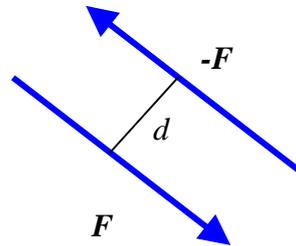


Forces and Moments: Part 4

Moment of a couple:

A couple is defined as:

- Two parallel forces
- Same Magnitude
- Opposite direction
- Separated by a perpendicular distance d



A moment produced by a couple is called a **Couple Moment**. In the figure below let M be the couple moment

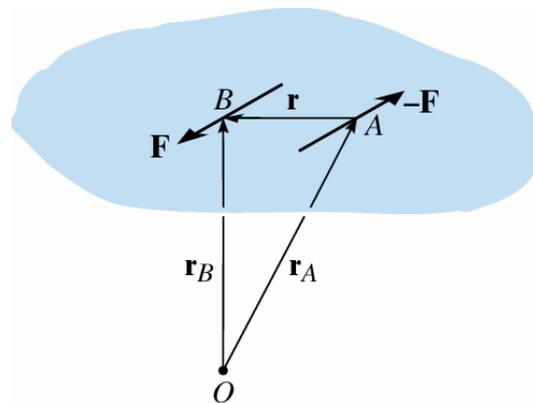
$$M = r_A \times (-F) + r_B \times F$$

$$\Rightarrow M = -r_A \times F + r_B \times F$$

$$\Rightarrow M = (-r_A + r_B) \times F$$

But $r_B - r_A = r$

$$\Rightarrow M = r \times F$$



So a couple moment is a free vector which can act at any point and depends only on r , not on r_A and r_B .

Remember:

Scalar Formulation:

Magnitude: $M = Fd$

Direction and sense using right-hand rule

Vector Formulation:

Magnitude: $M = r \times F$

Note: The moment of a couple does not depend on the point one takes the moment about. In other words, a moment of a couple is the same about all points in space.

