

















• Engineering strain is the increase in length divided by the original length

$$\varepsilon_E = \frac{L - L_0}{L_0} = \frac{\Delta L}{L_0}$$

 True strain is the increase in length due to a the increase in load ΔP divided by the length at the time the load was applied, true strain is the summation of all strains up to this point in loading

























- Is the ability of a metal to deform plastically and to absorb energy in the process before fracture
- Toughness gives an indication about the ductility of the material. Ductile materials will have larger toughness than brittle materials















## Effect of Test Speed

 Increasing the rate of loading increases the strength and decreases the ductility for ductile materials while having no effect on brittle materials

## <section-header><image><image><image><image>





## Steel Specifications (2007)

Steel Grade	Min Yield of proof stress (N/mm <sup>2</sup> )	Min ultimate stress (N/mm²)	Min percentage elongation
240/350	240	350	20
280/450	280	450	18
360/520	360	520	12
400/600	400	600	10

## Steel Specifications (2017)

Steel Grade	Min Yield of proof stress (N/mm²)	Min ratio of ultimate stress to yield or proof stress	Min percentage elongation
B240C-P	240	1.15	20
B240D-P	240	1.25	22
B400C-R	400	1.15	14
B400WR	400	1.15	14
B350DWR	350	1.25	17
B350DWR	400	1.25	17
B350DWR	420	1.25	16





18

