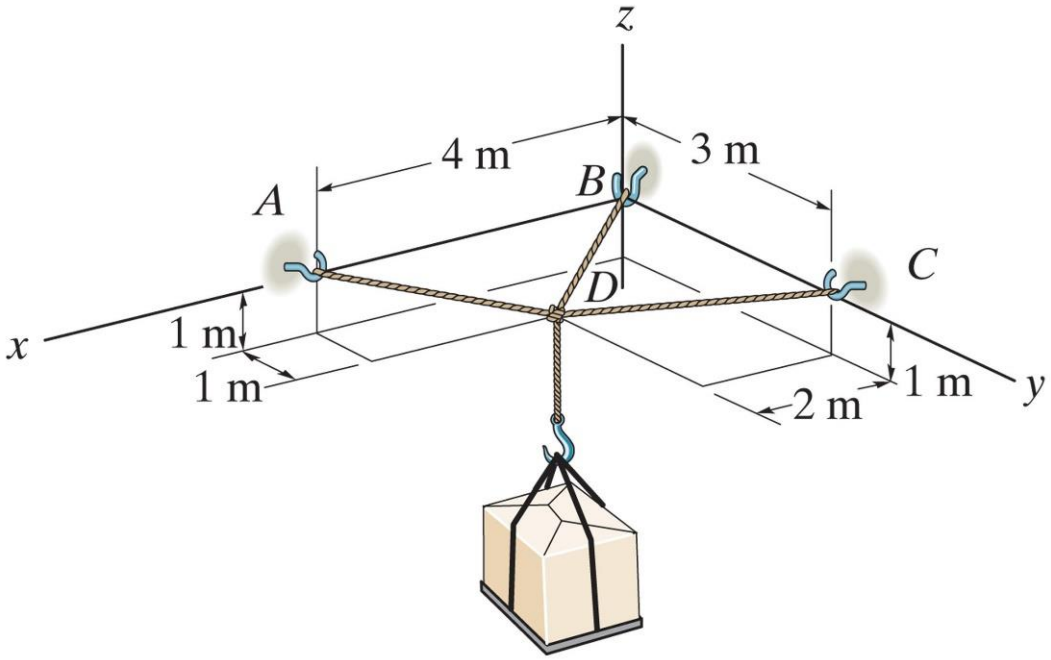
To do ...

- Quiz 1 this week
- Quiz 2 next week – sign up now!
- Morning office hours:
  - Mon, Wed from 9-10 am in MEB 220H
- HW 5 due **Thurs**
- HW 6 due **Tues**
- Written Assignment



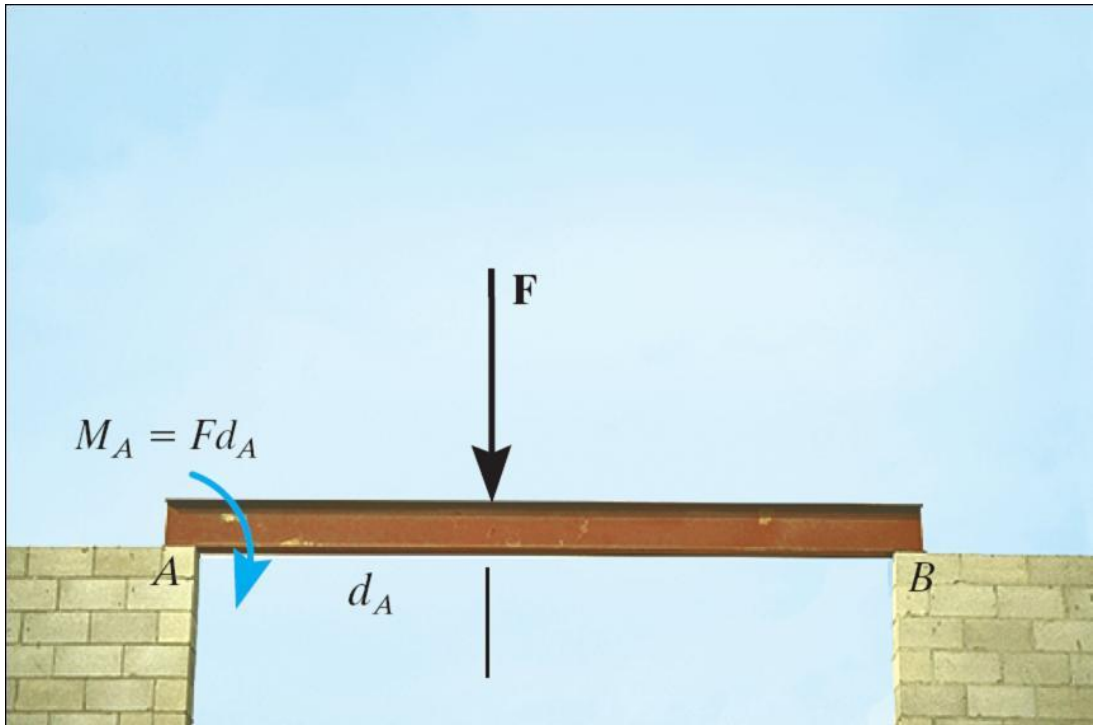
The crate has a mass of 130 kg. Determine the tension developed in each cable for equilibrium.

Chapter 4: Force System Resultants

Main goals and learning objectives

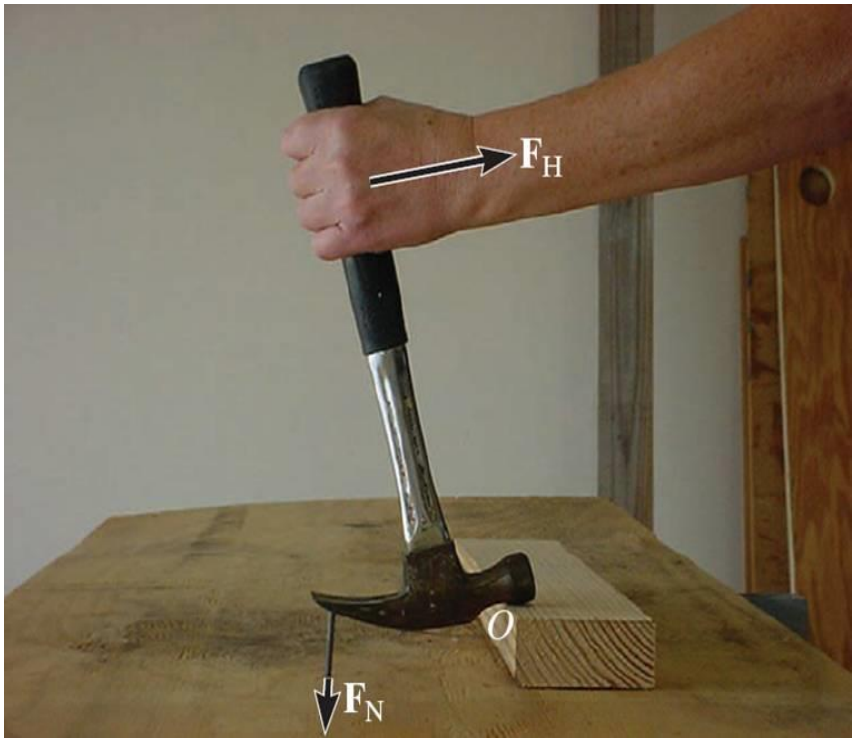
- Discuss the concept of the moment of a force and show how to calculate it in two and three dimensions
- Provide a method for finding the moment of a force about a specified axis
- Define the moment of a couple

Applications

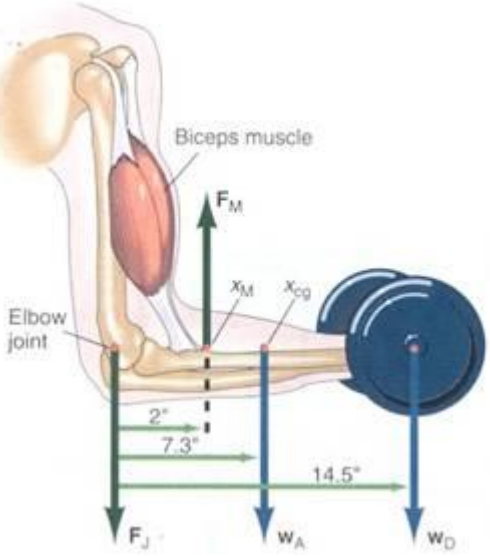


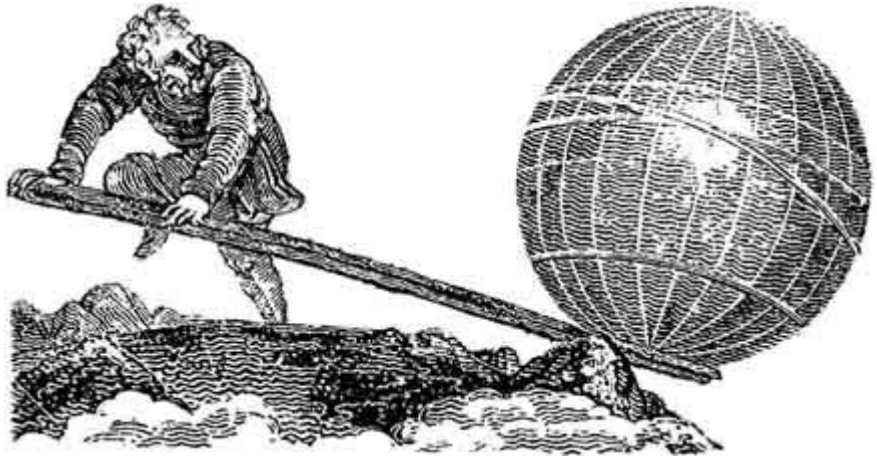
Beams are often used to bridge gaps in walls. We have to know what the effect of the force on the beam will have on the supports of the beam.

Applications



Carpenters often use a hammer in this way to pull a stubborn nail. Through what sort of action does the force F_H at the handle pull the nail? How can you mathematically model the effect of force F_H at point O?

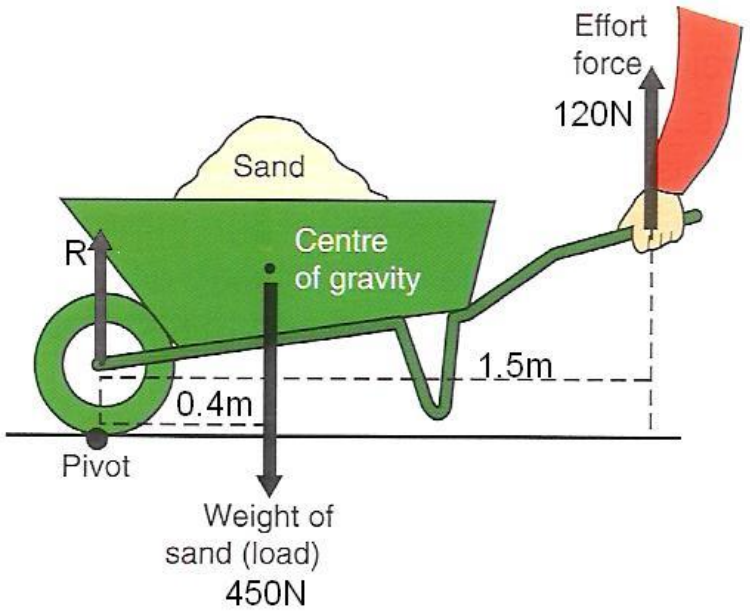




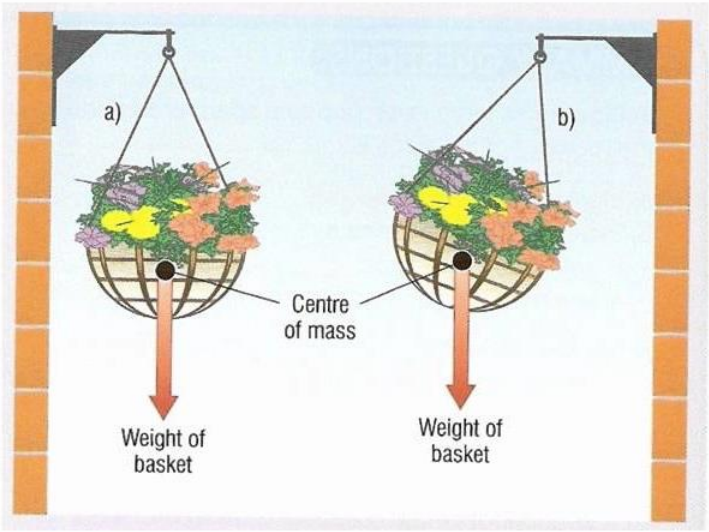
Moment 1.a very brief period of time. An Exact point in time. 2. importance. 3. A turning Effect produced by a force acting at a distance on An object.

Applications

Using moments



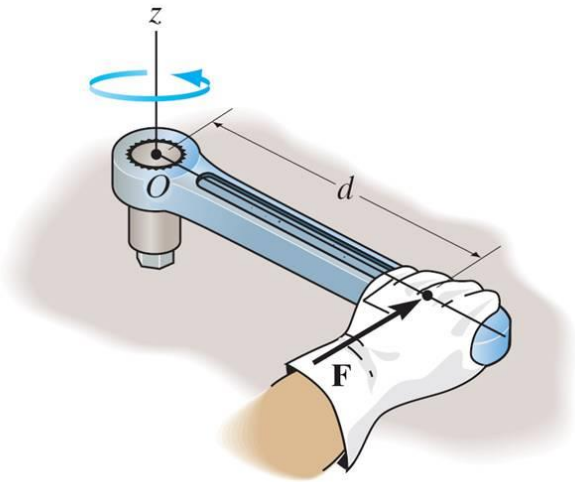
If suspended, a body will come to rest with its centre of mass directly below the point of suspension.

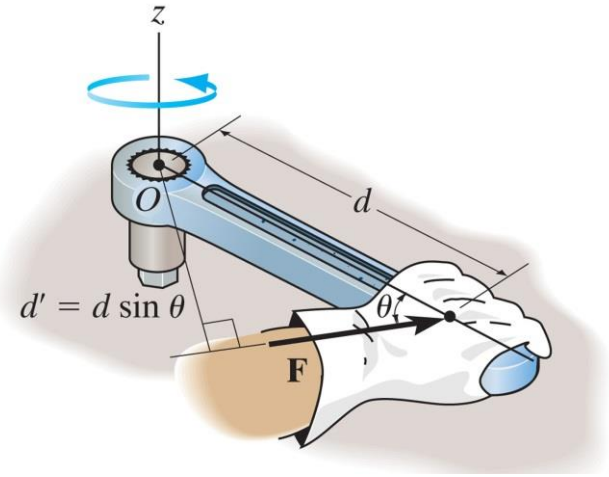


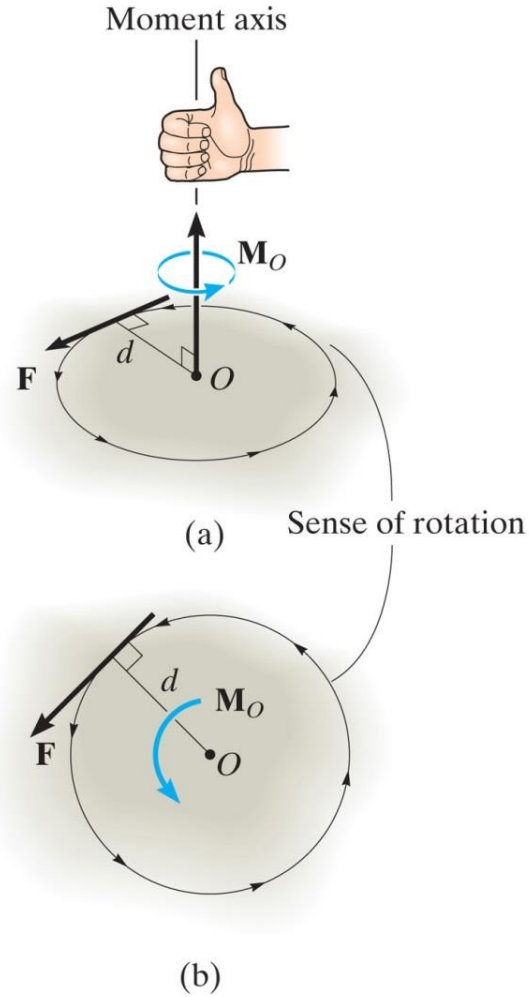
Moment 1.a very brief period of time. An Exact point in time. 2. importance. 3. A turning Effect produced by a force acting at a distance on An object.

Moment of a force – scalar formulation

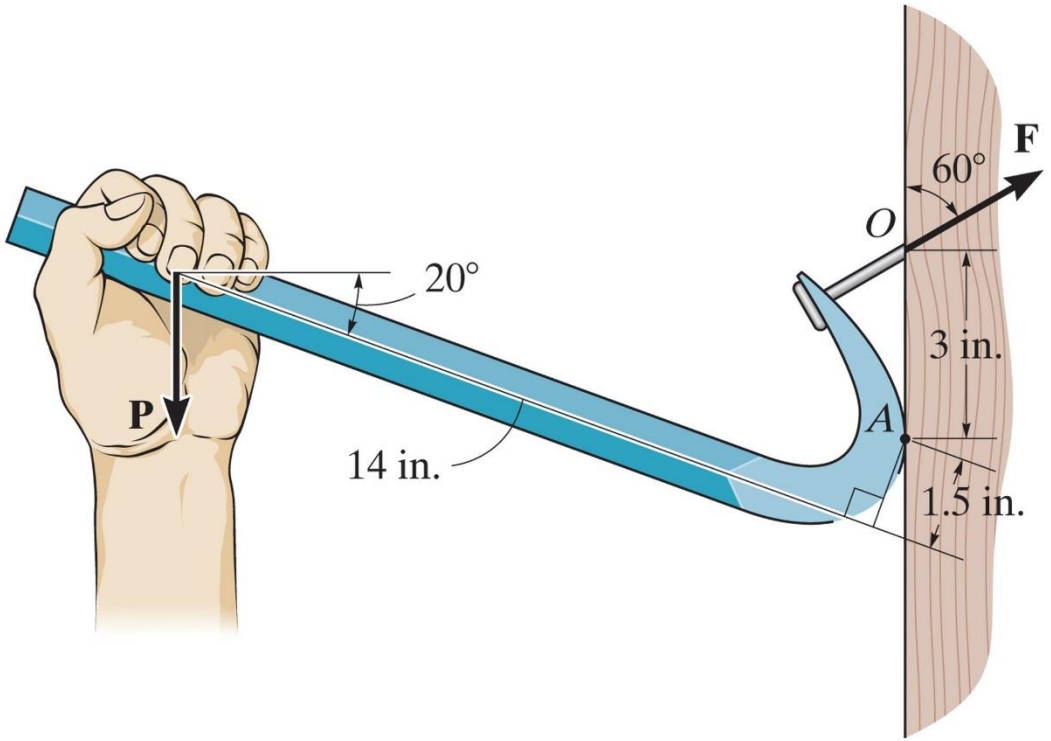
The **moment of a force about a point** provides a measure of the **tendency for rotation** (sometimes called a torque).





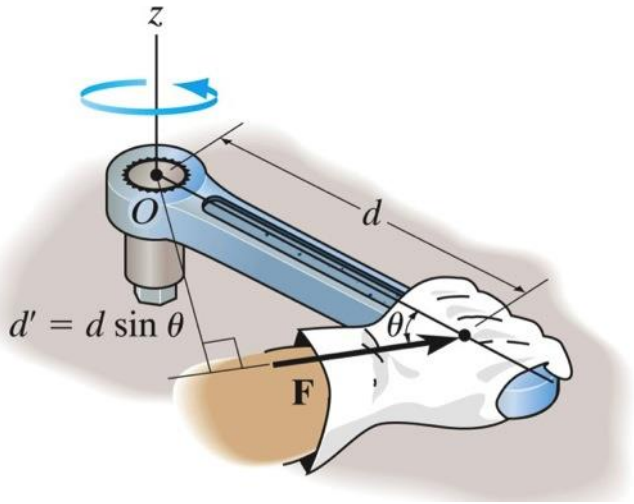


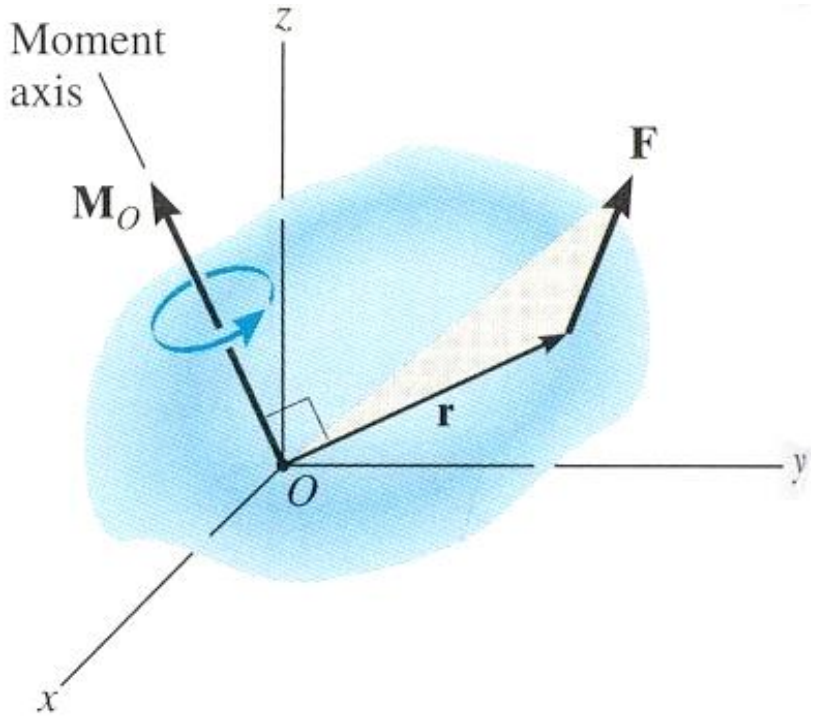
Moment of a force – scalar formulation



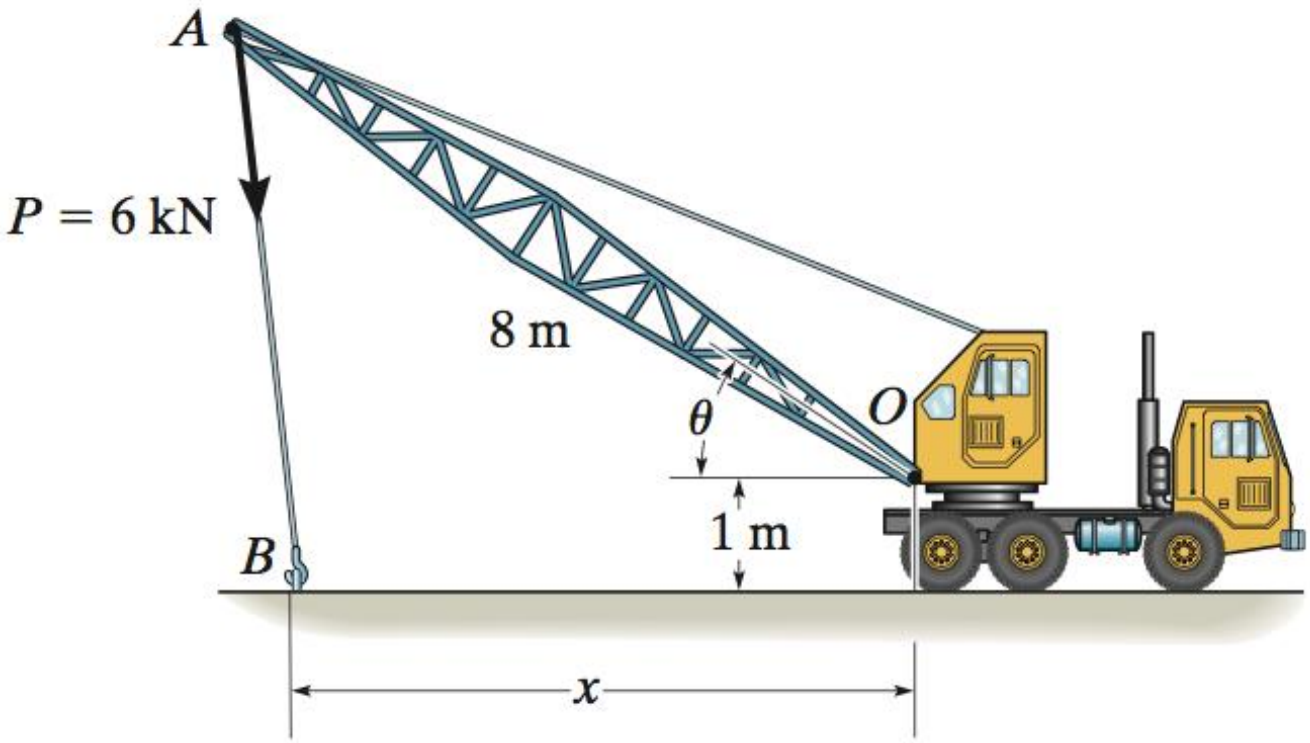
Moment of a force – vector formulation

The moment of a force **F** about point **O**, or actually about the moment axis passing through O and perpendicular to the plane containing **O** and **F**, can be expressed using the cross (vector) product, namely:





Example – Vector Formulation



Given: The angle $\theta = 30°$ and $x = 10$ m.

Find: The moment by **P** about point O.