ORGANIZATIONAL-TACTICAL AND INFORMATION-TECHNICAL SUPPORT OF PREVENTION, DETECTION AND INVESTIGATION OF CRIMES

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USE OF TECHNICAL MEANS OF WEIGHT CONTROL FOR THE PREVENTION AND DETECTION OF OFFENSES IN THE FIELD OF ROAD TRANSPORT

Фоменко А., Вишня В. ВИКОРИСТАННЯ ТЕХНІЧНИХ ЗАСОБІВ ВАГОВОГО КОНТРОЛЮ ДЛЯ ПОПЕРЕДЖЕННЯ ТА РОЗКРИТТЯ ЗЛОЧИНІВ У СФЕРІ АВТОПЕРЕВЕЗЕНЬ. Досліджено особливості боротьби з крадіжками вантажів при використанні вантажного автотранспорту, аналізу особливості використання технічних засобів зважування у боротьбі з цими злочинами.

Автори наводять класифікацію таких злочинів на відкриті і замасковані, розкривають складність виявлення останніх. та пояснюють, чому дієвим засобом боротьби з цими злочинами, сьогодні, вважається використання на автошляхах технічних засобів вагового контролю (ваговимірювальних систем).

У статті детально розглянуто конструктивні елементи ваговимірювальних систем, що застосовуються для зважування автомобілів у статиці і в русі, та приводяться аналітичні математичні розрахунки похибки електронних ваг з поосьовим зважуванням. У разі визначення, що автомобіль рухається з нерівномірною швидкістю, використовується метод корекції нерівномірності руху вантажного автомобіля, та розраховуються аналітичні залежності для коригування обмірюваної маси з урахуванням нерівномірної швидкості прямування автомобіля по платформам.

Ключові слова: *викрадання, вантажі, способи, автотранспорт, правоохоронні органи, злочини, нерівномірна швидкість, корегування маси, метод корекції.*

Formulation of the problem. One of the areas of the fight against economic crime is the prevention and disclosure of property abductions by means of motor vehicles, in particular freight motor vehicles. Today, they are involved with the traffic police and the National Police's economic crime units. Most likely, some part of the solution of these tasks will be assigned to the special units of the financial investigation service, which is being created in the near future.

Regarding the general classification of the crimes in question, the legitimate distribution of them into open and disguised [1]. The first involves the transportation of abducted material assets without accompanying documents. The disclosure of such crimes is not complicated and well regulated.

It is more difficult to disclose masked stolen documents when there is a document for the transported cargo, but the data in them is different from the actual one. On roads where the

economic control posts are usually located, it is quite difficult to determine unequivocally whether the mass of the goods actually transported specified in the consignment note is identical. This complicates the adoption of disclosure and prevention of such crimes. At the same time, today such methods are widely used for the abduction and smuggling of scrap metal, coal, grain and other agricultural products.

The most effective means of combating these crimes today is the use of weighing systems on highways, which allows:

- eliminate possible conflict situations related to the subjective visual assessment by police officers of the cargo carried by the car, in case of discrepancy with the data of the accompanying documents;
- to carry out operational control of sealed cargoes;
- to control the cargo, which is not quantitative miscalculation;
- to create a legal basis for preventing violations of law in the carriage of goods.

Together with the solution of issues of combating economic crimes the use of weighing instruments can simultaneously solve the issues of road safety, and, therefore, the safety of cargoes and roads, accident and other. Road police of the western countries, as well as Russia, Belarus successfully applies stationary car scales for axial weighing in the static of heavy trucks in order to control their overload.

Presentation of the main research material. Our weight measuring system (device) can consist of two weight platforms and a portable secondary device that connects to the platforms. Weighing platforms with built-in pressure sensors (each weighing not more than 10-15 kg) are placed on a selected section of the road at a distance corresponding to the axial size of the controlled vehicles. Cars alternately go to weight platforms with all wheels (axial pairs). Pressing a button on a portable secondary device initiates a load control (static) on the weight platform. After completing the last axle weighing, the gross vehicle weight (gross) is automatically recorded.

If using the numeric keypad available in the device to enter the weight of the packagings registered in the transport documents for the car, we will get the weight of the transported cargo (net). The result of such weighing gives supervisors the basis for adopting one or another solution (action), eliminates the possible conflict situations related to the subjective visual assessment of the mass of cargo transported [1].

The proposed technical solution to prevent theft of material assets using vehicles seems quite effective, as it is mobile (it is easy to transport to any part of the road), does not require significant financial expenses, easy to set up and maintain.

However, for its rational use, it is necessary for each vehicle, in the accompanying documents, to indicate the weight of the container. It's no secret that truck drivers used for the transportation of bulk goods (coal, agricultural products) are widely used different ways to artificially increase the weight of the container before loading (from below suspended metal bells, filled with water additional fuel tanks), receiving on their personal disposal surplus cargo Therefore, it is necessary that each vehicle for the transportation of goods by special (competent) authorities issued a document (whether marking in the documents available on the car) about the actual weight of the packagings.

In case of any repair work on the car, which leads to a change in the weight of the packaging (installation of a tent, badge of the sides), correction of these documents is necessary. Failure to comply with these requirements should be considered as a violation, which entails strictly defined consequences.

The presence of weighing instruments in law enforcement units allows not only to control the cargo that can not be quantified (bulk cargoes, scrap), but also to solve the problem of controlling sealed cargoes transported, for example, by TIR vehicles. At this time, the police officer needs to fill in a special driver document containing information on the purpose and purpose of cargo control, the identity of the controller (this is the case for the driver to determine which cargo is carried in such a truck (let alone check it) is associated with a large number of cases of robbery on the roads "on the alert").

The use of portable weighing instruments allows you to control the transportation of sealed cargo, operating only with the concepts of mass without identification of the load. Only in the event of a discrepancy between the results of the weighing and the data provided by the driver may be made a decision on violation of the seal on the cargo.

In view of the above, the technical realization of automobile electronic weighing with axial weighing is offered at the Dnipropetrovsk State University of Internal Affairs of Ukraine,

where the method of correction of the unevenness of the truck movement is used [1].

The proposed weight includes a weight platform, based on built-in strain gauge sensors and an electronic device of the suitcase type, which connects to the platform with the help of cable and connectors.

Structurally, the weighing platform can be stationary or portable. The stationary platform for car weights is set on a small foundation, level with an access road and has dimensions of 700x3000x200 mm. Acceptable load on the platform from one axle of the car is 20 tons.

Scales with this type of platform can be used to control the load of the object both in statics and in its movement. The number of axes of the object is not regulated, which allows you to weigh not only cars, but also auto trains.

The portable weight receiver platform of automobile weights consists of two mechanically unrelated nodes with strain gauges, which are mounted on a cloth of the road at a distance, which ensures simultaneous access to the wheels of one axle of the car. Such a design of the platform implies the presence of additional trapezoidal mechanical elements for the arrival and the rally from the platform. The portable platform design allows you to set weights in any convenient place and clean them after the control action is complete. Vehicle weighing instrument in this case is a static. The electric signal from the power measuring sensors of the weight, proportional to the load on the axis of the moving object, enters the electronic device, converted into code and fed to a load cell of saddle axes. Upon completion of the control weighing, the weight of the empty vehicle, according to the accompanying documents, or the total weight of the empty trains included in the self-propelled trailer is entered into the device in order to automatically obtain the mass of the cargo being transported (net). The identification of the load of each individual trailer is assumed.

Below are the analytical dependencies we have obtained for adjusting the measured mass, taking into account the unevenness of the car's movement during weighing.

It is known that when weighing a moving car, as a result of the fluctuation of its suspension, the signal of the power-measuring sensors of the load-receiving platform, in addition to the constant component Vm, is proportional to the mass of the car, contains the variable component Vd (dynamic error) caused by these fluctuations. Existing methods of weighing in motion are the reception of a signal from sensors of weight, the allocation of this signal of dynamic error and calculation of the value of the mass of the object on the received constant component of the signal.

However, such a model for determining the mass of the moving car, is valid only for the case of uniform motion of the platform. Otherwise, the output signal of the pressure sensors contains an additional constant component Va, due to unevenness of the car's motion on the platform. The magnitude of the measurement error made by the component Va, which is usually neglected, can reach 3 ... 10%. Particularly increases the value of the component Va, therefore, and due to this component of the error of weighing, if the driver drives sharply during the movement of the front axle of the car on the platform, and then, at the weighing of the rear axle, on the contrary, dramatically increases the speed. Therefore, known methods of axial weighing can not provide high accuracy of the mass of the moving vehicle.

In the scales proposed by us, in order to increase the accuracy of the measurement, the acceleration of the object is automatically controlled at the moments of weighing its axes, which are then taken into account when calculating the mass of the object M. For this purpose, the load-receiving platform is arranged by additional road sensors.

In fig. 1 is a diagram for explaining the proposed method of weighing. The following is indicated on the diagram: 1 - platform; 2 - car; F1 - platform reaction; F2 - path reaction; P = Mg - weight of the vehicle (object), g = 9,82 - acceleration of free fall, l - distance from the rear axle to the center of gravity, L - distance between the axles, h - height of the center of mass, a1, a2 - acceleration of the object, respectively, when weighing the front and rear axles, Fu - the force of inertia, due to the motion of the object with acceleration.

The expression for the reactions F1 and F2 is found from the equations of the sum of the moments of forces with respect to the points A and B [2]:

$$F1 = \frac{Mgl - Ma_1h}{L} \quad F2 = \frac{Mg(L-l) + Ma_2h}{L} \quad (1)$$

For axial weighing, the mass of the object is determined by the strength of the reaction:

$$M_п = (F1 + F2) /g = M + M\ h\ (a_2 - a_1)/ gL (2)$$

The second application in the last expression is an ingredient due to the unevenness of the car's motion.

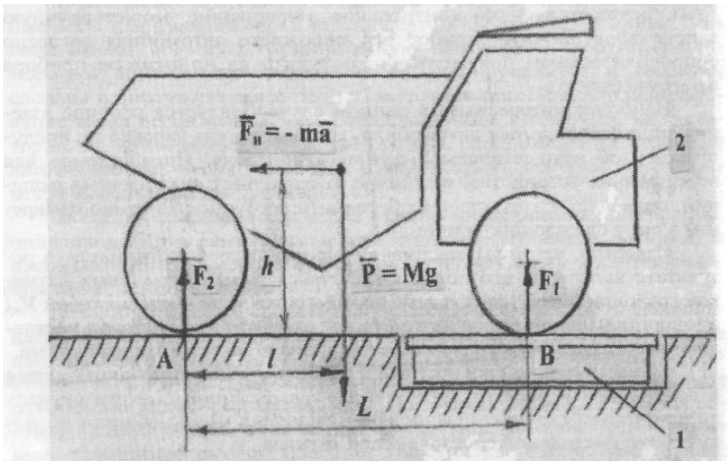

Fig.1. Scheme of loading at the axial weighing of the car, moving with uneven velocity

The relative error δM of the mass is determined by the expression [2]:

$$\delta M = (Mp - M) / M = h\ (a2 - a1) / gL\ (3).$$

The resulting error value can be quite large, especially when a1 and a2 have different characters. For example, at h = 1 m, L = 4.2 m (typical values for two-axle lorries) and a1 = -0.5 m / sec2, a2 = 0.5 m / sec2, the relative error due to uneven motion will reach 2 , 43%, which is several times the required accuracy of weighing.

At the same time, if the values of accelerations a1 and a2 are measured, then the actual value of the mass of the moving object M can be found with greater accuracy [2] for the measured Mn:

$$M = Mn / (1 + h\ (a2 - a1) / gL)\ (4).$$

Hence, taking into account the coefficient K of the transformation of the electric signal into mass, it follows:

M = K Vnc / (1 + h (a2-a1) / gL) (5),

where Vnc is the sum of the constant components of the signal strength sensors obtained during axle weighing.

This method of weighing well enough can be extended to more than two, the axes of the object.

In the secondary device of the offered weights it is provided to disable the mode of adjustment of the measured value taking into account the unevenness of the motion for an object with unknown parameters h and L. For typical car models, the basis of values h and L is introduced into the non-volatile memory of the secondary device .. If necessary these values can be changed using the instrument keyboard. The choice of the required h and L pair of pairs is carried out by the employee serving the weights by pressing the "AUTO TYPE" key when identifying the object subject to control (weighing).

In the case of violations detection, the maximum allowable loading rate for a driver is administrative measures (fine, unloading surplus on paid warehouses, etc.).

Conclusions In general, the use of the proposed measuring tools on the roads provides objective and effective levers for the prevention of theft using vehicles, the creation of a legal framework to prevent the violation of legality during road transport of goods.

According to the authors, the use of the proposed means of measurement on the highways of Ukraine will increase the objectivity and quality control of transported cargo, will partially eliminate the conditions for violation of legality in transport, will create prerequisites for

the rapid detection and investigation of cases of theft or abuse, improve the organization of the fight against crime on the vehicle This is a serious reason for considering the issue of the earliest possible provision of equipment by the Ministry of Internal Affairs of Ukraine.

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Summary

The article deals with the study of the features of the fight against theft of goods when using freight vehicles, analysis of the peculiarities of the use of technical means of weighing in the fight against these crimes.

The authors attribute the classification of such crimes to open and disguised, revealing the complexity of identifying the latter. and explain why the use of roadside technical means of weight control (weighing systems) is considered an effective means of combating these crimes today.

***Keywords**: theft, cargoes, methods, motor transport, law enforcement agencies, crimes, uneven speed, mass correction, method of correction.*

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TACTICS OF INTERROGATION OF THE SUSPECTED IN CASES OF ILLEGAL HOLDING OF FIREARMS BY SERVICEMAN

Коцюба С. ТАКТИКА ДОПИТУ ПІДОЗРЮВАНОГО У СПРАВАХ ПРО НЕЗАКОННЕ ЗАВОЛОДІННЯ ВІЙСЬКОВОСЛУЖБОВЦЕМ ВОГНЕПАЛЬНОЮ ЗБРОЄЮ. У статті сформульовані організаційно-тактичні особливості проведення допиту на початковому етапі розслідування незаконного заволодіння вогнепальною зброєю. Автор дійшов висновку, що до основних організаційно-підготовчих заходів до проведення допиту можна віднести: повне та детальне вивчення матеріалів кримінального провадження; вивчення слідчої ситуації, що сформувалася на певному етапі досудового розслідування; визначення кола осіб, які підлягають допиту; встановлення послідовності проведення допитів (якщо декілька підозрюваних осіб); визначення предмета допиту; вивчення особи допитуваного (збирання оперативної інформації про допитувану особу; її місце у складі злочинного угруповання, що займається наркобізнесом; вчинені цим угрупованням кримінальні правопорушення); визначення часу проведення допиту; встановлення місця проведення допиту; визначення способу виклику на допит; підбір речових доказів та інших матеріалів для пред'явлення допитуваному; визначення учасників проведення допиту; визначення технічних засобів фіксації допиту та їх підготовка; забезпечення сприятливих умов проведення допиту; ознайомлення зі спеціальною літературою або використання допомоги осіб, що володіють спеціальними знаннями; визначення низки тактичних прийомів, що будуть застосовані під час допиту; складання плану проведення допиту та ін.

***Ключові слова:** незаконне заволодіння вогнепальною зброєю, допит, доручення, початковий етап розслідування.*

Formulation of the problem. One of the separate aspects of a successful investigation into the illegal possession of firearms is to increase the effectiveness of conducting investigatory (search) actions, among which a special place is interrogated, which requires careful prepa-

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