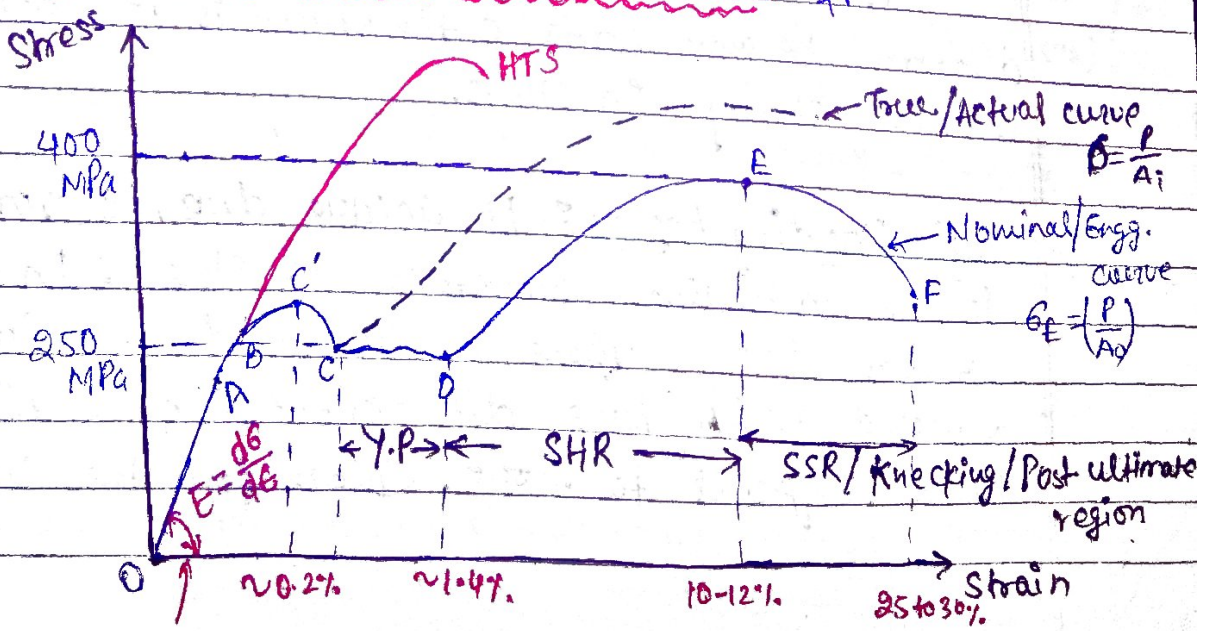
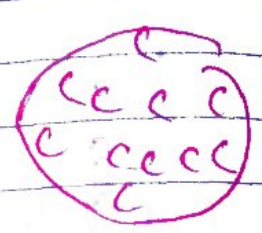
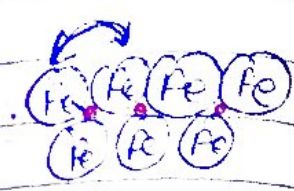
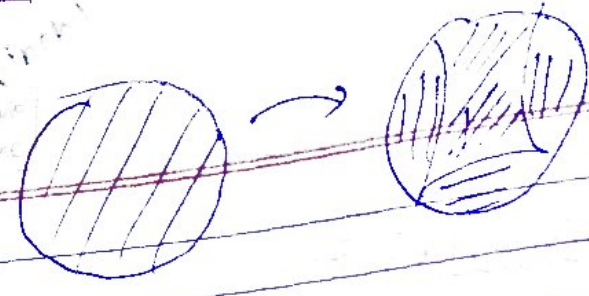


TENSION TEST RESULT OF MILD STEEL :- # Portal →



Grain size $\rightarrow 0.5 \mu m$
 $\frac{L}{D} = \frac{1}{0.5}$



It is called proportional limit and hook's law is valid up to this limit only.

After unloading within 'B', entire strain can be reversed.

C' and C \rightarrow C' is called upper yield point and C is called lower yield point (actual yield point). The fall of stress from C to C' is due to slipping of carbon atom in the molecular structure of steel.

NOTE: For mild steel, 'A', B and C are very close to each other however $\sigma_e > \sigma_B > \sigma_A$.

Region C-D - Yield Plateau - And stress corresponding to it is called yield point. From C mild steel is assumed to be plastically deform because from C the strain is increasing without change in stress.

Def: Grain Hardening Region: It occurs due to randomness in the molecular structure of steel. In this region there are no. of grain boundaries developed which have diff orientation of the atom. Hence difficult to move. Therefore the strength of

material increases in this region.

Point E: Ultimate point. And the stress corresponding to it is called Ultimate stress.

NOTE: For ductile material yield stress is design stress however for brittle material ultimate stress is design stress.

Region E-F: It is called necking region / strain softening region or post ultimate region.

Point F: Fracture Point.

NOTE: All the ^{grade} plate of steel have same young's modulus. It means that the initial strain stress curve will be same.

The fracture strain depends on the % of carbon. At higher % of carbon, yield stress is higher however the fracture strain is lower and vice versa.

The Ductile materials are those materials which have large deformation after yielding. A brittle material is those material which fails suddenly after yield limit of elastic limit. (less than 5%). The cast iron has very high fracture strain but after its elastic limit it fails suddenly. Therefore it is said to be brittle.

A ductile material is approximately strong in tension and compression but weak in shear. Whereas, brittle material is strong in compression and weak in tension. And shear strength is in both tension stress and compression stress.