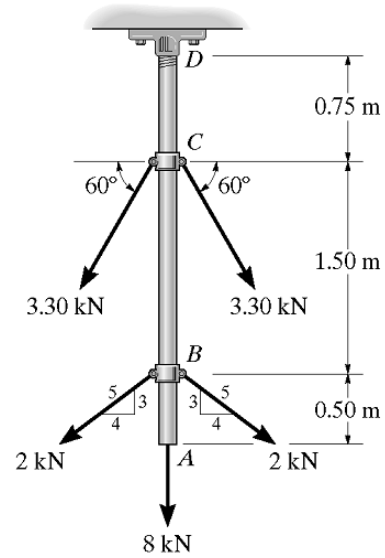
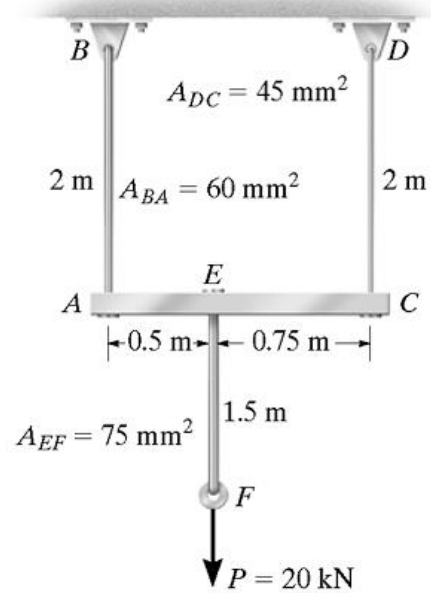


1. The steel rod is subjected to the loading shown. If the cross-sectional area of the rod is  $60 \text{ mm}^2$ , determine the displacement of  $B$  and  $A$ . Neglect both the weight of the rod and the size of the couplings at  $B$ ,  $C$  and  $D$ .  $E_{st} = 210 \text{ GPa}$ . 【一横截面面积为  $60 \text{ mm}^2$  的钢杆受载状况如图所示，忽略钢杆重量和  $B$ 、 $C$ 、 $D$  处耦合件的尺寸，试求截面  $B$  和截面  $A$  的位移， $E_{st} = 210 \text{ GPa}$ 。】

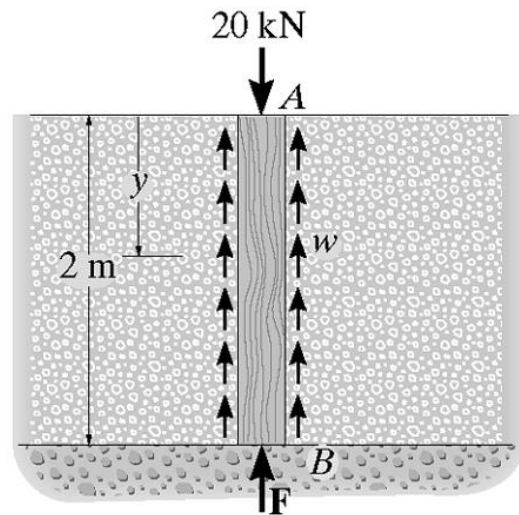


2. The assembly consists of three titanium rods and a rigid bar  $AC$ . The cross-sectional area of each rod is given in the figure. If a vertical force  $P = 20 \text{ kN}$  is applied to the ring  $F$ , determine the vertical displacement of point  $F$ .  $E_{ti} = 350 \text{ GPa}$ . 【图示装置由三根钛金属杆和一刚性杆件  $AC$  组成，已知钛金属杆的弹性模量为  $E_{ti} = 350 \text{ GPa}$ ，在竖直荷载  $20 \text{ kN}$  的作用下，试求  $F$  点位移。】



3. The post has a diameter of 60 mm and is subjected to the load of 20 kN. The soil provides a frictional resistance that is distributed along its length and varies linearly from  $w = 0$  at  $y = 0$  to  $w = 3$  kN/m at  $y = 2$  m, determine the force  $F$  at its bottom needed for equilibrium. Also, what is the displacement of the top of the post with respect to its bottom?  $E = 13.1$  GPa. Neglect the weight of the post.

【图示混凝土柱直径 60 mm，在顶部受到 20 kN 的竖直荷载，柱与土壤之间的摩擦阻力沿柱呈线性分布：在  $y = 0$  处  $w = 0$ ，在  $y = 2$  m 处  $w = 3$  kN/m，忽略柱子重量，试求柱顶端  $A$  相对于柱底部  $B$  的位移。 $E = 13.1$  GPa。】



4. The rod has a slight taper and length  $L$ . It is suspended from the ceiling and supports a load  $P$  at its end. Find the displacement of its end due to this load. Neglect the weight of the material. The modulus of elasticity is  $E$ . 【锥形吊柱的顶端与天花板相连，底端承受轴向荷载  $P$ ，几何尺寸如图所示，试求此锥柱底端相对于顶端的位移。锥柱弹性模量为  $E$ 。】

