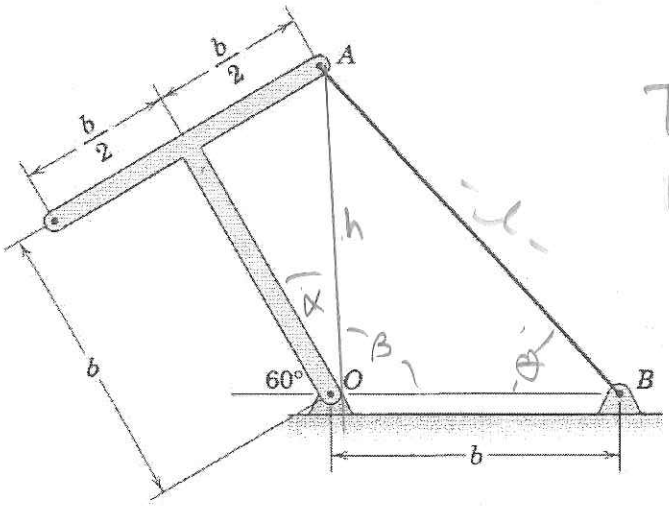
1. The tension in cable *AB* is 100 N. Determine the moment about *O* of this tension as applied to point *A* of the T-shaped bar. The dimension *b* is 600 mm.



$T = 100\ N$

$b = .6\ M$

$\alpha = \tan^{-1}\frac{\frac{b}{2}}{b} = \tan^{-1} 1/2 = 26.5°$

$\beta = 180 - 60 - \alpha = 93.4°$

$h = \sqrt{b^2 + \left(\frac{b}{2}\right)^2} = b\sqrt{1.25} = 1.118\,b$

L.O.C.

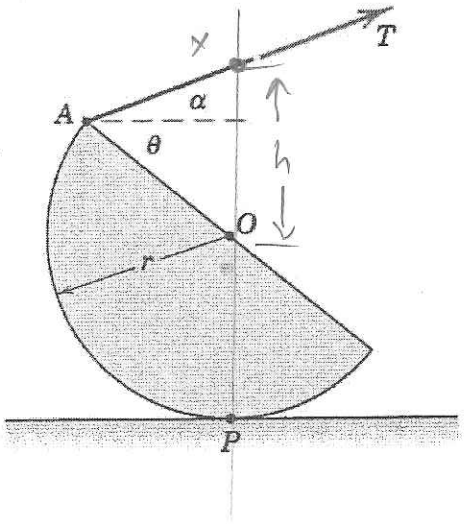
$l^2 = b^2 + (b\sqrt{1.25})^2 - 2(b)(\sqrt{1.25}\,b)\cos\beta =$

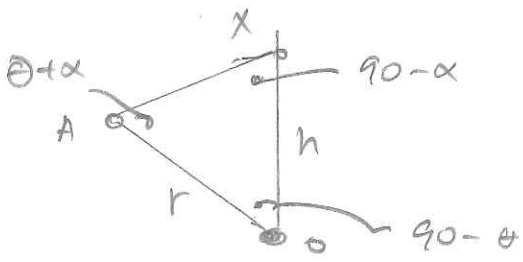
$l^2 = b^2(1 + 1.25 - (2\sqrt{1.25})(\cos\beta) = 2.385\,b^2 \Rightarrow l = 1.544\,b$

$\frac{h}{\sin\theta} = \frac{l}{\sin\beta} \Rightarrow \sin\theta = \frac{h\sin\beta}{l} \Rightarrow \theta = 46.29°$

$M_o = (T\sin\theta)(b) = 43.6\ N\text{-}m$

2. Determine the moments of the tension T about point P and point O.





$$\frac{h}{\sin(\theta+\alpha)} = \frac{r}{\sin(90-\alpha)}$$

$$M_P = (r+h)(T\cos\alpha)$$

$$h = r\frac{\sin(\theta+\alpha)}{\cos\alpha}$$

$$= r\left(1+\frac{\sin(\theta+\alpha)}{\cos\alpha}\right)(T\cos\alpha)$$

$$= r\left(\cos\alpha + \sin(\theta+\alpha)\right)T$$

$$M_O = rT(\sin(\theta+\alpha))$$