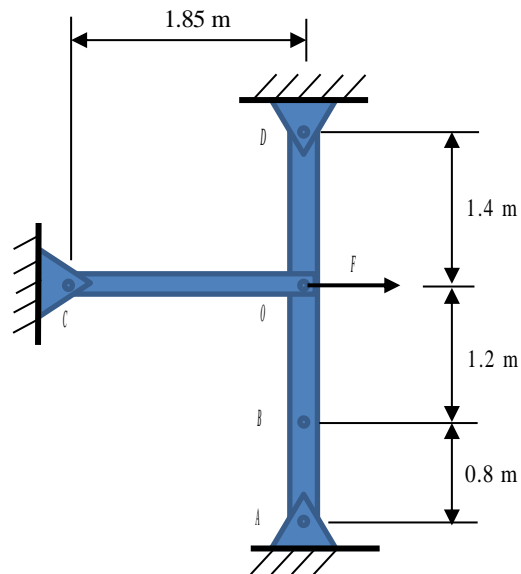


13. Determine the distributions of the moments produced by force  $F \sim N(1000, 50^2)$  N acting on the frame about points A, B, C, and D.



**Solution**

We know  $M_A = Fd_{OA}$  and  $F \sim N(1000, 50^2)$  N.

$$\mu_{M_A} = \mu_F d_{OA} = 1000(2) = 2000 \text{ N.m}$$

$$\sigma_{M_A} = \sigma_F d_{OA} = 50(2) = 100$$

Thus,  $M_A \sim N(2000, 100^2)$  N.m

**Ans.**

Similarly, with  $d_{OB} = 1.2$  m,  $d_{OC} = 1.85$  m, and  $d_{OD} = 1.4$  m, we obtain

$$M_B \sim N(1200, 60^2) \text{ N.m}$$

**Ans.**

$$M_C \sim N(1850, 92.5^2) \text{ N.m}$$

**Ans.**

$$M_D \sim N(1400, 70^2) \text{ N.m}$$

**Ans.**