1. Strength

Strength = ability to resist stress without failure

- The most important property that is often required, simply because Concrete is used for compressive loads.
- The strength of hardened concrete is measured by:

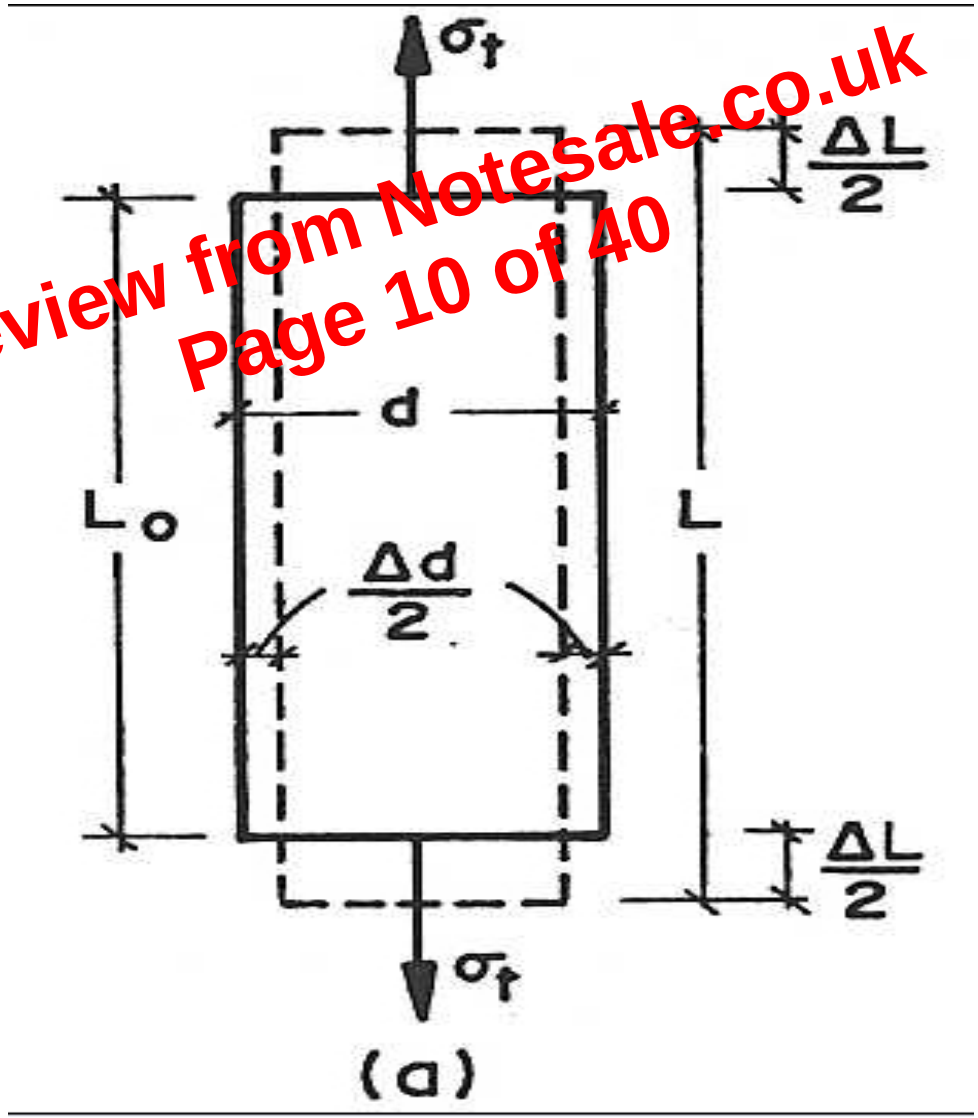
-Compressive strength (13 to 55 Mpa)

-Flexural strength (1.3 to 5.5 Mpa)

-Splitting tensile strength

Factors Affecting Strength

- Effect of materials and mix proportions
- Production methods
- Testing parameters



SPLIT TENSILE STRENGTH

❖The split-tension test (ASTM C496) measures the tensile strength of concrete

❖Concrete cylinder of 150mm by 300mm is subjected to a compressive load at constant rate along a vertical diameter until failure

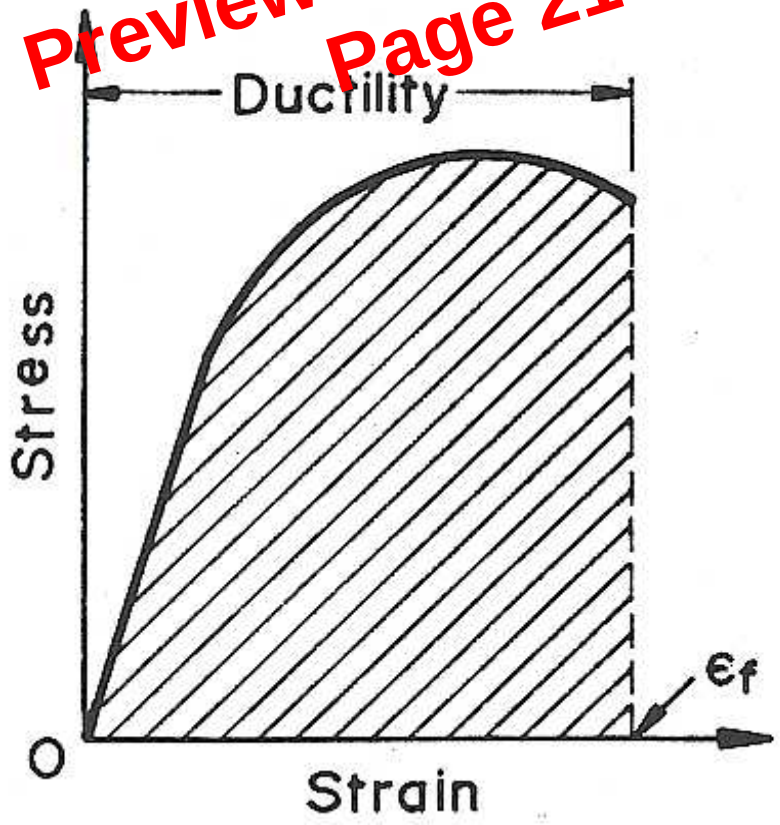
❖ Failure is due to tension developed in the transverse direction

❖The cross-section of beams used for the flexural strength test should not be less than 150 x 150 mm, or three times the maximum size of aggregate, whichever is larger.

❖The length of beams should be at least three times the depth of the beam plus 50 mm.

For example, if the maximum size of aggregate in the concrete is 40 mm, the total length should be not less than 500 mm for a 150 x 150-mm beam.

Modulus of elasticity cont…



σ - ε relationship for concrete is nonlinear. However, specially for cylindrical specimens with h/D=2, it can be assumed as linear upto 40-50% of σ_{ult}