

ELASTICITY BASED VS CONVENTIONAL STRESS ANALYSIS: A CASE STUDY

SUNIL BHAT

School of Mechanical and Building Sciences,
VIT University, Vellore-632014, Tamil Nadu, India
E-mail: sbhat_789@rediffmail.com

Abstract

Stress analysis with the principles of elasticity is more versatile and accurate than with conventional strength of material concepts. Elasticity based approach necessitates a stress function satisfying the governing bi-harmonic equation. The constants of the stress function are determined from the boundary conditions represented by the geometry, load and constraints of the body. The stress state is finally obtained from the constant free stress function. A case study is presented in the paper in which the elasticity procedure is applied in stress analysis of a tapered cantilever beam subjected to uniformly distributed load along the span. The results are compared with those obtained from the conventional method. A clear difference is noticed between the two.

Key Words : *Airy's stress function, Biharmonic equation, Boundary conditions, Cantilever beam, Elasticity, Stress solution.*