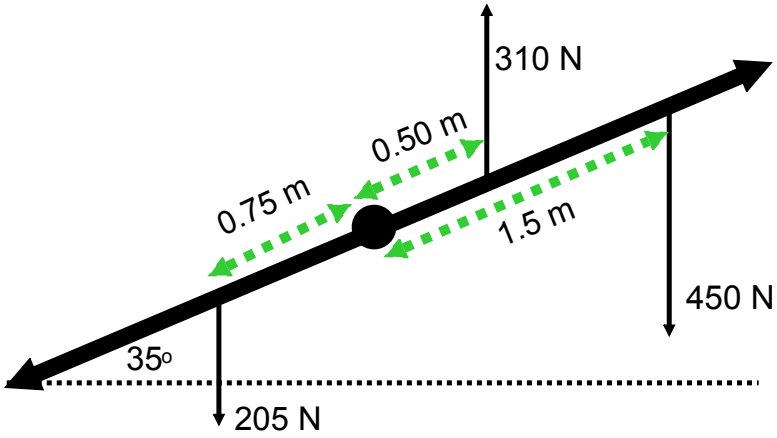
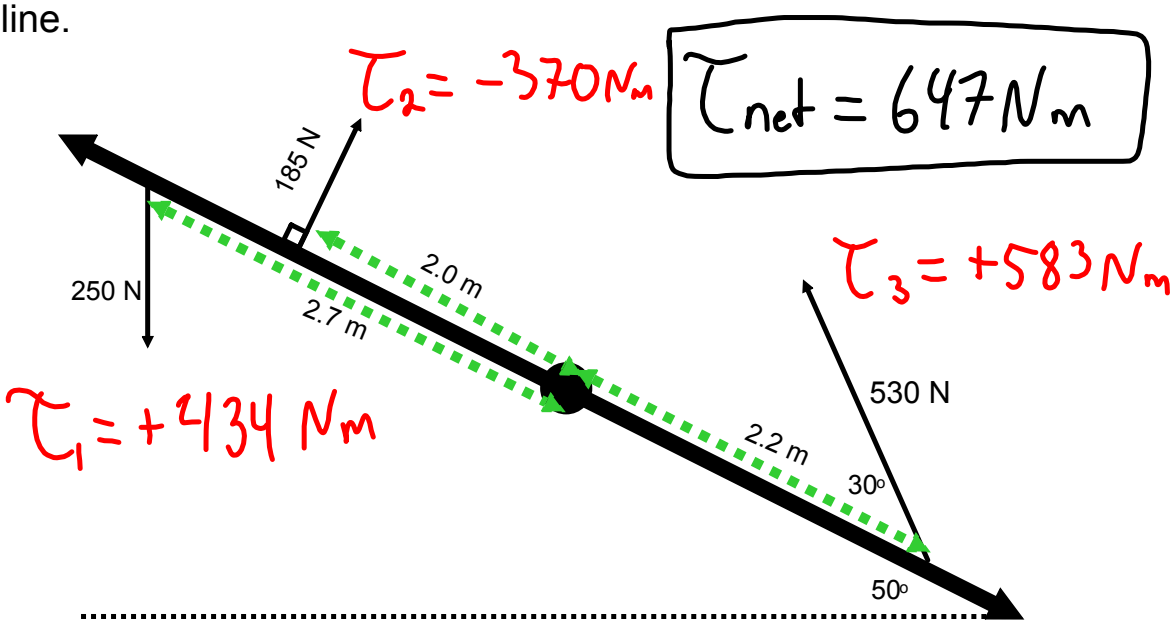
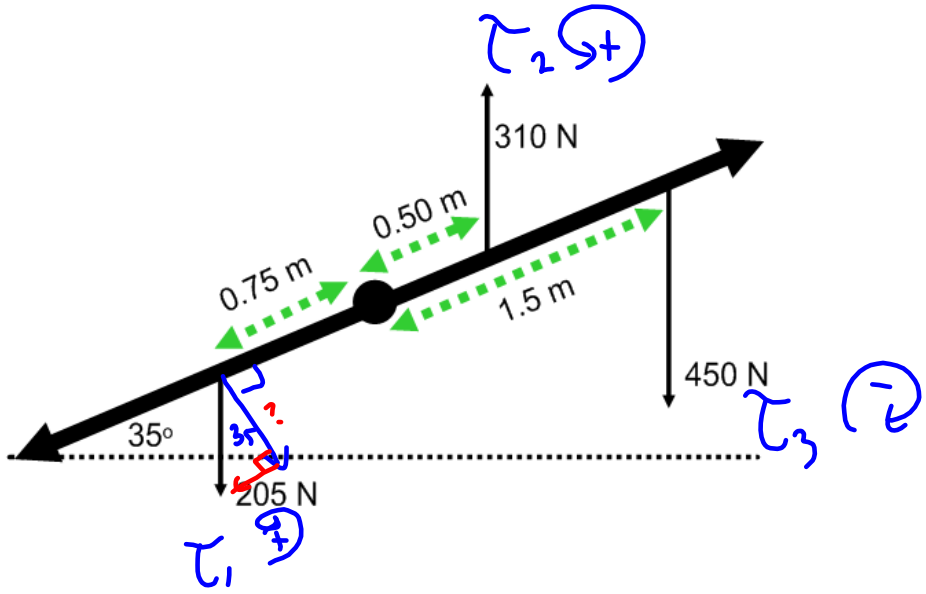
#9) All forces are perpendicular to the horizontal dashed line.



#10) Unless indicated, all forces are perpendicular to the horizontal dashed line.



#9) All forces are perpendicular to the horizontal dashed line.



$\tau_1 = +(0.75)(205)\cos 35°$

$\tau_1 = 126\ Nm$

$\tau_2 = +(0.5)(310)\cos 35$

$\tau_2 = 127\ Nm$

$\tau_3 = -(1.5)(450)(\cos 35)$

$\tau_3 = -553\ Nm$

$\tau_{net} = \tau_1 + \tau_2 + \tau_3$

$= 126 + 127 - 553$

$= -300\ Nm$

Static Equilibrium

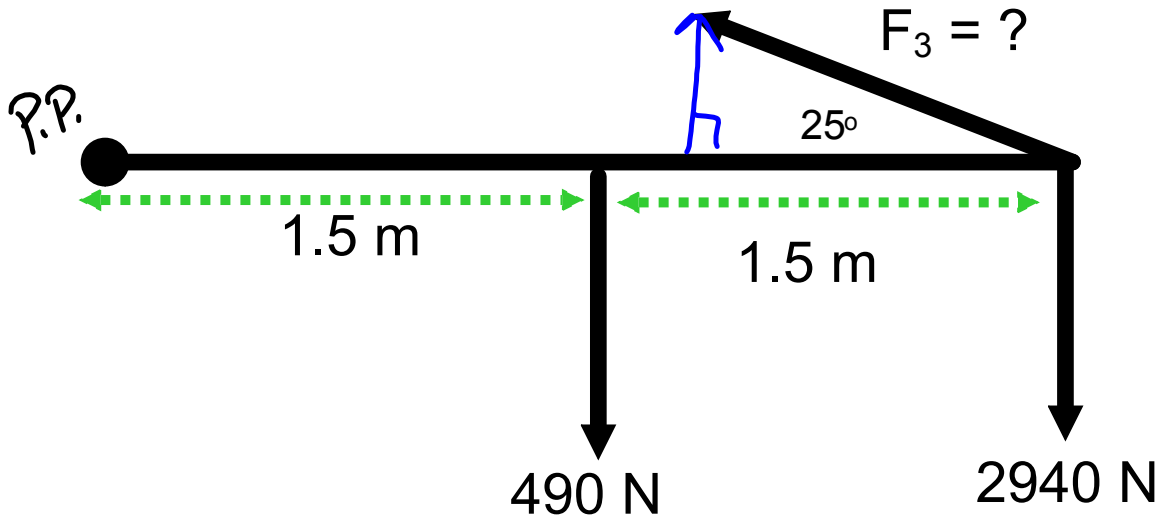
An object is in static equilibrium if:

1. $\mathbf{v} = 0$ m/s
2. $\mathbf{F}_{net} = 0$ N
3. $\tau_{net} = 0$ Nm

Steps for Solving Static Equilibrium Problems

1. Draw a diagram.
2. Label all forces.
3. Choose a pivot point. It is helpful to place the pivot point where an unknown force exists (in a case of two unknown forces).
4 Label distances from the pivot point to the forces. (r values)
5. Write a τ_{net} equation.
6. Solve the equation(s) for the unknown.

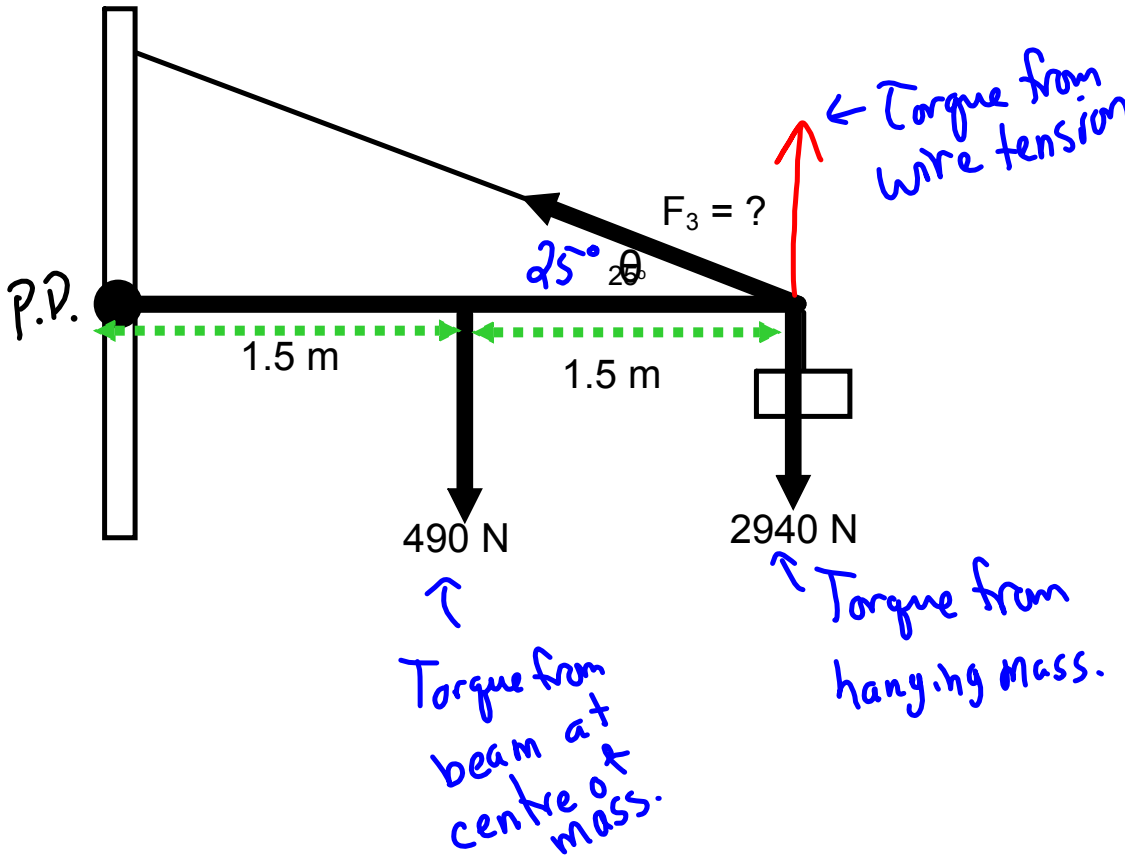
$\tau_{net} = 0$ Nm



$0 = -(1.5)(490) - (3)(2940) + (3)(F_3)\sin 25$

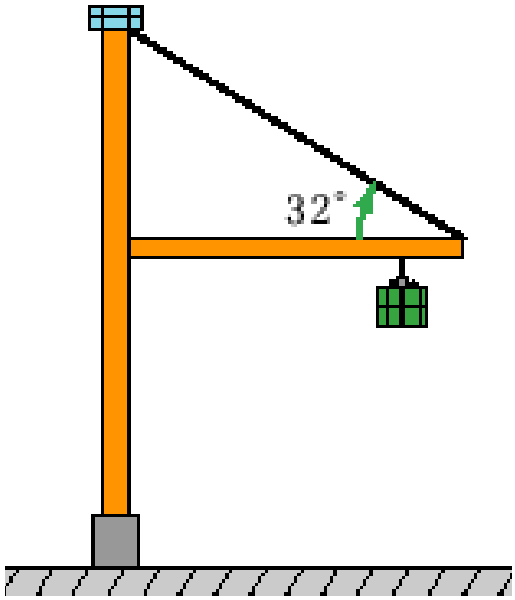
$7536\ N = F_3$

Example: A uniform beam of mass 50.0 kg and length 3.00 m is attached to a wall with a hinge. The beam supports a sign of mass 300 kg which is suspended from its end. The beam is also supported by a wire that makes an angle of 25 ^{o} with the beam. Determine the tension in the wire. (7.5 x10 ^{3} N)



The 355 kg container is hanging from a cable that is 6.15 m out on the 7.50 m arm. The arm has a mass of 345 kg. A cable that is attached at its end makes an angle of 32° with the horizontal.

1. Calculate the tension in the cable (8582).
2. Calculate the net force on the hinge.



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Attachments

balancing-act_en.jar