

Problem 1 - If the applied load on the bar is $P = 10,000$ lb. and the cross-sectional area is $A = 0.50$ in.², what is the stress?

Problem 2 - If the allowable stress at failure for the material is 35,000 psi and the applied load on the bar is $P = 20,000$ lb., what is the minimum area required to prevent failure?

Problem 3 - A bar has a 2 in.² cross-sectional area; if the allowable stress at failure for the material is 25,000 psi, what is the maximum force the bar would support?

Problem 4 - If a bar elongates 2.5 in. and the original length is 10.0 ft., what is the strain?

Problem 5 - If the bar fails at strains greater than 0.15 and the original length of the bar is $L = 10$ ft., what is the maximum allowable deformation before failure?

Problem 6 - Determine the cross-sectional area of a 100-ft. steel cable supporting a 25,000 lb. tensile force while not exceeding the allowable tensile stress of 40,000 psi or a maximum elongation of 0.100 ft. Assume the modulus of elasticity of steel is $E = 29,000,000$ psi (assume all values are “exact” measurements).