

ФИЗИЧЕСКИЕ СИЛЫ, ОБЕСПЕЧИВАЮЩИЕ РАБОТУ МЕХАНИЗМОВ

Normal force

The normal force is due to repulsive forces of interaction between atoms at close contact. When their electron clouds overlap, Pauli repulsion (due to fermionic nature of electrons) follows resulting in the force which acts in a direction normal to the surface interface between two objects. The normal force, for example, is responsible for the structural integrity of tables and floors as well as being the force that responds whenever an external force pushes on a solid object. An example of the normal force in action is the impact force on an object crashing into an immobile surface.

Friction

Friction is a surface force that opposes relative motion. The frictional force is directly related to the normal force which acts to keep two solid objects separated at the point of contact. There are two broad classifications of frictional forces: static friction and kinetic friction. *The static friction* force will exactly oppose forces applied to an object parallel to a surface. *The kinetic friction* force is independent of both the forces applied and the movement of the object.

Tension (physics)

Tension forces can be modeled using ideal strings which are massless, frictionless, unbreakable, and unstretchable. They can be combined with ideal pulleys which allow ideal strings to switch physical direction. Ideal strings transmit tension forces instantaneously in action-reaction pairs so that if two objects are connected by an ideal string, any force directed along the string by the first object is accompanied by a force directed along the string in the opposite direction by the second object. By connecting the same string multiple times to the same object through the use of a set-up that uses movable pulleys, the tension force on a load can be multiplied. For every string that acts on a load, another factor of the tension force in the string acts on the load. However, even though such machines allow for an increase in force, there is a corresponding increase in the length of string that must be displaced in order to move the load. These tandem effects result ultimately in the conservation of mechanical energy since the work done on the load is the same no matter how complicated the machine.

Elasticity (physics)

An elastic force acts to return a spring to its natural length. An ideal spring is taken to be massless, frictionless, unbreakable, and infinitely stretchable. Such springs exert forces that push when contracted, or pull when extended, in proportion to the displacement of the spring from its equilibrium position.

Чтение – предсказывание содержания текста

Task 1

Ответьте на следующие вопросы:

Working in your group, try to explain these problems.

Why doesn't the ship sink?

What makes the spring stretch and what keeps the weight up?

Why doesn't the box slide down the slope?

To sink	Тонуть
Spring	Пружина
To stretch	Растягиваться
Weight	Вес
To keep up	Удерживать наверху (на поверхности)
To slide	Скользить
Slope	Уклон