

A4:STRENGTHOFMATERIALS

Introduction : Concept of Stress, axial loading normal stress, shearing stress, bearing stress, stress on an oblique plane under axial loading.

Deformation : Concept of strain, normal strain under axial loading, stress-strain diagrams, Hooke's law, modulus of elasticity, Poisson's ratio, thermal stresses, bulk modulus, modulus of rigidity, shearing strain, stress-strain relationship.

Transformation of Stress and Strain : Principal stresses, maximum shearing stress, Mohr's circle for plane stresses. Stresses in thin-walled pressure vessels, measurement of strain Rosette.

Pure Bending : Deformation in a transverse cross-section, derivation of formula for bending stresses. Bending stresses in composite sections.

Shearing Force and Bending Moment : Diagram for simply supported Beam, Cantilevers, with concentrated, uniformly distributed and variable loads. Castigliano's theorems, unit load method.

Deflection of Beams : Deflection in simply supported beams and cantilevers with concentrated loads, uniformly distributed loads and combination of these. Macaulay's method, moment area method.

Springs : Design of Helical (closed coiled) springs and leaf springs.

Columns : Euler formula for pin-ended columns and its extension to columns with other end conditions. Rankine Gordon formula.

Torsion : Deformation in a circular shaft, angle of twist, stresses due to torsion, derivation of torsion formula, torsion in composite shafts.

Loads on Airplane Components: Steady and unsteady load.

Text Books :

1. S Ramamrutham, Strength of Materials, Dhanpat Rai Publishing Co.
2. E P Papov, Mechanics of Materials, Prentice Hall Inc.
3. U C Jindal, Strength of Materials, Umesh Publications

Reference Books :

1. S Timoshenko, Strength of Materials, D Van Standard Co. Inc.
2. G H Ryder, Strength of Materials, B I Publications, Mumbai