

2.1 Factors affecting Elasticity

It is found that some bodies lose their elastic property even within the elastic limit, due to elastic fatigue. Therefore, the manufacturer should choose the material in such a way that it should regain its elastic property even when it is subjected to large number of cycles of stresses. *The temporary loss of elastic property of a body by the continuous applied strain or stress is called elastic fatigue.*

Apart from elastic fatigue, some materials will have change in their elastic property because of the following factors.

- Effect of stress
- Effect of change in temperature
- Effect of impurities
- Effect of hammering, rolling and annealing
- Effect of crystalline nature

Effect of stress

When a material is subjected to large number of cycles of stresses, it loses its elastic property even within the elastic limit. Therefore, the working stress on the material should be kept lower than the ultimate tensile strength.

Effect of change in temperature

A change in temperature affects the elastic properties of a material. Normally the elasticity increases with the decrease in temperature and vice versa. For example, lead is not a good elastic material at room temperature. But it behaves as an elastic material at low temperature.

Effect of impurities

The elastic property of a material is either increased or decreased due to the addition of impurities. It depends upon the elastic properties of the impurity. For example, an elastic property of gold is increases by the addition of potassium (or) copper init.

Effect of hammering, rolling and annealing

The crystal grains are break up into small unit by hammering and rolling, which turns increase the elastic properties of a body.

Annealing is a process to heat and cool the body gradually and it increase the crystalline size, which is ultimately reduces the elastic property of a body.

Effect of crystalline nature

The modulus of elasticity of a body is more when it is in single crystal and in polycrystalline state it is comparatively small.