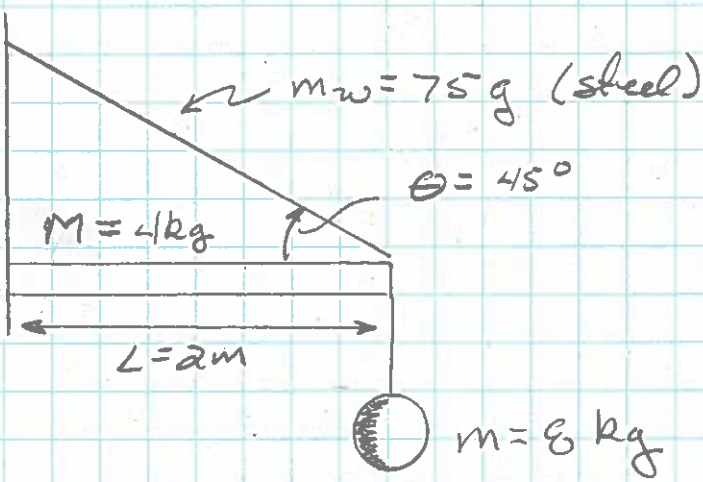
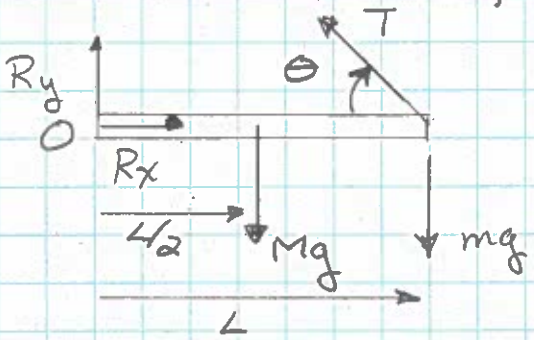


Length of wire, $d = \frac{L}{\cos 45°} = 2.828$ m

So, $\mu = \frac{m_w}{L} = 0.0265$ kg/m

Now, we need the Tension, FBD of beam:



$$\circlearrowleft_+ \Sigma \tau_O = -Mg\frac{L}{2} - mgL + T\sin\theta\, L = 0$$

$$T = \frac{g\left(\frac{M}{2} + m\right)}{\sin\theta} = 138.6\ N$$

So, the wave speed in the wire is:

$$v = \sqrt{\frac{T}{\mu}} = 72.38\ m/s$$

and the fundamental frequency is:

$$f_1 = \frac{v}{2d} = \underline{12.79\ Hz}$$