

Drawing a Free Body

Mechanical Engineering

The five-step method that prevents most statics errors.

One body, every force on it, nothing else.

1

Cut the body out

Draw the part alone. Every contact you cut becomes a force.

2

Add the applied loads

Weight at the centre of mass, plus every external load.

3

Replace each support

One force per motion it blocks, a moment if it blocks rotation.

4

Fix a sign convention

Pick positive x, positive y and a positive sense for moments.

5

Count the unknowns

Three equations in 2D, six in 3D. More unknowns needs stiffness.

A force the body exerts on something else never appears on its own diagram.