

Chapter 1 Analysis of Stress and Strain

Introduction

➤ The stresses in a beam are given by the flexure and shear formulas

$$\sigma = \frac{My}{I} \quad , \quad \tau = \frac{VQ}{Ib} \quad ; \quad Q = \int y dA$$

➤ The Stresses in a shaft are given by the torsion formula

$$\tau = \frac{T\rho}{I_p}$$

➤ In discussions of plane stress, we will use *stress elements* to represent the state of stress at a point in a body.

➤ We will derive the transformation equations that give the stresses acting on the sides of an element oriented in a different direction.

§ Plane Stress

Normal stresses: σ_x, σ_y ; Shear Stresses: $\tau_{xy} = \tau_{yx}$