

SIMPLE MACHINE

In physics, a simple machine is any device that only requires the application of a single force to work. Mechanical advantage is the result obtained by using these machines.

List of machines

The traditional list of simple machines is:

- The inclined plane (N)
- The wheel and axle (O)
- The lever (T)
- The pulley (U)
- The wedge (V [single wedge]; X [double wedge])
- The Archimedes' screw (Y)

(The letters are a mnemonic, because their shapes resemble the shapes of the simple machines.)

Definition

The ratio of the output force to the input force is the mechanical advantage.

Examples

For example, the mechanical advantage of a lever is equal to the ratio of its two arms. The mechanical advantage of an inclined plane (with the force acting parallel to the plane) is the cosecant of the angle of inclination.

Note: Real machines are also affected by factors such as friction and elasticity, so the actual mechanical advantage of a simple machine will usually differ from its theoretical value.

Classes

These simple machines fall into two general classes;

those dependent on the vector resolution of forces (inclined plane, wedge, screw, toggle joint) and

those in which there is an equilibrium of torques (lever, pulley, wheel).

Uses

Simple machines are often used in combination as components of more complex machines; for example the Archimedes screw, which is a pump, is an example of a complex machine where the screw is a helical inclined plane.

Variations

Variations to the list of simple machines:

Some say there are only five simple machines arguing that the wedge is a moving inclined plane.

Others further simplify the list to four saying that the screw is a helical inclined plane. This position is less accepted because a screw simultaneously converts a rotational force (torque) to a linear force.

Source : http://engineering.wikia.com/wiki/Simple_machine