

MATERIAL TECHNOLOGY

Cement and Concrete:

Portland Cement: Chemical Composition, hydration of cement, structure of hydrated cement, mechanical strength of cement gel, water held in hydrated cement paste and heat of hydration. Cements of different types. Factors affecting the strength of concrete. Elasticity, shrinkage and creep of concrete

Durability of concrete:

Permeability of concrete, chemical attack of concrete, air-entrained concrete and thermal properties of concrete. Mechanical test of hardened concrete. light weight and high density concrete. Mix Design. Statistical quality control: Biaxial strength of concrete, Fiber reinforced concrete.

Metals:

Behaviour of common constructional metals in tension and compression. True stress-strain curve for mild steel in simple tension. Theories of failure and yield surfaces.

Fatigue Properties:

Nature of fatigue failure, fatigue strength for completely reversed stresses, fatigue strength with super imposed static stress and factor influencing fatigue strength.

Temperature and creep properties:

Low temperature properties, high temperature properties, creep stress -time-temperature relation for simple tension, mechanics of creep in tension. structure of materials and imperfection, deformation of crystals and theory of dislocation.

Reference Books:

1. Concrete Technology, M.L.Gambhir, Tata Mc-Graw-Hill, New Delhi,2002
2. Concrete Technology, M S Shetty, S.Chand Publisher, 2013
3. Properties of Concrete, A M Neville-Pearson Education,2008
4. Mechanical Behaviour of Engineering Materials, AJ Martin