

# Physics of automotive accidents

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In this article we will discuss how safe cars are now? Why not make the car even more durable, and what did the engineers work on to prevent crying effects when accidenting?

The gasoline liter contains about 56 megalules of chemical energy. It is more than when the explosion of the same amount of TNT. And this energy would have enough for a whole day of the toaster. The machines are working due to the burning of gasoline, which turns the chemical energy into kinetic, contributing to the movement of the machine. Eighty percent of energy is lost in the form of heat in the engine, but 20 percent of 56 million Jouley - it is still a lot. You need only 5 teaspoons of gasoline to overclock the 2-ton car from 0 to 60 km / h. It does not seem like a large amount of fuel, but the energy of the machine that moves at a speed of 60 km / h, comparable to the elephant energy or rather the stegonosaurus dropped from the third floor. To stop the car, all this energy should go somewhere. If the machine stops the brakes, they dispel energy using heating (and subsequent cooling) brake pads and disks. And in the event of a collision, the energy is dissipated by deformation of the front of the machine. And since the slow stop is better fast, the machines are carefully designed to frighten when a collision. This prolongs the collision time and stop requires less intense braking acceleration.

A large acceleration is very poorly affected by human brains and organs. But people do not really like to drive cars with a long front. Most machines have 50 cm of the frozen space in which they must dispel the energy equivalent. The deformation of the front of the machine must withstand power, which is equal to a quarter of the main shuttle motor. More than half of the monitored crumpled should take on a steam of steel rails connecting the main part of the machine with the bumper, which bend and deformed to absorb energy and slow down the machine. All the remaining energy should be absorbed by the deformation of the rest of the metal, which is in front of the machine. This planned destruction allows the machine to slow down quickly, but with an acceptable and stable speed.

If the cars were very hard, they would stop so quickly that the acceleration in them would exceed 15 or more than those who are experiencing astronauts in training. Such huge overloads are not compatible with life. Engineers learned how to make cars with frozen parts creating inside a safe zone. Fully solid machines are not suitable for the safety of the driver and passengers. In fully solid machines, even when a collision at a very low speed (30-40 km / h) could die people.