

Centre of gravity

Centre of gravity: The center of gravity (G) is a point which locates the resultant weight of a system of particles or body. [or]

It is the theoretical point at which all of the body's weight is considered to be concentrated.

Method to find the centre of gravity:

- Take a lamina and punch 3 holes such that they are towards any three edges of the lamina.
- Now suspend the lamina through a stand through one of the holes.
- Also attach a plumbline keeping it very close to the hole used for suspending the lamina.
- Take care to see that the plumbline does not touch the lamina.
- Allow it to oscillate and come to rest.
- When the lamina is steady, mark the point on the lamina which is exactly vertically down and just behind the plumb line.
- Remove the lamina and connect the punched hole and the marked point with a pencil line.
- Repeat the above process by suspending the lamina through the other two holes.
- The point of intersection of the pencil lines drawn on the lamina is the position of the centre of gravity.
- Draw a line of equilibrium for each suspension point.
- The point of intersection of these three lines would be the centre of gravity.

Note:

- The centre of gravity's location is dependent on the weight and the distribution of this weight within the body.
- An object hanging from any point will automatically rotate so that its centre of gravity is along this vertical line from the hanging point.
- The centre of gravity does NOT have to lie within the physical matter of the body.
- Example: tire, football and helmet
- In humans, the centre of gravity may also fall outside body's physical matter: • (e.g., high jumper, pole vaulter)

Effect of the position of the centre of gravity on the stability of simple objects:

- An object will topple over once its centre of gravity falls outside its base of support.

Example:

The Leaning Tower of Pisa does not topple over: its centre of gravity is still above its base

- Objects with lower centre of gravity are more stable.