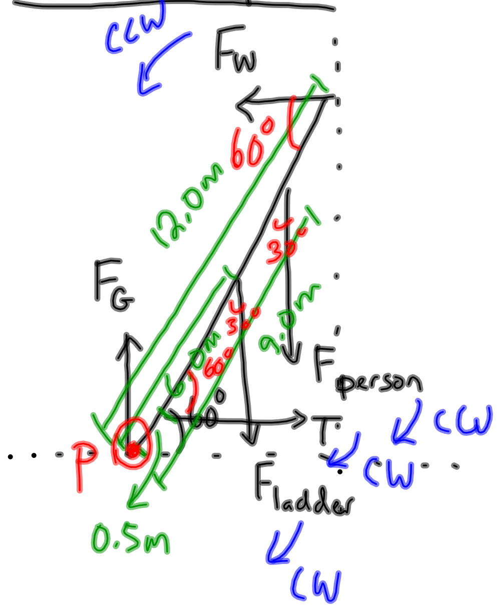
FoP (§6-3/PP)



$$\sum \tau_{ccw} = \sum \tau_{cw}$$

$$\tau_W = \tau_T + \tau_{ladder} + \tau_{person}$$

recall: $\tau = r_\perp F$

$$\tau = rF\sin\theta$$

$$(12.0\,m)(\cancel{F_W}\ T)\sin 60° = (0.5\,m)(T)\sin 60° + (6.0\,m)(196.2\,N)\sin 30° + (9.0\,m)(706.32\,N)\sin 30°$$

$$F_{ladder} = (20\,kg)(9.81\,m/s^2) = 196.2\,N$$

$$F_{person} = (72\,kg)(9.81\,m/s^2) = 706.32\,N$$

we know $F_W = T$

$$(12.0\,m)(T)\sin 60° = (0.5\,m)(T)\sin 60 + 588.6\,N\cdot m + 3178.44\,N\cdot m$$

$$(12.0\,m)(T)(\sin 60°) - (0.5\,m)(T)(\sin 60°) = 3767.04\,N\cdot m$$

$$T\left((12.0\,m)(\sin 60°) - (0.5\,m)(\sin 60°)\right) = 3767.04\,N\cdot m$$

$$T(10.39\,m - 0.433\,m) = 3767.04\,N\cdot m$$

$$T(9.96\,m) = 3767.04\,N\cdot m$$

$$T = 378\,N$$

$$T \doteq 3.8 \times 10^2\,N$$

$$F_G = F_{ladder} + F_{person}$$

$$F_G = 196.2\,N + 706.32\,N$$

$$F_G = 902.52\,N$$

$$F_G \doteq 9.0 \times 10^2\,N$$

$$\therefore F_W = 3.8 \times 10^2\,N$$

Momentum

- depends on mass and velocity

$$\vec{p} = m\vec{v}$$

where $\vec{p}$ is momentum (kg·m/s)
m is mass (kg)
$\vec{v}$ is velocity (m/s)

$1N = 1kg \cdot \frac{m}{s^2}$

Conservation of Momentum in 1D.

What about 2D?