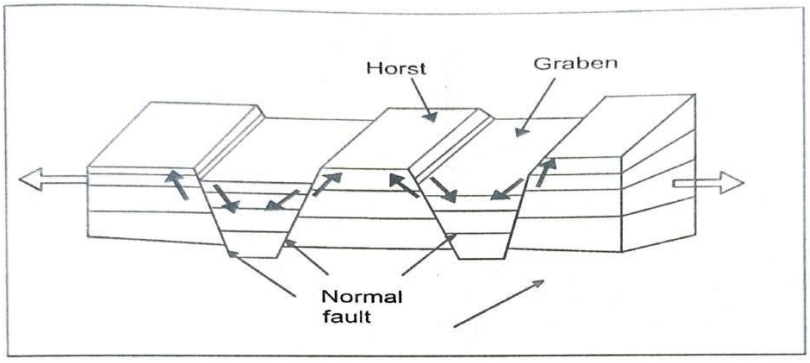
6. Step faults:

If in a series of parallel faults, the succeeding blocks have more and more exceeding down throw towards a particular direction, the resulting structure will be looking like “steps in a staircase” and is known as step faults.



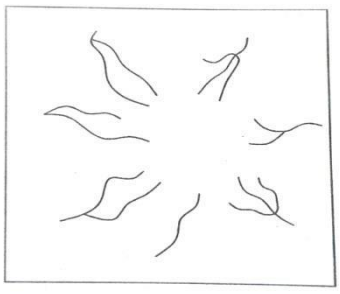
7. Horst and Graben:

The elevated blocks are known as horsts and depressed ones, the grabens. Horsts and grabens of large size give rise to what are known respectively as Block Mountains and Rift valleys.



8. Radial faults:

A number of faults showing a radiating pattern is said to form a group of radial faults.



9. Arcuate or peripheral faults:

Curved faults, more or less circular or arc like in outline are known as Arcuate or peripheral faults.

10. Low angle faults:

Faults dipping an angle of less than 45 degree are known as low angle faults.

11. High angle faults:

Faults dipping an angle of greater than 45 degree are known as high angle faults.

Recognition of Faults:

- Appearance of fault scarp (steep slopes) on the topography.
- Appearance of aligned springs.
- Presence of slicken sides (polished surfaces) along the fault planes.
- Repetition and omission of strata.
- In the down through side of a fault, a younger bed occurs against an older bed in the corresponding up throw side.

Engineering importance of Faults:

Faulted areas are associated with earthquakes or tectonic movements. Hence for the safe execution of engineering projects, the tectonic history of the project area should be thoroughly studied and established. Proper quake poof structure should be designed for the safety of the project.