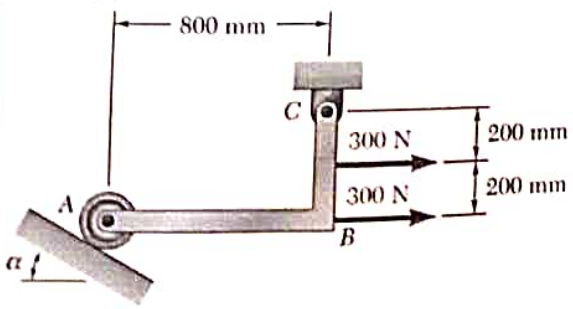
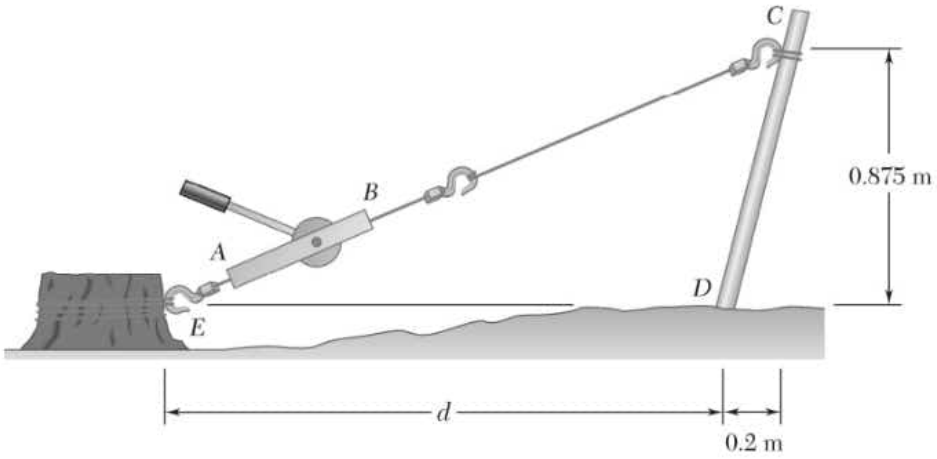
Problem 1 (Tutorial)



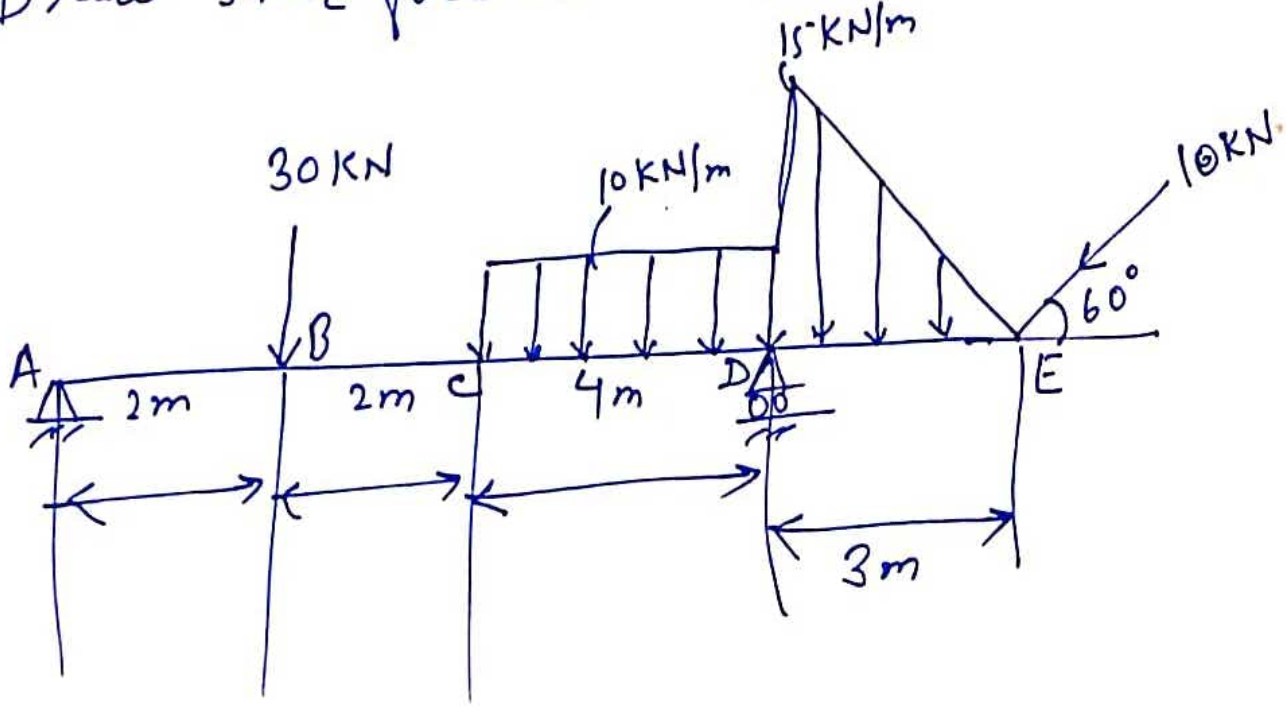
~~PROBLEM 4.21~~

Determine the reactions at A and C when (a) $\alpha = 0$, (b) $\alpha = 30°$.

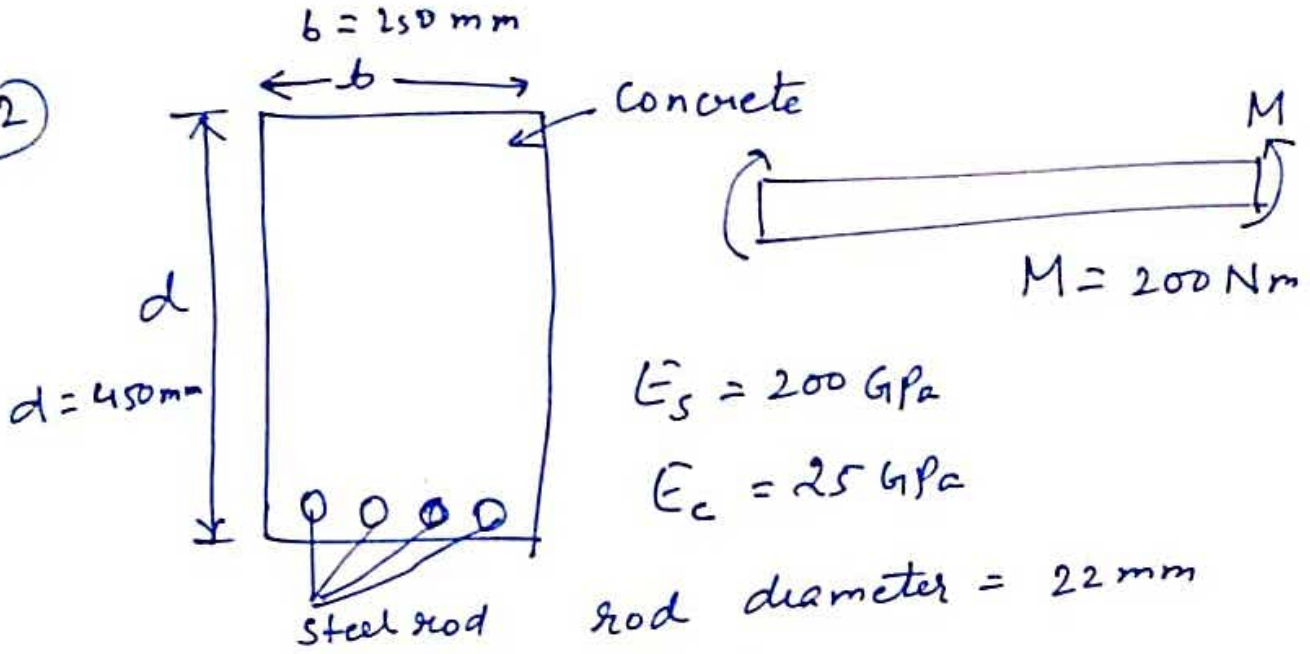
A winch puller AB is used to straighten a fence post. Knowing that the tension in cable BC is 1040 N and length d is 1.90 m, determine the moment about D of the force exerted by the cable at C by resolving that force into horizontal and vertical components applied (a) at Point C, (b) at Point E.



(1) Draw shear force and Bending Moment diagram



(2)

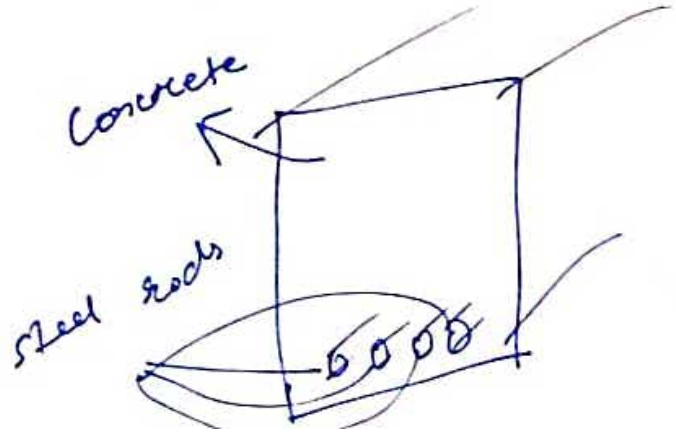


$E_s = 200\ GPa$

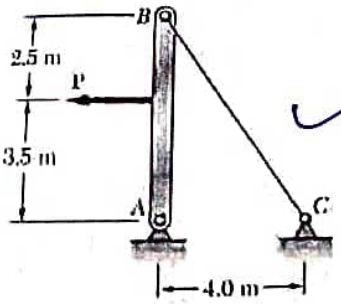
$E_c = 25\ GPa$

rod diameter = 22 mm

3D



Solve by using area transformation method.



PROBLEM 2.13

The 4-mm-diameter cable BC is made of a steel with $E = 200$ GPa. Knowing that the maximum stress in the cable must not exceed 190 MPa and that the elongation of the cable must not exceed 6 mm, find the maximum load **P** that can be applied as shown.

$\sigma = \frac{F_{BC}}{A} =$

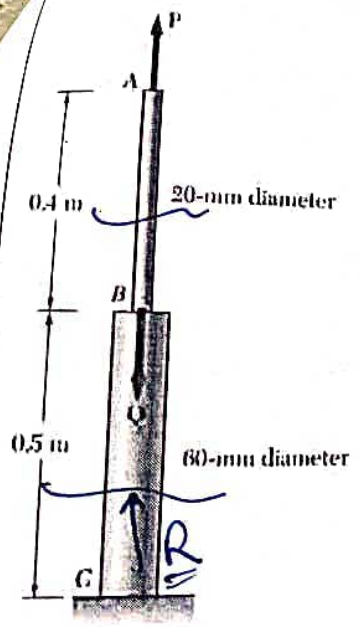
$F_{BC} = \sigma A = 190 \times 10^6 \text{ Pa} \times \pi r^2$

SOLUTION

$$L_{BC} = \sqrt{6^2 + 4^2} = 7.2111 \text{ m}$$

PROBLEM 2.19

Both portions of the rod ABC are made of an aluminum for which $E = 70$ GPa. Knowing that the magnitude of **P** is 4 kN, determine (*a*) the value of **Q** so that the deflection at A is zero, (*b*) the corresponding deflection of B.

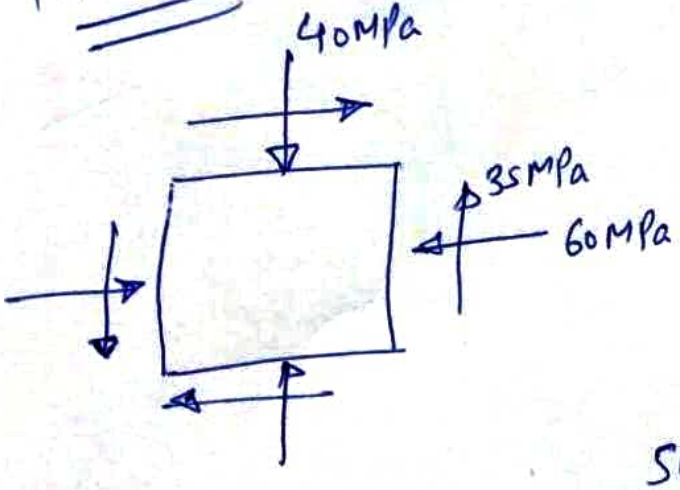


$$\sigma = \frac{P}{A_{AB}} \qquad \delta_{AB} = \frac{P L_{AB}}{A_{AB} \cdot E}$$

$$E\varepsilon = \frac{P}{A_{AB}}$$

$$\frac{E \delta_{AB}}{L_{AB}} = \frac{P}{A_{AB}}$$

Problem 1



For the given state of stress, determine (a) the principal planes, (b) Principal stresses

Solve by using analytical and Mohr's circle

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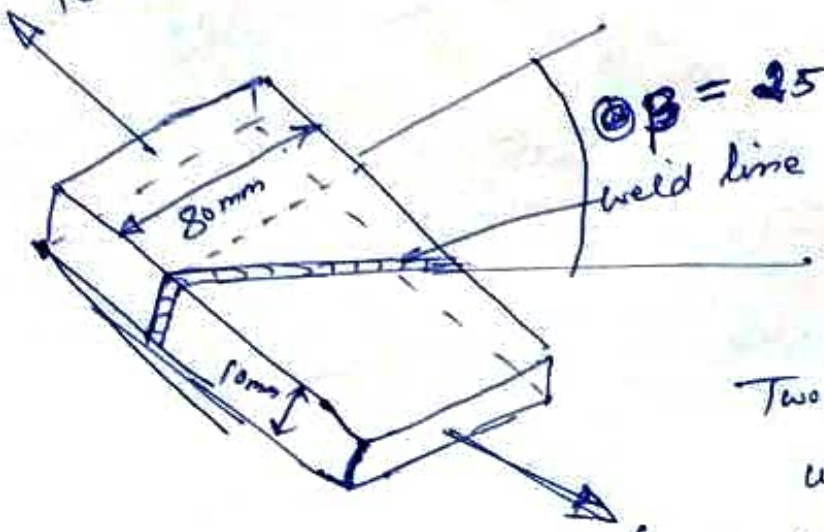
Problem 2



Two steel plates of uniform cross-section 10 x 80 mm are welded together as shown. Knowing that centric 100kN forces are applied to the welded plates and that $\beta = 25°$, determine (a) the in-plane shearing stress parallel to the weld, (b) the normal stress perpendicular to the weld.