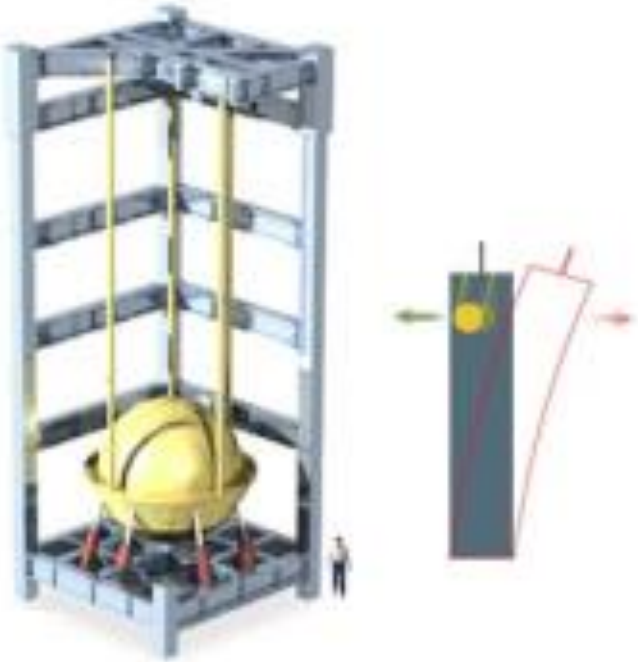
Announcements

- Happy Monday

- Upcoming deadlines:
- Tuesday
  - PL HW
- Friday
  - Writing Assignment

Objective

- Moment of a Couple
- Equivalent Systems



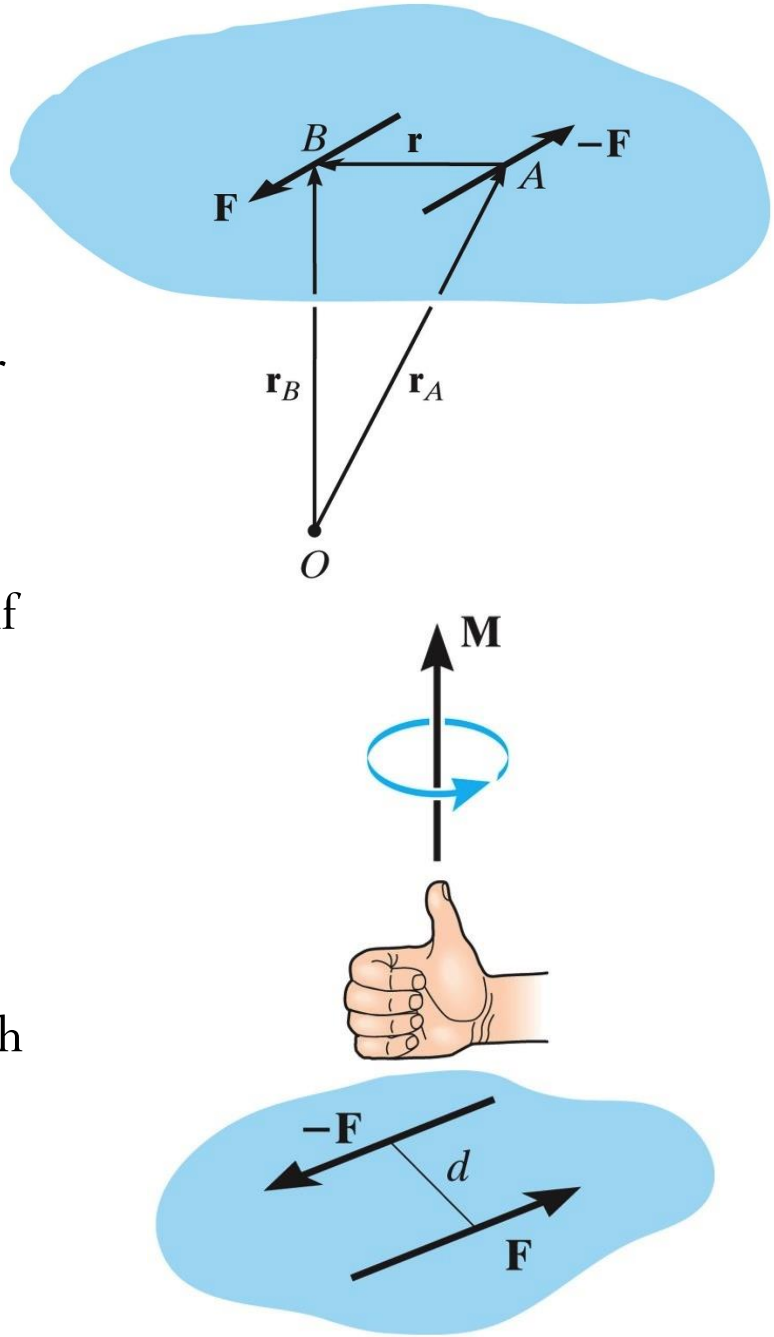
Moment of a couple

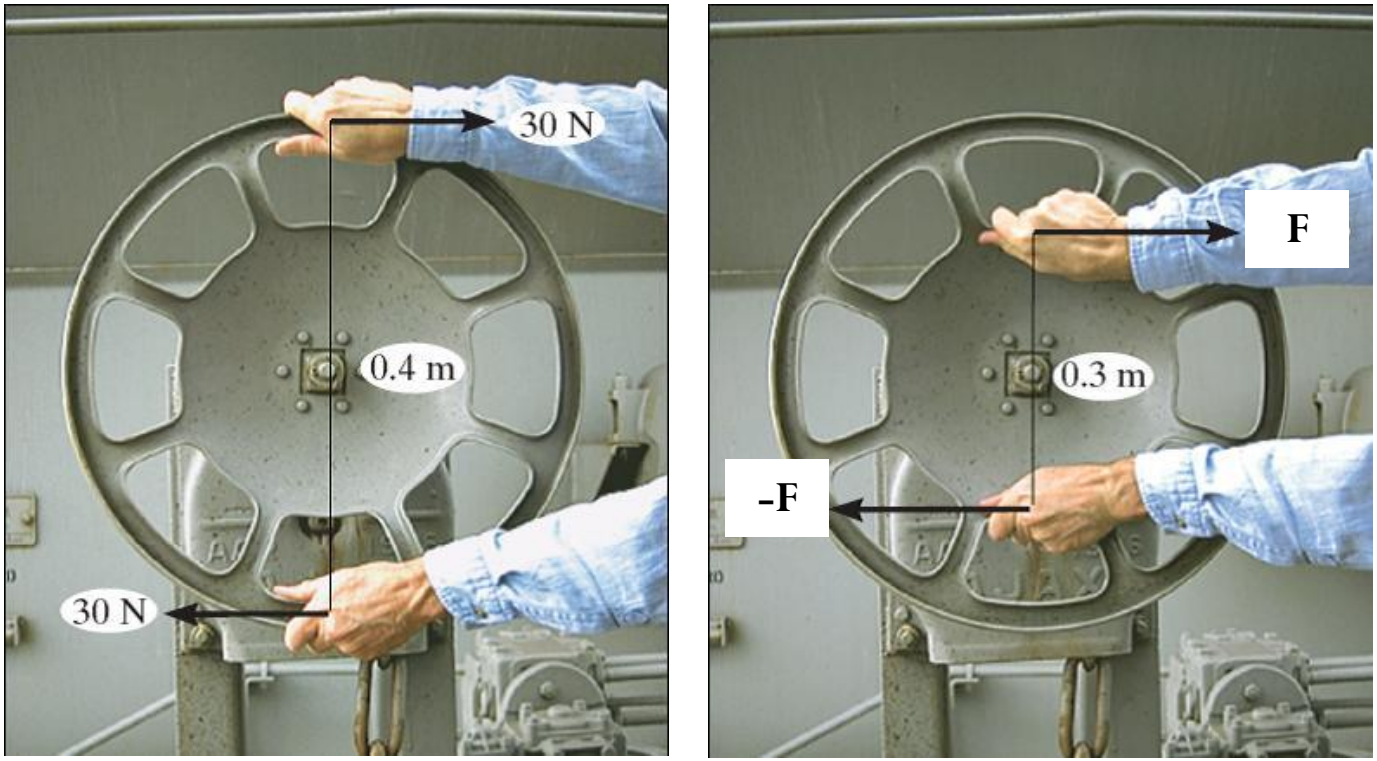
A **couple** is defined as two parallel forces that have the same magnitude, but opposite directions, and are separated by a perpendicular distance d.

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**.

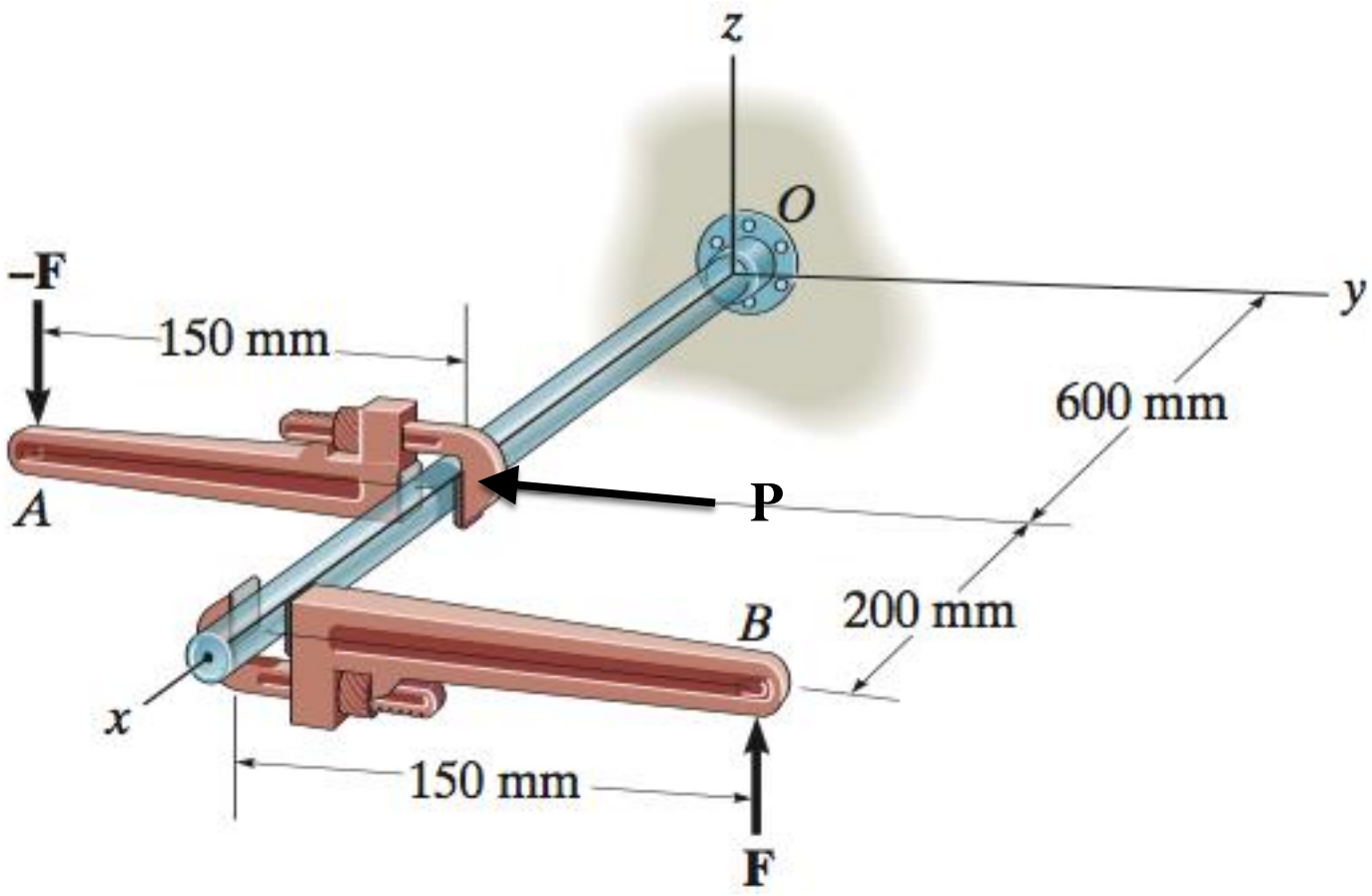
Let's determine the sum of the moments of both couple forces about **any** arbitrary point:



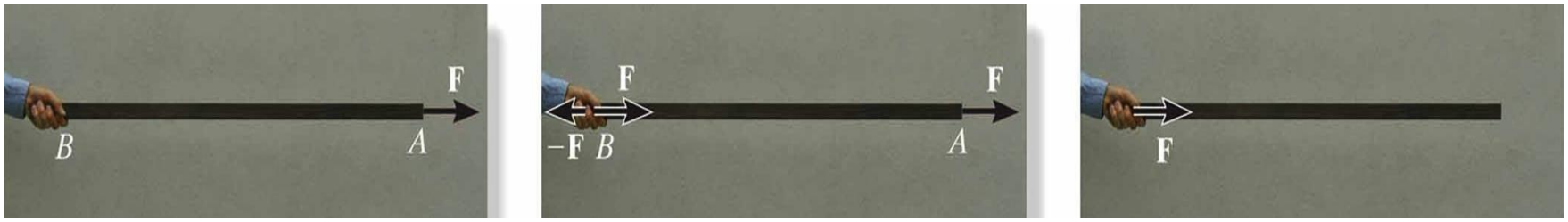


A torque or moment of 12 N·m is required to rotate the wheel. Would F be greater or less than 30 N?

Find the moment about the support at *O*? F = 100 N, P = 50 N.



Moving a force on its line of action

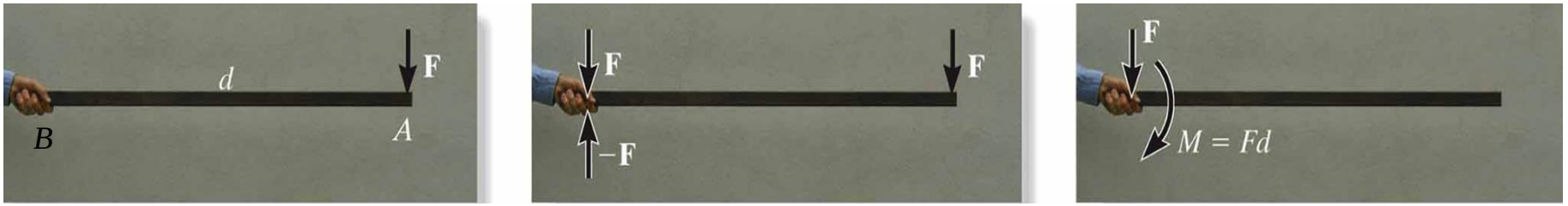


Moving a force from *A* to *B*, when both points are on the vector's line of action, does not change the **external effect**.

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

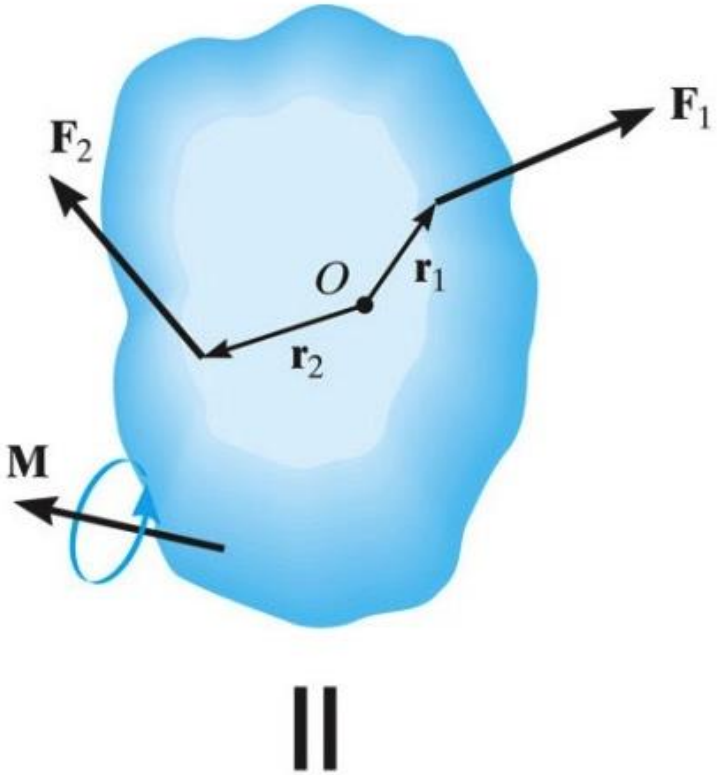


What if point *B* is not on the line of action of vector **F**?

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?