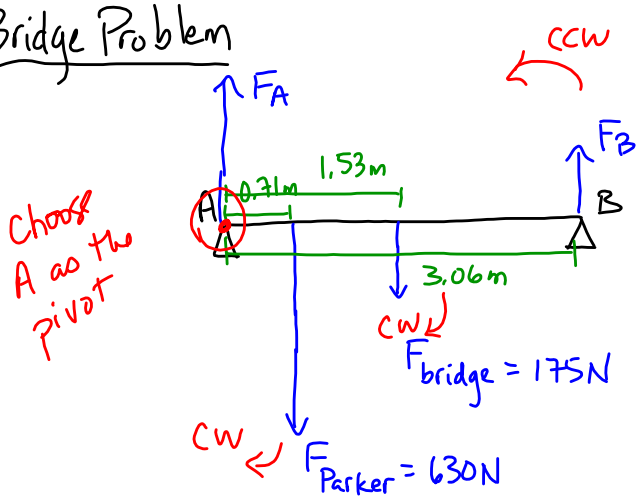
# A Bridge Problem




Two conditions for Static Equilibrium:

① $\vec{F}_{net} = 0$ (no translational movement)

② $\vec{\tau}_{net} = 0$ (no rotational movement)

The net torque must equal to zero:

$$\sum \tau_{CCW} = \sum \tau_{CW}$$

Recall

$\tau = r_\perp F$

or $\tau = rF\sin\theta$

$$\tau_B = \tau_{Parker} + \tau_{bridge}$$

$$(3.06m)F_B = (0.71m)(630N) + (1.53m)(175N)$$

$$(3.06m)F_B = 447.3N\cdot m + 267.75N\cdot m$$

$$F_B = \frac{715.05N\cdot m}{3.06m}$$

$$F_B = 234N \qquad 245N$$

So now since $\vec{F}_{net} = 0$, all the upward forces must balance with all the downward forces:

$$F_A + F_B = F_{Parker} + F_{bridge}$$

$$F_A + 234N = 630N + 175N$$

$$F_A = 571N \qquad 560N$$