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METHODOLOGY FOR DETERMINING VEHICLE BRAKING IN TRAFFIC

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Abstract
In this article, based on the theoretical approach developed in the study of the car braking process, it is to increase the performance of the results of the examination of the car transport.

Keywords: Transport, brake, car, truck, result, expertise.

Introduction

In the Republic of Uzbekistan, the traditional methodology of motor transport expertise, which appeared on the basis of studies, is used. Among the main parameters describing the movement of the vehicle is its deceleration, which is currently determined only experimentally or selected in the study of vehicle movement parameters based on various road conditions and vehicle-oriented table values. categories. At the same time, in modern expert practice, the specific share of the use of the latter is significant, which leads to serious errors in the calculation. In the Republic of Uzbekistan, the main general method for determining the car's deceleration was adopted [1], taking the road adhesion coefficient of the car tire as the basis for calculating the deceleration. The same method was proposed for determining the deceleration. However, this technique is based on experimental tests carried out in the 80s of the last century, which calls into question their connection with the development of the automotive industry in general, and in particular with the braking elements of cars. In addition, in classical physics, the friction force depends on two parameters: the base reaction force and the friction coefficient. These are. the use of the coefficient of friction in the calculation of friction-related processes is unreasonable or requires scientific justification. In addition, according to Ilarionov, the decelerations used in calculating the braking parameters of vehicles are equal in certain road conditions for vehicles of the same category with different masses and structural characteristics of tires, which is currently contradicts the tests being conducted at the time. Currently, in our country, a number of tests related to braking detection of braking systems and braking elements are being organized, which indicates the growing interest in the problem of selecting the initial data of braking traffic cars, it's car deceleration. The obtained results were systematized and issued as a manual for expert auto technicians by the IIB of the Ministry of Internal Affairs of Uzbekistan. However, it should be noted that these tests were conducted only for certain brands of cars and car tires at certain values of braking speed, as a result of which the methodological guide is incomplete and reflects only some aspects of this problem. only applies to vehicles that are suitable for their various tests, this is not possible if they are seriously damaged. Expert practice theoretically shows that the development of a universal device capable of measuring in various situations is necessary to optimize the production of expert calculations related to the coefficient of deceleration and friction. Conducting experimental measurements is difficult in some cases, for example, when vehicles are not in motion (damaged by an accident) and if the

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technical condition after the accident does not allow conducting tests at sea. In addition, the deceleration detection method based on the use of a universal formula does not reflect the variability of driving conditions during car braking, for example: the difference in air pressure in different wheels, the difference in tire wear in road conditions for different wheels. Even in the study of the movement of vehicles, with the increase of the above differences, including the existing methodology of the initial parameters, increases significantly on average. In addition, there will be an increase in work related to cars. In addition, the method of determining the deceleration based on the use of a universal formula does not reflect the variability of driving conditions during car braking, for example: the difference in air pressure in different wheels, the difference in tire wear for different wheels. The error in the study of the movement of vehicles increases significantly on average with the increase of the above differences, including the existing methodology of the initial parameters. In addition, there is an increase in the number of cases involving cars, equipped with anti-lock braking systems (ABS), in accidents, they create research conditions that are not provided for in the table data, which makes it difficult to perform calculations using the traditional method. does not allow, which forces the specialist to refuse to solve the problem.

At the same time, braking of all the wheels of the car takes place in the total force.[4]

$$F_{tor}=\frac{M}{r}$$

From the result of transformations, we get the following formula

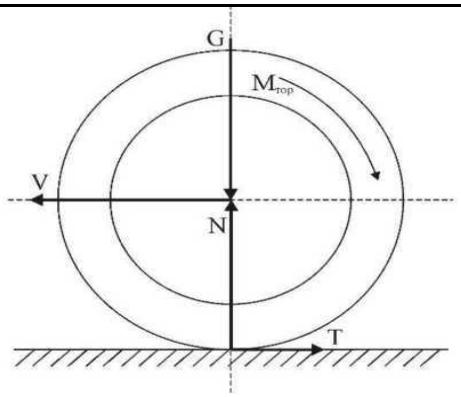
$$T_1= -F_{tor1}- N_1 \cdot \mu-\frac{I_1}{r^2} \cdot j$$

$$T_2= -F_{tor2}- N_2 \cdot \mu-\frac{I_2}{r^2} \cdot j-F_{xx}$$

Based on this, the increase in the braking torque leads to an increase in the tangential reaction of the road until it reaches the limit value - the Rsc adhesion force of the tire to the road:

$$T \leq F_{sp}=N\mu$$

The braking system of modern cars develops a torque that exceeds the torque of the tires. Based on this, in practice, it is observed when driving a car, wheels slip, wheels lock during sharp and intensive braking, and when the process of sliding along the road begins, excluding rotation. Before the wheels are locked between the friction pads and the discs, the friction force, the static friction force, is exerted when the tire tread contacts the road. At the final stage of wheel locking, this pattern is reversed, braking mechanisms, static friction force is established, the contact of the tire tread with the support surface is accompanied by friction force. Heat energy costs are also redistributed between these two processes - energy costs for friction between the pads and the disc are lost, and the heat energy output is generated in the friction zone of the tire connection with the road. [2]



Vehicle dynamics under braking can be calculated using the vehicle motion equation. Braking of the car without taking into account the operation of the engine is based on the condition of resistance to movement of friction mechanisms. In this case, the equation of forces acting on the machine takes the following form:

$$T_1 + T_2 + F_i - F_n + F_i = 0$$

Combining T_1, T_2 and F_i values into the formula and changing them, we construct the equation of car movement during braking without taking into account the slippage of the engine and tires on the supporting surface.

$$\frac{G}{g}\left(1 + \frac{Ig}{NG}\right) = \frac{G}{g}\delta_i j = -F_{tor} - F_k + F_n - F_v - F_{xx}$$

Here $F_k = F_i + F_k$ is the total braking force, N[3]
It is possible to determine the deceleration of transport from the obtained equation

$$j_3 = -j = \frac{F_{tor} + F_d + F_v + F_{xx}}{G\delta_i} \cdot g$$

Based on this expression, we can conclude that when the car slows down, the friction in the friction mechanisms and transmission elements increases, and the resistance forces of external factors increase. Deceleration decreases with an increase in the mass of the car and the moments of inertia of the rotating parts. The biggest influence on braking is the total braking force F, which depends on internal braking pressure, configuration and technical condition of the brakes. If the rolling resistance forces are not taken into account, then determining the brake force, its maximum value depends on the tire holding force[3]

$$F_{tor} = G\mu$$

It occurs when the braking force exceeds the traction force, causing the wheels to lock up and begin to slide on the road surface.
When calculating the deceleration, the force equation can be written in the following form

$$F_i = F_{tor} + F_d + F_i$$

The inertia force is moving, it is used to overcome the braking force F_{tor}, road resistance force $F_d$va and air resistance force F_vTo determine the js deceleration of the car, it is enough to use the value of Bi in equation:[4]
To determine the js deceleration of the car, it is enough to use the value of Bi in equation

$$j_3=\frac{F_{tor}+F_d+F_v}{G\delta_i}\cdot g$$

We can assume that F_v = 0 under the condition that the car's speed tends to zero during braking. So, equation takes the form.

$$j_3=\frac{\mu+\psi}{\delta_i}\cdot g$$

All the above studies have shown that the adhesion coefficient mainly depends on the condition of the pavement [5]. It should also be noted that it is actually a complex function of many variables.
To determine the coefficient of adhesion, tests were conducted by towing a car or a special trolleybus when its wheels were braked on the road surface. Until now, a similar method of determining the coefficient of friction using a dynamometer when pulling a braked car or a special trolley on a hard surface has been widely used and remains one of the most reliable [6]. redistributed between the wheels. In addition, the value of the coefficient changes with the change in viscosity deceleration rate, so these methods can only find its approximate value [7]. Based on the data of the specified research organizations, the average values for the coefficient of friction shown in Table 1.4 were calculated.

Summary

The most common types of accidents are: vehicle collisions (42.7%), pedestrian collisions (28.0%), overturned vehicles (8.0%). In 2021, the share of the number of accidents caused by vehicle technical failures2 more than doubled and amounted to 3.1% (2020 - 1.3%). preliminary analysis
methods of conducting tests for this type of accidents showed limitations and provided an opportunity to improve the selection of initial data in the study of vehicle braking and also their production
2. Currently, the method of determining the coefficient in our country
the clutch theoretically exists in unity and is incredibly close. This is because such a method does not take into account that not all wheels have the same contact with the ground, and when braking, the load is redistributed between the axles of the car.
3. Currently, the following friction coefficients are distinguished:
Coefficient of adhesion at rest, coefficient of adhesion during sliding or sliding;
coefficient of adhesion during lateral movement of the wheel, their differences and very little attention has been paid to the mechanics of formation in the interaction of the tire with the supporting surface. In addition, friction does not take into account the mode of the accident, where the contact surface of the wheels depends on various parameters.

Therefore, the justification and integration of these differences allows the development of automotive braking research methods.

4. There may be instruments available to measure the coefficient of friction according to the principle of operation, it is divided into the following groups: trailed (dynamometric) principle; hinge principle; the principle of imitation.

The fact that each of the considered methods has its own shortcomings allows us to consider them universal

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