

Further Equilibrium Problems

Starter

1. (Review of last lesson)

A fork-lift truck is raising a container with an acceleration of 1.2 m/s^2 . The normal contact force on the container from the horizontal forks is 1485 N . Calculate the mass of the load.

Notes

No new notes.

E.g. 1 A lift of mass 500 kg carrying a load of 80 kg is drawn up by a cable. The lift accelerates at $\frac{1}{12} \text{ g m/s}^2$ from rest to its maximum speed which is maintained for a time, after which the lift decelerates to rest at $\frac{1}{10} \text{ g m/s}^2$. For each of the stages of motion (accelerating upwards, constant speed and decelerating upwards) find:

- the tension in the cable
- the force exerted by the load on the floor of the lift.

Working:

Accelerating upwards

Take the positive direction as upwards.

(a) $F = ma(\uparrow)$ for whole system:

$$T - 500g - 80g = (500 + 80) \times \frac{g}{12}$$

$$T = (500 + 80) \times \frac{g}{12} + 500g + 80g$$

$$T = 6157\frac{2}{3}$$

(b) $F = ma(\uparrow)$ for 80 kg mass:

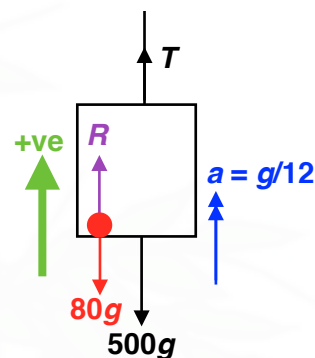
$$R - 80g = 80 \times \frac{g}{12}$$

$$R = 80 \times \frac{g}{12} + 80g$$

$$R = 849\frac{1}{3}$$

When accelerating the tension is $6157\frac{2}{3} \text{ N}$ and the normal contact

force is $849\frac{1}{3} \text{ N}$.



Video: [Lift problems](#)

[Lift problems EQ](#)

[Solutions to Starter and E.g.s](#)

Exercise

p518 22C Qu 1-5, 7