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Importance of Trace Evidence Study in Determining Road Traffic Accident Circumstances in order to Prevent Insurance Fraud

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ABSTRACT

The authors, on the basis of analysis of growing motorization, particularly at the regional level (using the example of Penza region of the Russian Federation) confirm the urgency of the tasks of preserving life and health of road users, note changes in frequency of accidents of various origin, the positive role of insurance instruments in dealing with the consequences of road traffic accidents.

At the same time, fraud in the field of compulsory motor third party liability insurance (MTPL) is one of the most important and urgent issues for insurance companies. One of the most common schemes of fictitious accidents is an attempt to get repair or replacement of existing damage at the expense of the insurer. In this regard, the use of transport trace evidence examinations has become widespread.

It is this type of transport expertise that reliably and accurately determines conformity of damage to vehicles to the mechanism and circumstances of a road traffic accident. Trace evidence analysis is always assigned when it comes to currently notorious «staged crash». It is impossible to understand the nature of accidents associated with lane change by vehicles moving along the way without study of trace materials. Particularly many problems arise in a situation where both participants in the accident claim that they were moving without changing the direction of movement, and that was the opponent who made a maneuver of lane change not complying with the requirement of the road traffic rules of the Russian Federation on priorities in traffic movement.

As an example, the article presents an expert study of a road traffic accident that raised doubts about reliability of circumstances set out by policyholders.

Keywords: road transport, road traffic accident, insurance, insurance of vehicles, compulsory motor third party insurance, examination, transport trace evidence examination, damage to vehicles, staged accident, insurance fraud.

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Introduction. Road transport is an integral part of everyday life. The development of the transport network, infrastructure, and the growth of motorization contribute to the increasing role of road transport in the transport system.

The growing urgency of tasks of preserving life and health of road users (thanks to increased discipline on the roads, quality of road infrastructure, traffic management, improvement of quality and efficiency of medical care for victims, etc.) and, as a consequence, of reduction of demographic and socio-economic damage from road accidents and their consequences, are consistent with the social priorities of the society.

This fully applies to the priorities of the socio-economic development of the Russian Federation in the long and medium term [1, 2].

The *objective* of the authors is to consider various features of trace evidence study of circumstances of a road traffic accident.

The authors use general scientific and engineering *methods*, comparative and statistical analysis, and particularly trace evidence analysis.

Results. According to official data 80,4 % of road traffic accidents occurred in the Russian Federation in 2018 due to violation of traffic rules by car drivers. In Penza region, this figure is of 82,2 %. It is worth noting an increase by 3,3 % in the number of accidents caused by drivers of vehicles, and, in particular, through the fault of drivers of passenger cars in the Russian Federation as a whole and by 2,9 % in Penza region [3].

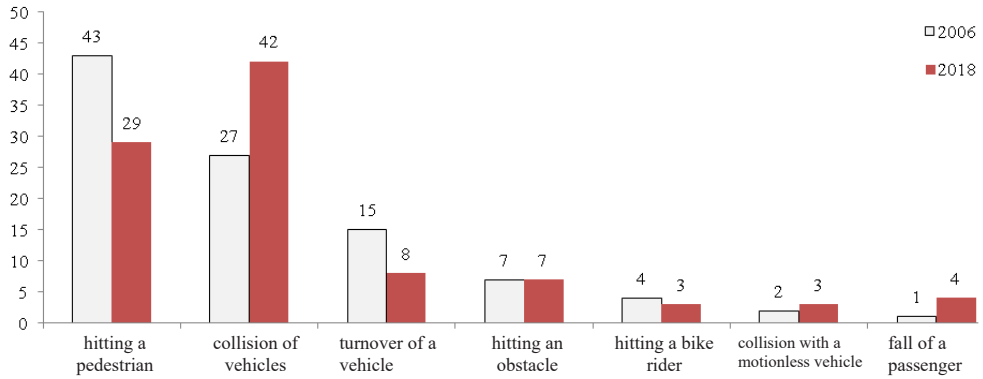
If we consider frequency of various types of road traffic accidents (RTA), then about ten years ago the part of collisions of cars in all types of RTA was of 25–27 %, and the most common type of accident was hitting a pedestrian (40–43 %) [3] (Pic. 1).

Currently, due to the increase in traffic intensity, the number of collisions of vehicles has increased to attain 42 % and continues to grow. Compared with the previous year 2017, there was an increase by 0,3 % [3] (Pic. 2).

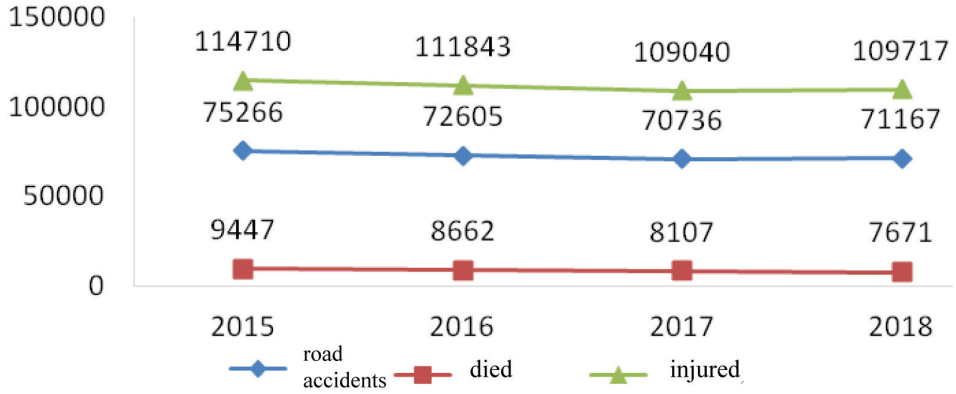
15 years have passed since introduction in the Russian Federation of compulsory motor third party liability insurance of motor vehicle owners (MTPL). This type of insurance occupies one of the leading places in the insurance market for almost the entire period of its existence. The activities of insurance companies are regulated by the Federal Law No. 40-FZ dated April 25, 2002 (as amended on December 18, 2017) «On compulsory insurance of civil liability of vehicle owners» [4, p. 3].

At the same time, approximately 15 % of all payments in terms of satisfying insurance claims in road accidents occur as a result of providing false information in order to obtain illegal profits [5]. In this regard, insurance claims must be thoroughly investigated.

Article 159.5 of the Criminal Code of the Russian Federation states «Insurance fraud, that is, theft of another's property by deception regarding the occurrence of an insured event, as well as the amount of insurance compensation payable in accordance with law or contract to the insured or other person, is punishable by a fine in the amount of up to one hundred twenty thousand rubles or in the amount of salary or other income of the convicted person for a period of up to one year, or compulsory work for up to three hundred sixty hours, or correctional work for up to one year, or



Pic. 1. Comparative analysis of the number of road accidents by type (2006 and 2018) in the Russian Federation, %.



Pic. 2. Road accidents and injured from collisions of vehicles in the Russian Federation.

restriction of freedom for up to two years, or compulsory labour for up to two years, or imprisonment for up to four months» [6, p. 74].

The main objectives of the so-called staged accidents are: receiving insurance payment in case of an accident that would otherwise be recognized as a «non-insured» event; replacement of a drunken participant in the accident before arrival of traffic police officers; receiving double payments (from the guilty party and from the insurance company); repair of damage received earlier at the account of insurance payments; replacement of faulty parts at the expense of the insurance company; receipt of compensation for hijacking covered by the hull insurance and sale of the car by parts. Very often, premium cars participate in staged accidents: namely of BMW, Porsche, Mercedes-Benz brands.

The initiators of artificially created road traffic accidents are the car owners themselves and (or) professional fraudsters who specialize in deceiving insurance companies. Sometimes the fraudsters use front cars with damage.

In the course of any road accident, many traces are formed. When cars are colliding with each other, not only deformations (dents), but also other mechanical damages, such as scratches, burrs etc., are formed on cars. Vehicles, moving on the road, leave different traces on it: of rolling, skidding, dragging, etc. Each single trace carries information about how the accident developed in a particular phase [7, pp. 6–37; 8, pp. 27–33].

The problems associated with identification of a vehicle of an accident participant, its traces' tracks, traffic parameters, and with ensuring road safety in general are also researched by foreign scientists [9, pp. 5–25; 10, pp. 267–276; 11, pp. 633–642].

The study of the entire set of traces, gives an idea of a single accident mechanism, reflecting the sequence of all its stages, from the beginning to the end. The study of traces of the accident, in order to investigate its causes and circumstances, is included in the subject matter of trace evidence analysis of a road accident.

The range of issues resolved through this examination is quite wide. Depending on the objects studied, the goals and objectives of the examination, there are three groups of issues.

The first group of questions is aimed at determining the group identity of motor vehicles:

- what type of transport do traces left on the scene belong to?
- which tire model did leave a trace taken from the accident site?
- do traces belong to the specified type of vehicle?
- was the collision of cars A and B possible considering the shape, size and location of traces on vehicles?

The second group of questions is used in order to identify (to integrate) the whole by parts:

- are the damaged objects of the parts, found on the scene of the accident, parts of a particular vehicle?
- were the particles of paint (glass, plastic) found at the scene of the accident and the vehicles a single whole before the accident?

Pic. 3. Damage to UAZ-396259 car.

The third group of questions is related to identification of a specific motor vehicle:

- do traces belong to this vehicle?
- did one or more vehicles leave traces?
- whether this car tire left traces at the scene of the accident [12, pp. 37–46].

The regulatory framework for assigning and performance of trace evidence examination in case of an accident is based on the procedural codes of the Russian Federation.

To illustrate the effectiveness of this kind of examination, we analyzed the case when, based on the source data of the accident, and using methods of trace evidence examination, studies were conducted to determine whether or not the mechanism of formation and the nature of the damage to the BMW car corresponded to the circumstances of the accident that occurred on 08.12.2017 in Penza with participation of UAZ-396259 car.

To address the above question, the circumstances of the accident were analyzed, information about the damage to vehicles participated in the accident was investigated.

According to traffic police report, the UAZ-396259 car after the accident had damages of the following elements: disturbance of the paint coating of the front bumper.

The BMW car after the accident had damages of the following elements: front and rear right fenders, front and rear right doors, right rear-view mirror.

During the expert inspection of the vehicles, it was found that there are mechanical damages on the vehicles participated in the accident.

The most forward elements of the left side of UAZ-396259 are the lower hinge of the left door and the groove between the front panel and the opening of the left door. The lower hinge has a length of 6 cm and is located at a distance of 64 cm from the road surface. The hinge is deformed in the direction from behind to the front. On the groove at distances of 102÷103 cm and 82 cm from the road surface there are deformations formed in the rear-to-front direction. On the left door at distances of 102÷103 cm and 82÷84 cm from the road surface there are horizontal scratches formed in the direction from behind to the front. On the left front surface of the front bumper there is worn paint coating (Pic. 3).

On the BMW car, the most forward parts on the right side are the right mirror and the

Pic. 4. Damage to the BMW car.

handles of the right doors. Damage to the right mirror is located at a distance of 102 cm from the road surface. Damages are horizontal scratches up to 2,5 cm in length on a section about 1 cm wide, formed in the direction from front to back.

Traces on the front right door start in the middle of the door at a distance of 66÷72 cm from the road surface and represent a section 55 cm long and 6 cm wide with horizontal scratches and layers of light-colored substance formed from front to back, and slight pressure in the direction of right to left with formation of a dent at the end of the trace.

Damages on the front right door handle are located at a height of 81÷84 cm from the road surface and are horizontal scratches formed from front to back with pressure to the end of the trace (on the lining of the door lock) from right to left with a layering of light colored substance.

Damage to the rear right door is a continuation of the damage to the front right door, and starts at the front of the door at a distance of 66÷72 cm from the road surface and is a section 68 cm long and 6 cm wide with horizontal scratches and layers of light colored substance formed in the direction from front

Pic. 5. Comparison of damage to the vehicles.

to back, and a slight pressure in the direction from right to left with formation of a dent on the entire surface of the door at the location of the trace and gaps in the metal in the front.

Damage to the handle of the rear right door is located at a height of about 86 cm from the road surface and represents horizontal scratches 2 cm long, formed in the direction from front to back with a layering of light-colored substance.

Damage on the right sidewall is a continuation of the damage on the rear right door, 66÷72 cm from the road surface and represents a section 68 cm long and 6 cm wide with horizontal scratches and layers of light-colored substance formed in the direction from front to back and small pressure in the direction from right to left with formation of dents mainly in the front of the sidewall and rupture of the metal at a height of 68 cm from the road surface.

Damage to the rear right wheel disc represents horizontal scratches formed in the direction from front to back (when the wheel is in the position that the damage zone is on top). The rear bumper has damage in the form of scratches located on the right side surface.

The front bumper has damage in the form of flaking paint coating on the right side surface at the interface with the fender and in the form of scratches located on the right molding and the surface of the bumper below the molding.

The front right fender is damaged in the form of paint coating split in the front lower part (Pic. 4).

When comparing vehicles (Pic. 5), it was found that the damages on cars partially coincide in height relative to the road surface and the mechanism of formation. The pairs of mutually contacting parts were established [13, pp. 3–51].

The damage to the right mirror of BMW in terms of location relative to the road surface and the mechanism of formation corresponds to damage to the left door and left groove of UAZ-396259, located at a height of 102÷103 cm from the road surface.

The damages to the front and rear right doors and the right sidewall (rear right fender) of BMW in terms of location relative to the road surface and the formation mechanism correspond to damage to the lower hinge of the left door of UAZ-396259.

The damages to the front and rear right doors and the right sidewall (rear right fender) of BMW in terms of location relative to the road surface and the formation mechanism correspond to damage to the lower hinge of the left door of UAZ-396259.

The damages to the front right door handle (including the front door lock lining) and the rear right door handle of BMW car in terms of

location relative to the road surface and the formation mechanism correspond to the damage to the left door and the left groove of UAZ-396259 located 82÷84 cm above the road surface.

The damages on the disc of the rear right wheel of BMW in terms of location relative to the road surface and the mechanism of formation correspond to the damages to the left front surface of the front bumper of UAZ-396259.

But at the same time, damages to the front bumper (including molding), front right fender, rear bumper of BMW car do not form a pair of mutually contacting surfaces with UAZ-396259, which allows to conclude that it is not possible that those damages have been formed during the road accident.

Thus, the investigated road traffic accident occurred under the following circumstances:

• On the BMW car, damaged areas are located on the right side of the vehicle and are formed from front to back, from right to left.

• On the UAZ-396259 car, the damaged areas are located on the left side of the vehicle and are formed in the direction from behind to the front.

• The UAZ-396259 car was moving to the right of the BMW car.

• The BMW car was moving faster than the UAZ-396259 car.

• At the time of the collision, vehicles were located at an acute angle.

Conclusion. As a result of the trace evidence study of cars participated in the road traffic accident, a combination of damages resulting from an accident, to which its participants refer to, as well as damages that do not correspond to the circumstances of RTA were revealed. Thus, there are signs of fraud in order to obtain economic benefits from the part of the driver of the BMW car.

The significance of this trace evidence examination for an insurance company focuses on the fact that an expert base has been created to separate the reasonable claims of the road accident's participants from the claims that are not related to this road accident. At the same time, the criminal subtext of the reasons of the accident participant's claiming for compensation for damage that is not related to this accident does not refer to the tasks of the trace evidence examination.

Thus, trace evidence examination is an important method of countering attempts to commit fraudulent acts in relation to the receipt of illegal payments by insurance companies.

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