

The equations of static equilibrium become:

$$F - N_2 = 0 \text{ (horizontal)}$$

$$N_1 - mg = 0 \text{ (vertical) and } N_2 L \sin \phi - \frac{1}{2} mg L \cos \phi = 0 \text{ (torque about bottom of ladder)}$$

$$\text{Where } mg = 80 \text{ N, } \cos \phi = \frac{1.0 \text{ m}}{3.5 \text{ m}} = 0.28571$$

$$N_1 \text{ (the force exerted by the ground) } = 80 \text{ N}$$

$$N_2 \text{ (the force exerted by the wall) } = \frac{1}{2} mg \cot \phi = \frac{1}{2} \cdot 80 \text{ N} \cdot 0.29814 = 11,9256 \text{ N}$$

$$F \text{ (the frictional force exerted by the ground) } = N_2 = 11,9256 \text{ N}$$