國立成功大學 75 學年度 航空太空工程研究所 考試（材料力學 試題） 共 2 頁 第 1 頁

1. The cantilever beam show in Fig.(a), with cross section shown in Fig.(b), is composed of an elastic-brittle material for which the stress-strain curve is given in Fig.(c). A strain gage at A indicates $\varepsilon_A = -180 \times 10^{-6}$ in/in

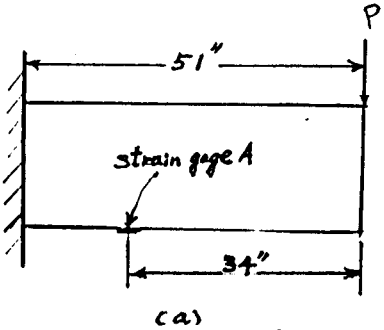
Determine:

a). the magnitude of the load.

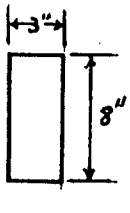
b). the maximum shear stress in the beam.

c). the maximum load (failure load) P which can be applied to the beam.

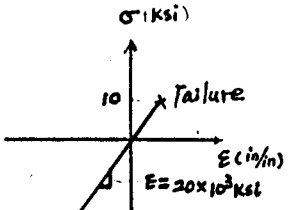
d) the stress distribution for the cross section at the fixed end if the stress-strain curve for this material is given by Fig.(d) and the applied load $P = 15$ kips



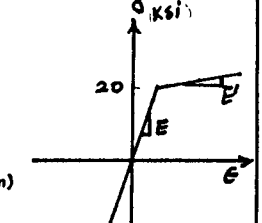
(a)



(b)

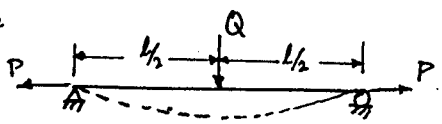


(c)

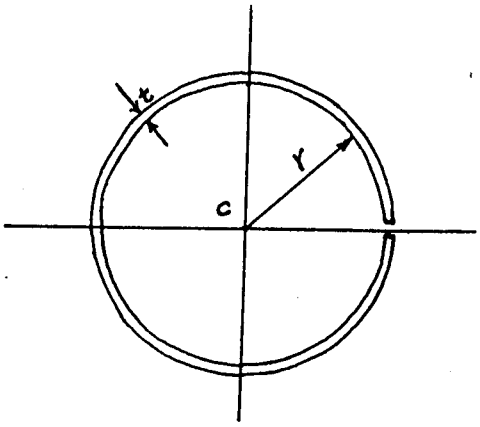


$E = 20 \times 10^3$ ksi $E' = 5 \times 10^3$ ksi
(d)

2. A simply-supported slender bar of length l, moment of inertia I, and Young's modulus E subjected to axial tension, P, and loaded transversely by force, Q, applied at the center. Assuming the slope of the deflection curve remains small, compute the deflection at the center.



3. A cross section of a slit circular tube of constant thickness is shown in the figure. A vertical force V is applied through the shear center S. Find, (1) the position and the magnitude of the maximum shear stress. (2) the position of the shear center.



4. All the members in the pin-connected structure shown in the figure below have the same cross section A and Young's modulus E. Find the movement of point D caused by the application of a horizontal force P at point D by Castigliano's theorem.