

MATERIALS AND ITS PROPERTIES

Material

- Here materials are referred as structural material.

Structural materials are generally selected on the basis of mechanical properties rather than its electronics, chemical, optical, magnetic etc.

In general on the basis of physical properties all the engineering materials are classified as-

1. Elastic material
2. Plastic material
3. Ductile material
4. Brittle material.

Material

Elastic materials- If a material regains its original position, on removal of the external forces acting on it then it is called elastic material.

Plastic materials- If a material does not regains its original position, on removal of the external forces acting on it then it is called plastic material.

Ductile materials- If a material can undergo a considerable deformation without rupture, it is called a ductile material. (e.g If a material can drawn into wires)

Brittle material – If a material cannot undergo any deformation when some external forces act on it and it fails by rupture it is called a brittle material.

IMPORTANT DEFINATIONS

- **Elasticity** :- Elasticity is the property of certain materials of returning their original position after removing the external force .
- **Stress** :- Whenever some external system of force acts on a body , it undergoes some deformation and set up some resistance to deformation . This resistance per unit area to deformation is known as stress .

Mathematically , p or σ or $f = P / A$

Where , p or σ or $f =$ Intensity of stress .

$P =$ Load or force acting on the body.

$A =$ Cross sectional area .

****Unit of stress :-** If the load or force is in Newton(N) and the area is square metre(m) then the unit of stress will be N/m^2 or Pascal(P).