

1. (20pts) The distributed loading is applied to the rigid beam, which is supported by the three bars. Each bar has a cross-sectional area of a 1.25 in^2 and is made from a material having a stress-strain diagram that can be approximated by the two line segments shown in Fig. 1. If a load of $w = 25 \text{ kip/ft}$ is applied to the bar, determine the stress in each bar and the vertical displacement of the rigid beam.

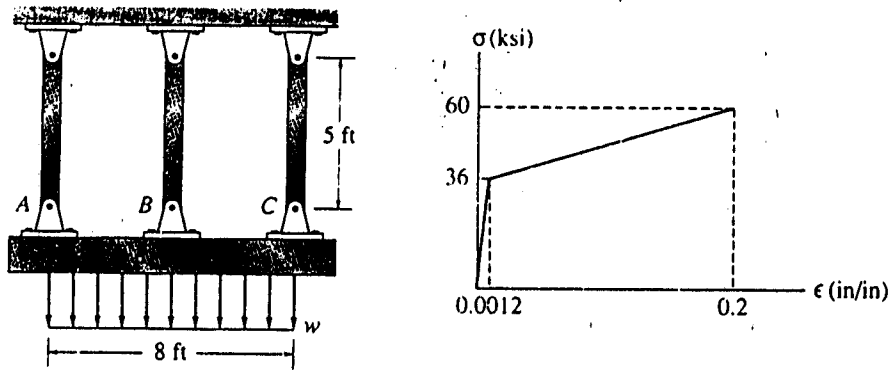


Fig. 1

2. (25pts) Three steel plates, each 0.5 in. thick, are welded together to form a cantilever beam. For the loading shown in Fig. 2, (a) determine the stress states at points a, b, d and e, (b) the principal and maximum shearing stress states at point b.

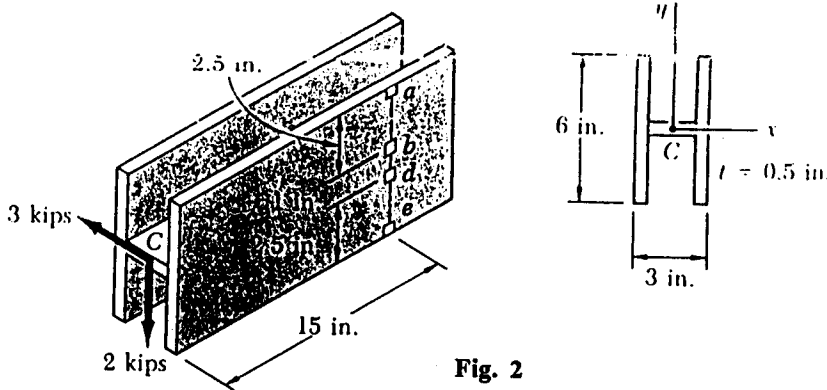


Fig. 2

3. (25pts) For the beam shown in Fig. 3, determined (a) the equation for the elastic curve, and (b) the maximum displacement between the supports. Also draw the shear and moment diagrams.

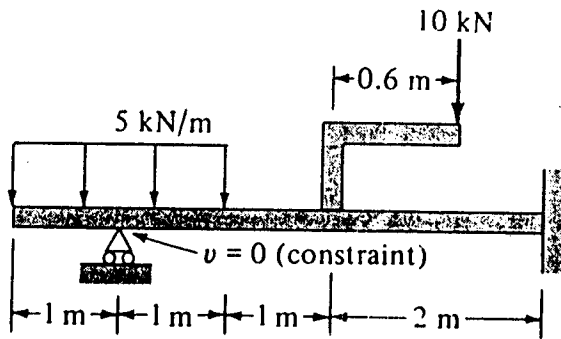


Fig. 3

4. (30 pts) Please define the following key words :

- (a) Factor of safety.
- (b) Generalized Hooke's law.
- (c) Poisson's ratio.
- (d) Bulk's modulus.
- (e) Idealized elastoplastic material.
- (f) Elastic section modulus.
- (g) Maximum-distortion-energy criterion.
- (h) Strain Rosette.
- (i) Method of superposition.
- (j) Strain-energy density.