

WORK SHEET-ECCENTRIC LOADING

Equations

(1) Uniaxial Hooke's Law

$$\sigma_i = E \varepsilon_i$$

σ_i = stress at gage i location, psi

E = modulus of elasticity, psi

ε_i = axial strain on gage i, in/in

(2) Experimental Neutral Axis

$$y_{NA,exp} = \frac{-b_{exp}}{m_{exp}}$$

$y_{NA,exp}$ = location of exp. NA, in

b_{exp} = y-intercept from regression, psi

m_{exp} = slope from regression, psi/in

(3) Theoretical Stress vs. Position

$$\sigma_{th} = \left(\frac{Pe}{I_c} \right) y - \frac{P}{A} = m_{th} y + b_{th}$$

σ_{th} = theoretical stress, psi

P = applied load, lb

e = load offset distance, in

y = position from centroid, in

A = cross sectional area, in²

I_c = moment of inertia about centroid, in⁴

m_{th} = slope of theoretical line, psi/in

b_{th} = intercept of theoretical line, psi

Results

Experimental regression line equation	Neutral axis	Neutral axis	Max tensile stress		Max compressive stress	
	experimental	Theoretical	experimental	Theoretical	experimental	Theoretical
Theoretical stress vs position equation						

Comments

Attach the graphs of your data(Done in excel or using graph paper)

