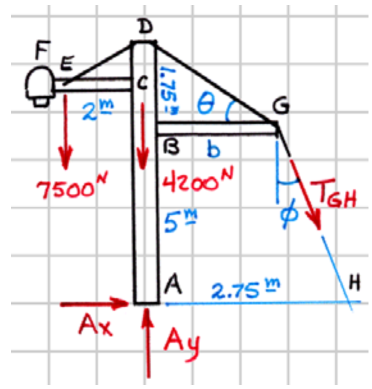
1-50

From an overall free-body diagram of the light pole,



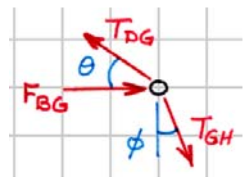
$$\theta = \tan^{-1}\frac{1.75}{b} \qquad \phi = \tan^{-1}\frac{2.75-b}{5}$$

the moment equation of equilibrium gives

$$\circlearrowleft \Sigma M_A = 0: \qquad 2(7500) - 2.75(T_{GH}\cos\theta) = 0$$

$$T_{GH} = \frac{2(7500)}{2.75\cos\theta}$$

It will be assumed that the cable *DG* supports the end of the arm *BG* and that the connection of the horizontal arm *BG* to the vertical pole *ABCD* exerts negligible moment on the arm. (If the connection could provide a sufficient moment, then the cable between *D* and *G* would not be necessary.)



Then, from a free-body diagram of the pin *G*, the equations of equilibrium give

$$\rightarrow \Sigma F_x = 0: \qquad F_{BG} + T_{GH}\sin\phi - T_{DG}\cos\theta = 0$$

$$\uparrow \Sigma F_y = 0: \qquad T_{DG}\sin\theta - T_{GH}\cos\phi = 0$$

$$T_{DG} = \frac{T_{GH}\cos\phi}{\sin\theta}$$

$$F_{BG} = T_{GH}\,\frac{\cos\phi\cos\theta - \sin\phi\sin\theta}{\sin\theta}$$