

Physics with Synno – Motion-2 – Lesson 18

M.6.1 Translational Equilibrium

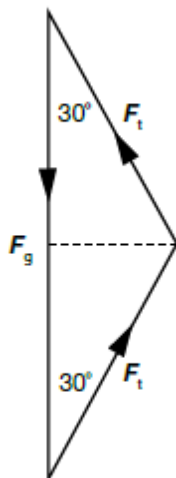
A body is translational equilibrium when the sum of the forces acting on the body are **zero**. Thus it does **not** change its position.

Example

A rigid advertising banner is to be hung by two guy ropes. The banner has a mass of 45 kg and the ropes must be at an angle of 30° to the vertical, as shown. If the mass of the ropes is ignored, determine the tension in each rope required to support the banner.



Solution



As the arrangement of the guy ropes is symmetrical the tension in each rope can be considered equal. Draw a force vector diagram.

From the diagram

$$\frac{F_g}{2} = F_t \cos 30^\circ$$

$$F_t = \frac{45 \times 9.8}{2 \times \cos 30^\circ}$$

$$F_t = 254.6 \text{ N}$$

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