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EVALUATION OF VEHICLE TRAFFIC SAFETY THROUGH COLLISION PROCESS

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Abstract:

This article analyzes the structural features of the vehicles that affect the vehicle's technical condition and traffic safety. Recommendations have been developed to reduce the occurrence and impact of road accidents due to the deterioration of the technical condition of vehicles.

Keywords:

Car, technical condition, driver skills, highway, traffic safety, mode of action, traffic accidents, collision, active security, passive security.

Introduction

One of the urgent issues of today is the increase in the number of road traffic accidents, especially collisions, as a result of the breakdown of the technical condition of vehicles and the failure to organize diagnostic work at the required level. Of course, it is known that the deterioration of the technical condition of cars has a negative impact on the environment. The environmental hazard of vehicles depends not only on their design specifications, but also on their technical condition. Therefore, during the operation of motor vehicles, it is necessary to pay special attention to the operation of aggregates and nodes that affect the fuel consumption, the amount of toxicity of exhaust gases, the level of noise and the safety of movement at the specified level. This is certainly one of the important areas of environmental health.

As a result of the research of experts, changes in the main operational characteristics of various vehicles have been determined in scientific sources, in which it has been determined that harmful factors due to the poor quality of technological processes during operation cause road traffic accidents [1].

Performance indicators of vehicles are evaluated by all the following factors involved in the safe movement of the traffic flow, i.e. driver skill, road condition, environment and other influencing factors. Regulation of traffic on highways is a somewhat complicated process, because each driver chooses a convenient mode of traffic, and he does not consider the effect of his chosen mode of traffic on other road users.

At this point, traction dynamics plays a special role in ensuring road traffic safety of the main operating characteristics of the car. Traction dynamics, as we know, refers to the types of car engines, their power, and the time it takes to accelerate to a specified limit speed. In the

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movement of different dynamic qualities of different types of cars, the interaction of cars increases with the amount of movement [3].

Based on the above, any factor affecting traffic safety should be taken into account when organizing traffic. The main point of attention is the safe passage of various vehicles at high speed on different sections of the road in any weather conditions of the year.

In order to successfully fulfill the tasks set for the organization of the movement, it is necessary to carry out large-scale active work at the level of various ministries, enterprises, concerns, associations and authorities. From this, the issues to be solved in the organization of the movement can be divided into three levels depending on their scale:

There are 3 specific characteristics of car traffic that cause low traffic safety:

1. Inadequate supply of roads with motor transport utilization indicators corresponding to their indicators.

2. Car traffic is not sufficiently separated from other road users and pedestrians have a low traffic culture.

3. The popularity of the driving profession and the large number of amateur drivers with low qualifications and low skills.

Statistics show that the majority of accidents occur due to technical malfunctions of cars. This mainly includes the condition of the vehicle's brakes, steering system, tires, drive unit and mechanisms. It is caused by a faulty heating and cooling system in the car, an uncomfortable position of the driver's seat, an incorrectly installed rearview mirror or a malfunctioning windshield wiper [3]. .

In order to prevent traffic accidents, it is necessary to ensure active and passive safety of the car. While the stability and controllability of the car, traction, speed and braking characteristics, and the reliability of structural elements play an important role in providing active safety, the ability or inability of certain mechanisms, units and parts of the car to meet technical requirements is involved in passive safety. is taken into account [4].

Low safety detection tests are carried out in special test areas or stands. The vehicle is tested in the test areas as follows: head-on collision; hit from the side or from behind; falling over;

The passive safety of most passenger cars is implemented by rear collision mitigation. The test is conducted at a speed of 35-30 km/h, and the tank is filled with 90% fuel. Spring-loaded catapults are effective in impact testing the car body. A winch moving along the catapult stretches the spring, and its tension is stopped by a pneumatic actuation mechanism.

The mass of the tested object is 2200 kg. From the launch impulse until the collision, the speed reaches 50 km/h.

The methods of passive safety testing of cars are not limited to the formation of various shocks, but are also determined by the simulation of injuries inflicted on the driver or passengers with the participation of special mannequins. However, the listed methods have their own disadvantages. For example, a natural sample of the vehicle is needed to perform each test procedure. These activities are associated with a large amount of expenses. Second, the reproducibility of the experiment is limited, which may lead to certain errors in the results. Thirdly, the impact process between the moving car and the barrier is not fully controlled. In

addition, the ability of cars to fully demonstrate the ability to hit obstacles and overcome them is limited.

Other analytical methods are also used in the analysis of the accident.

For example, when a car leaves the road surface, its speed is determined by the following relations:

$$v = \frac{K_1 S}{\sqrt{S^n - h}} \qquad (1)$$

Here: K1-7.97 (2.2) speed change coefficient;

H- difference between road levels, m

N- the amount of slope of the joint, mm

S- distance covered, m

The main drawback of this method is that it is characterized by a large number of measurement parameters and approximate values, and it is inconvenient to use in practice.

The length of the braking distance traveled by the vehicle during braking is determined as follows.

$$S_t = \frac{t_2 v^2}{3{,}6} + \frac{K_э V^2}{254\,(\varphi \cos\alpha \div i)} M \qquad (2)$$

Here: V is the initial speed of the car, km/h

□ - gearing coefficient: the slope angle of the □-wheel, grad

T2 is the action time of the brake transmission, s

K2 is the effective performance coefficient of the brake.

This method is only valid for pure braking and does not take into account shock or collision parameters that occur during the braking process.

The sum of the road and air resistances is mainly accepted as the environment that resists the movement of the vehicle or the characteristic of the base traction.

In particular, the aerodynamic drag is found as follows.

$$P_w = \frac{K_w * F_a * V^2{}_a}{13} \qquad (3)$$

Here: Kw - air resistance coefficient, F - surface, m2

$$K_w = Cx * \rho / 2, \quad \frac{H * C^2}{M^4} \qquad (4)$$

Here: Sx - coefficient of thinness - density of air, kg/m3

$$\rho = \frac{h}{[21.2(273 + T)]} \qquad (5)$$

Here: h is the height of the test column, m

T - air temperature, oS [4]

However, in the research works carried out so far, the effect of the resistance parameters on the operational performance of the car when it meets a fairly stable or sufficiently hard environment has not been taken into account.

Thus, experimental and theoretical methods of testing cars for safety are not logically connected.

The study of the process of vehicle collisions or collisions with obstacles takes the main place in the chain of general operation characteristics and it is necessary to accurately evaluate the indicators and gauges in ensuring the safety of the vehicle.

It is well known from statistical data that most of the traffic accidents on the roads are caused by collisions.

Based on the table below, it is noted that the majority of accidents occur as a result of vehicle collisions with other vehicles.

Table 1 The main types of collisions in accidents.

T/r	Types of accidents	Comparative amount of traffic accidents %
1	Other vehicles	29
2	conflict with	14,3
3	Crashing cars into obstacles	1,3

External safety of the car includes measures to minimize damage to all participants (victims), pedestrians, cyclists and motorcyclists as a result of a road traffic accident. Car safety factors include:

deformation characteristics of the car body;

external form of the car body;

When designing a car structure, the main goal of the designers is to minimize the damage to the car body and the driver as a result of a road traffic accident.

As a result of the collision, the technical damage of the vehicles, the physical damage of the passenger and the driver as a result of a strong impact, lead to an increase in the large monetary damages. In order to prevent accidents caused by collisions of vehicles and to reduce the amount of damage, it is necessary to make changes to shock absorbing buffers.

A collision with the front of a car is a fatal road traffic accident for pedestrians and other road users, because folding headlights, windshield wipers, door openers, antennas and rear view mirrors can also cause serious damage to pedestrians and other road users. .

In order to eliminate these situations, it is proposed to apply to the production of the shock protection device during the collision of vehicles. This device consists of the following main parts. (Figure 1)

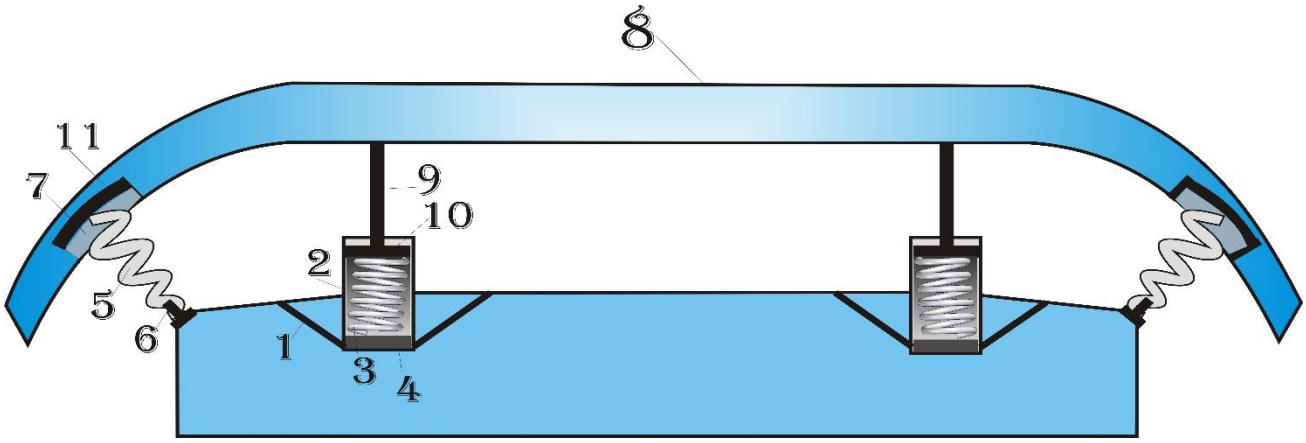

Fig. 2. Scheme of the shock protection device during the collision.

This device consists of the following main parts:
1. Clamp holding the bushing
2. Tube-bush
3. Cylindrical spring
4. Rubber floor
5. Conical spring
6. Conical spring holding pin
7. A hole with a conical spring tip
8. Buffer
9. Piston pressing on the spring
10. The contact surface of the piston with the spring
11. Conical spring passing rubber

This device is preferred for its simplicity and simplicity as well as for its high accuracy in ensuring safety. This device can prevent serious technical damage to vehicles, prevent death and injury, and reduce property damage.

In order to reduce the number of road traffic accidents and their damages, every person responsible for traffic safety should take responsibility for their work. In this regard, the activities of local traffic safety commissions are strengthened, the work in this regard is carried out with increased responsibility of the leaders, and the joint efforts are made with the involvement of offices and organizations, the mass media, and the general public. we will reach

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