

Announcements

- Quiz 2 starts tomorrow!

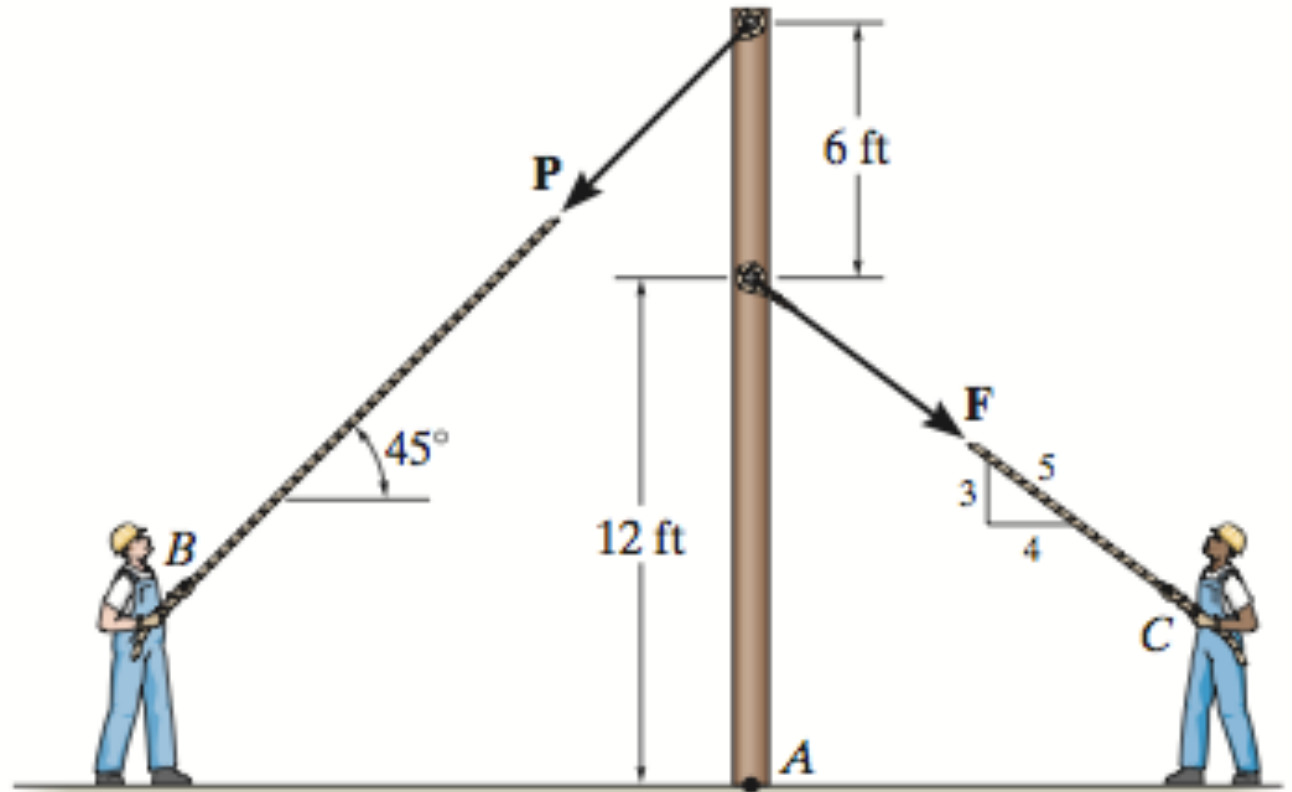
❑ Upcoming deadlines:

- Tuesday (9/19)
 - PL HW6
- Thursday (9/21)
 - ME HW7
- Friday (9/22)
 - Writing Assignment 1
(FBD only)



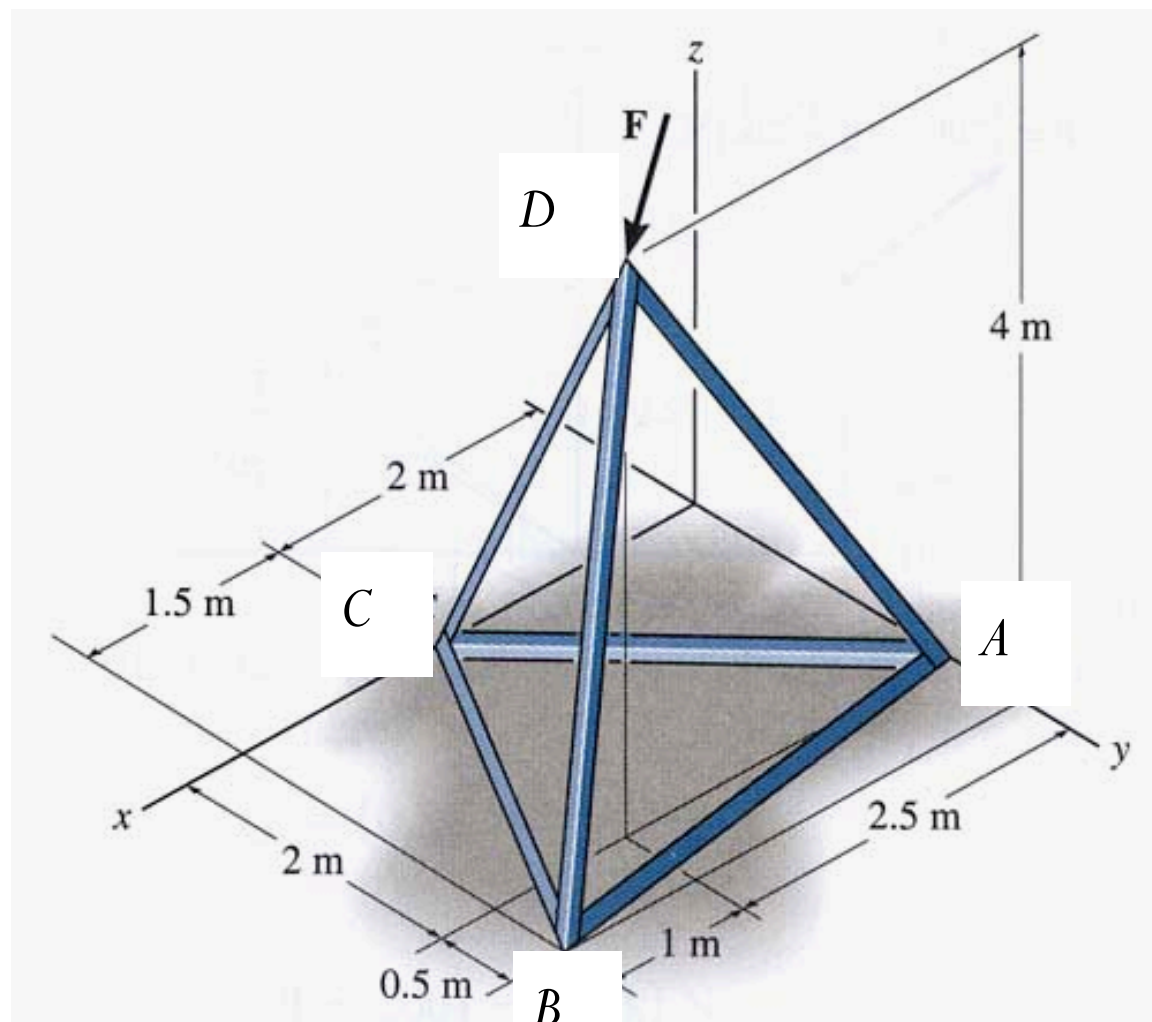
Recap

- Moment of a force
- About a point

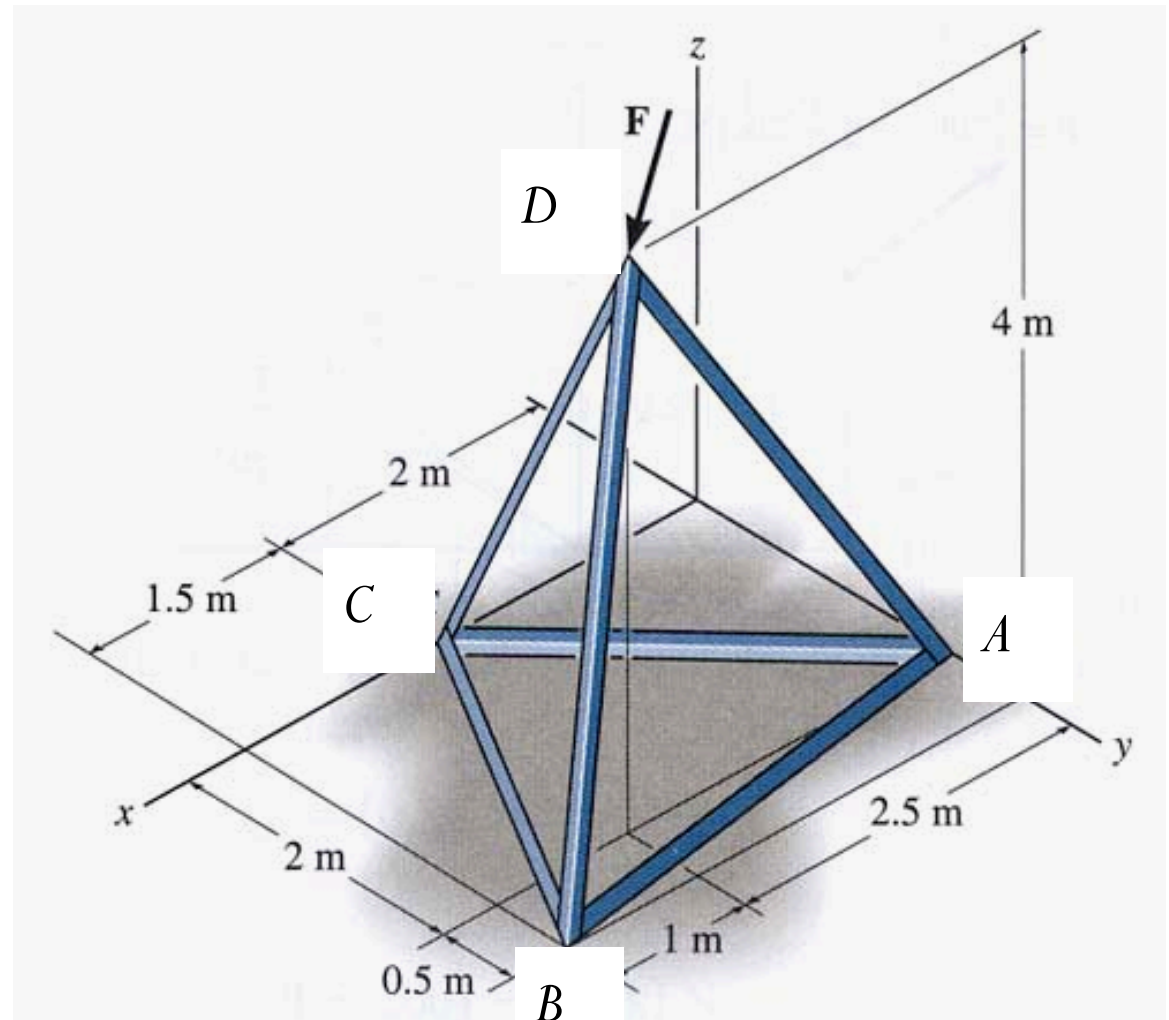


Recap

- Moment of a force
 - About a point
 - **About an axis**



The force $F = 10 \text{ N}$ is acting along DC . Determine the moment of F about the bar BA .



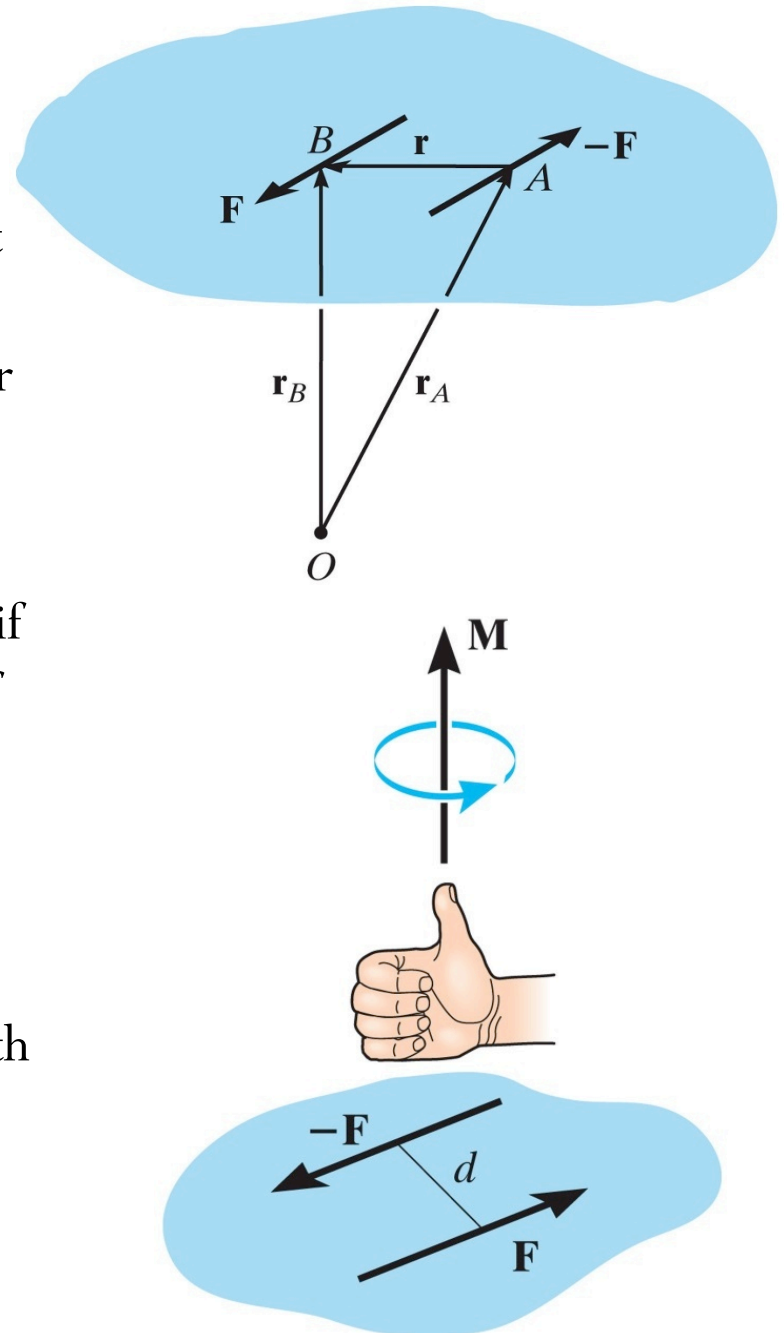
Moment of a couple

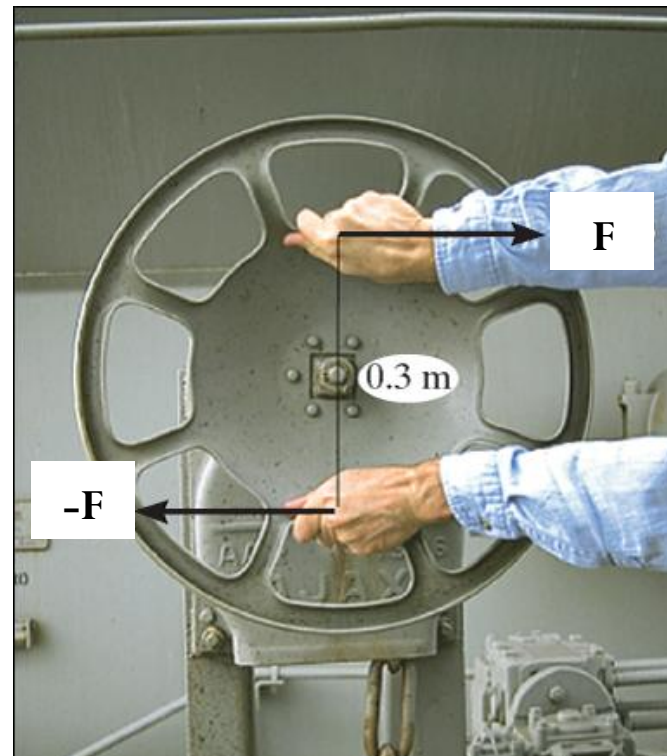
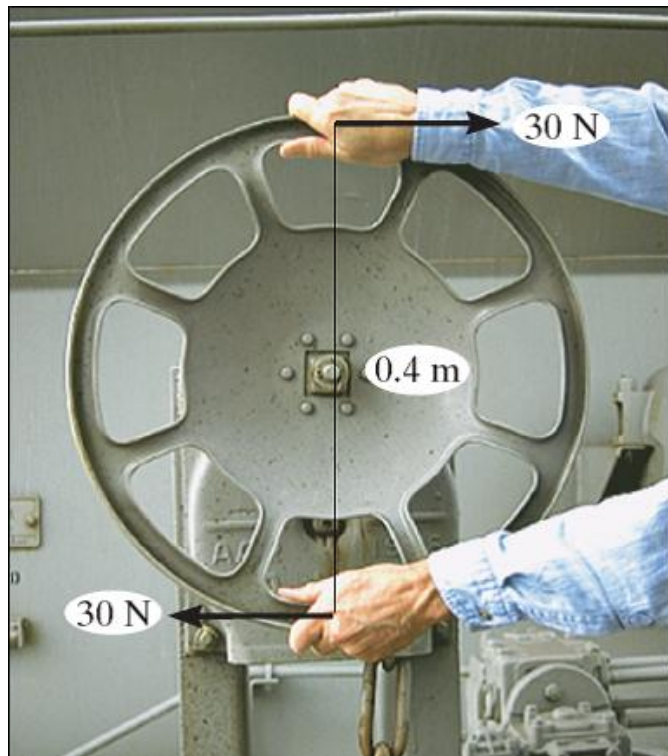
A **couple** is defined as two parallel forces that have the same magnitude, but opposite directions, and are separated by a perpendicular distance d .

Since the resultant force is zero, the only effect of a couple is to produce an actual rotation, or if no movement is possible, there is a tendency of rotation in a specified direction.

The moment produced by a couple is called **couple moment**.

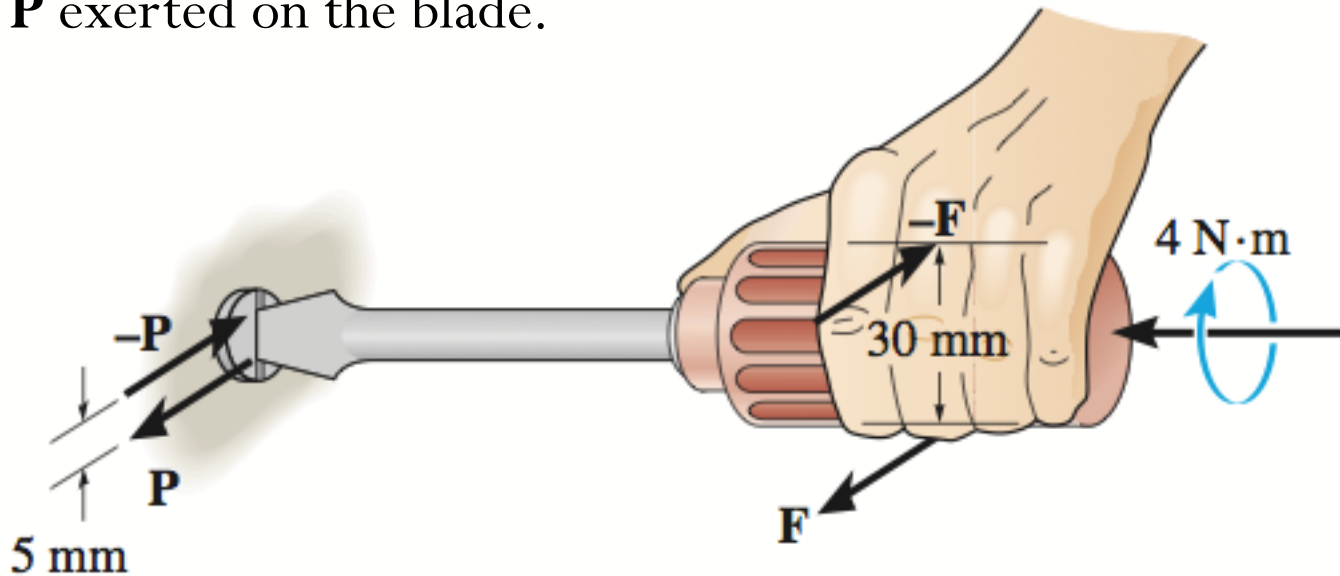
Let's determine the sum of the moments of both couple forces about **any** arbitrary point:



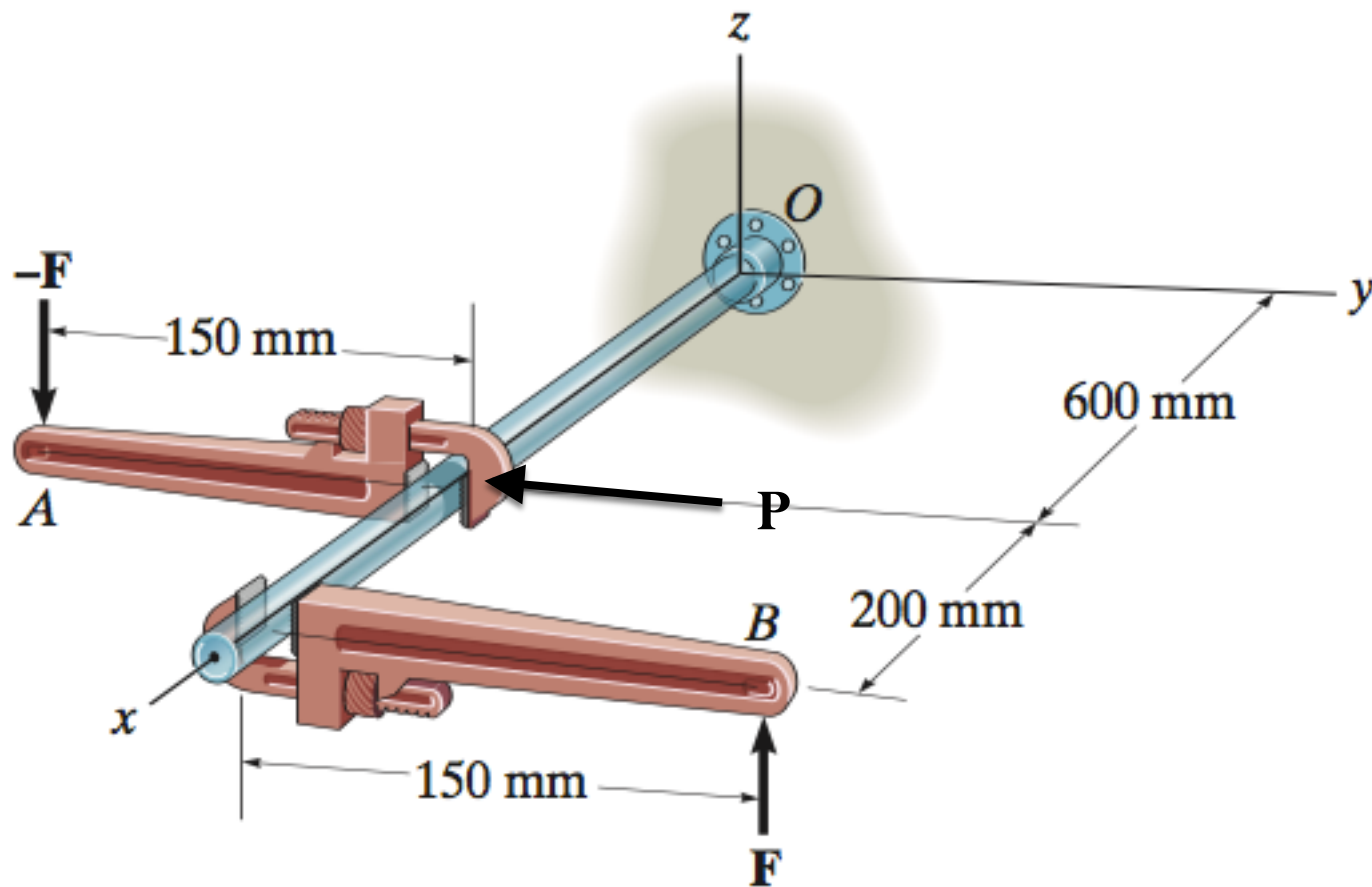


A torque or moment of $12\text{ N}\cdot\text{m}$ is required to rotate the wheel. Would F be greater or less than 30 N ?

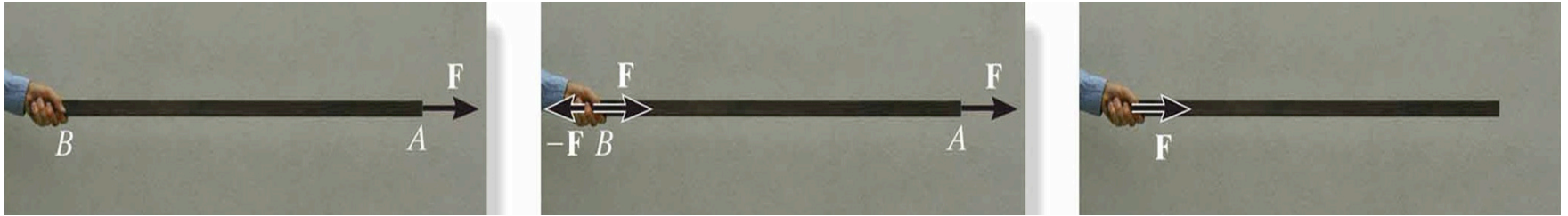
A twist of $4 \text{ N}\cdot\text{m}$ is applied to the handle of the screwdriver. Resolve this couple moment into a pair of couple forces \mathbf{F} exerted on the handle and \mathbf{P} exerted on the blade.



Find the moment about the support at O ? $F = 125\text{ N}$, $P = 100\text{ N}$.



Moving a force on its line of action

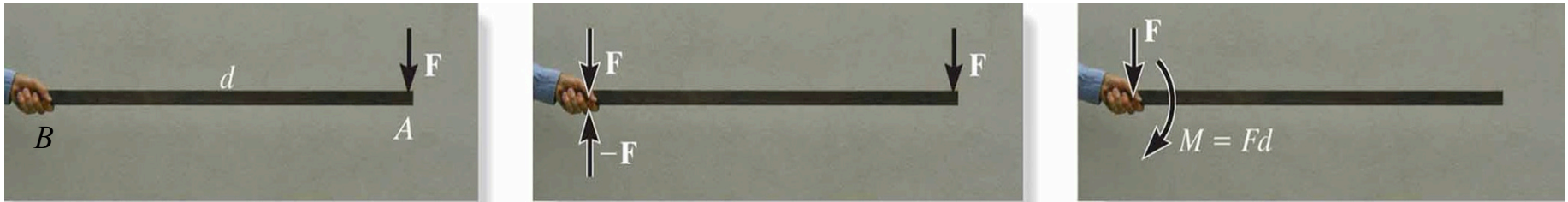


Moving a force from A to B, when both points are on the vector's line of action, does not change the **external effect**.

Hence, a force vector is called a **sliding vector**.

However, the **internal effect** of the force on the body does depend on where the force is applied.

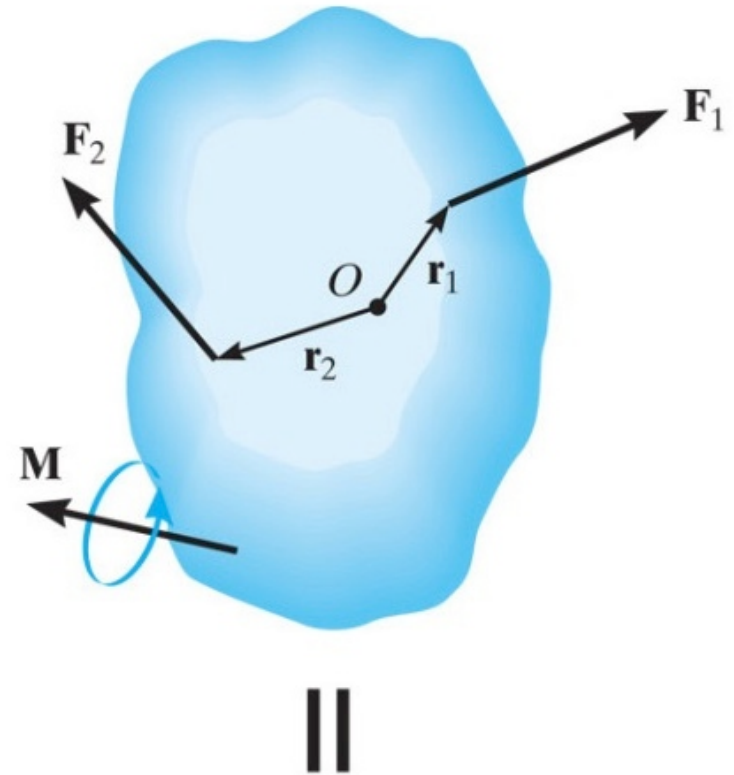
Moving a force off of its line of action



Equipollent (or equivalent) force systems

A force **system** is a collection of **forces** and **couples** applied to a body.

Two force systems are said to be **equipollent** (or equivalent) if they have the **same resultant force** AND the **same resultant moment** with respect to any point P .



What is the equivalent system?

