

Forensic Expertise in the Case of Road Traffic Accidents

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ABSTRACT: In a growing world of population, the world economy and air pollution, urban and rural agglomeration by motor vehicles is caused by the factors stated. Numerous road safety studies have been carried out worldwide, showing that the only means of transport with the lowest mortality rate remain airplanes, ships and trains. Even if the issue of aggressive pollution by driver overcrowding has been asked at the level of international institutions, we cannot talk about a restriction of the human right to enjoy his personal property. This overpopulation has led to the decimation of regulations, conduct and laws governing urban and rural traffic by encouraging citizens to use vehicles with CO2 emissions as low as possible or even electric, bicycles, mopeds, and electric scooters, etc. However, the environment is not the only problem facing large cities, but rather another major problem being the lack of road infrastructure, but exactly the original streets and boulevards are no longer coping with car surpluses. This aspect has forced, in economically developed cities, acceleration of inventions in the field by: bridges, suspended variants or underground passages, motorways and unique boulevards (for example 6 strips per one). Even if there were numerous efforts to reduce the number of cars, it continues to grow daily, the factors being multiple, and traffic accidents in traffic are exceeded. Are we asking why there are still road accidents, given that we are in the century of speed, state-of-the-art technology? Well, if the computers themselves produce system errors, then we understand that the human being is the only computer that produces errors that are impossible to prevent. Although there are numerous appearances in the showrooms of large motor vehicles that promise their endowment with advanced artificial intelligence, the social status of each country in the world differs, which makes it impossible to acquire all drivers. So, road accidents cannot be eliminated, they will only be in a continuous prevention, in order to reduce their number and at the same time increasing the safety of pedestrians and drivers. That is why in this paper I will talk about how forensic expertise is achieved in the case of road accidents.

KEYWORDS: accident, infrastructure, forensics, expertise, technology, safety

Some forensic expertise in case of road traffic accidents

The traffic accident was defined in the specialized literature (Suciu 1972, 640) as an event produced on public roads, consisting in the collision of two or more vehicles, or of a vehicle with an obstacle, hitting or stepping on pedestrians, etc. resulting in injury to bodily integrity or death of a person, property damage, and traffic jams. As favoring factors of road traffic accidents can be listed: environment (urban or rural), season, day of the week, weather conditions (Buzatu 2013, 157-158).

To begin with, we do not have to confuse on the topic addressed, namely a forensic expertise in road traffic accidents does not only include cars but on the contrary are analyzed among various accidents such as: pedestrian accidents, property destruction, vandalization in the public space of the car, cyclists (and in general the population finding an alternative to agglomerated traffic by traveling with mopeds, skates, etc.), to the abduction of people on the street with the car, at the collision of trams, trains or even a the plane, helicopter with a mass of people and cars (for example, the pilot of an airplane may lose control and land for a motorway, and following this maneuver, it produces an unpleasant event). So, in the field of forensic expertise on road traffic accidents, there are two main branches from which forensic expertise and technical expertise. The two branches were and are applied along the time of

many forensic experts in a meal. From the point of view of law experts, this activity carried out in generations in generations leads to numerous judicial errors and the creation of superficial files that are taken to the judge (Jacetta 2020, 1-4).

To better understanding the two branches, I will look at this aspect, as follows (*Idem*):

- forensic expertise - according to the definition, this activity represents the identification and analysis of traces left by beings, objects, substances found on the spot, of natural or man-made phenomena and disasters (law-dictionary).

We are therefore in the situation of a forensic expert study in the case of a road traffic accident, which is examined in a traditional way by the judicial research body on the resemblance of the damage caused by the car that left the accident site. For example, many investigators consider forensic expertise as the action that makes the distinction between the objects and traces left by the fugitive such as the paint on its car, printed on the harm, or that is not the essence of a forensic expertise. Such an expertise would mean the technical analysis of the created situation, such as the speed with which the car is moving, a rather important aspect in the case file.

Thus, this activity consists in a detailed analysis of the car in question, the traces left by it from the sudden braking action, from small pieces of material left on the road, etc. And all of this is achieved with simulators that determine how the deed was committed. For example, checking a car, leaving traces of tires, is based on the analysis of the judicial photos. Another important aspect is the importance of examining the collision between two or more motor vehicles, towards the correct choice of equipment to be expertise and, in particular, for the determination of the road accident (Jacetta 2020, 1-4).

Thus, the basis for this information will be the creation of the forensic survey by the road traffic system expertise method, crossing the following steps (*Idem*):

- establishment of the state of affairs;
- the route reconstruction of the accident;
- analysis of remaining deformations;
- determining the location where the collision has occurred;
- establishing the relative position between motor vehicles or between the vehicle and the victim (if involved and pedestrians);
- establishment of travel speeds;

In this paper, we will find some of the steps set out above for a more extensive analysis of forensic expertise in the case of road traffic accidents.

Analysis of residual deformations

For this chapter we will treat as it remains according to the fatal impact between two or more vehicles but also in the case of pedestrian impact. Considerately, the fact that road accidents cause material damage that are sometimes minor, sometimes major and statistically speaking most often cause serious medical problems involved (for example, following an accident, some pedestrians end up in a wheelchair, undergo complicated operations in the area of the column, the upper and lower limbs; with mental trauma, etc.) (Ward Smith 1957, 93).

In section, we will analyze paint fragments and traces, metal parts from the car body, physical samples (fibers, hairs, blood, etc.), examination of the samples taken from the site of the car engine, and the list can continue (*Idem*).

Analysis of paint fragmentation and traces left by it

When an accident occurs, even if a pedestrian is also involved, a scratch or deformation, local, car body is created, resulting in small parts of paint that breaks and fall, becoming physical samples, in the case of which is suddening from the scene of the accident, which can

be collected by the forensic experts. For example, we have a road accident involving a motor vehicle and a cyclist, as a result of the impact, the right horn of the bicycle handlebar will scratch the surface of the car body, locally, which will cause the particles and small parts of paint to fall on the asphalt. If the driver of the car escapes from the accident site, these paint fragments will be taken and analyzed in the specialist laboratory, thus determining the model and type of self-test in question. This analysis is performed under microscope under bright lighting conditions (Ward Smith 1957, 95).

The following aspects will be determined by expertise: If the machine paint has been applied correctly, if originally not modified, the type of scratches on its surface (there may be deep or superficial scratches) and last but not least it can be determined whenever the car paint has been applied and how viscous it was. However, it can not be talked about a finality of the expertise, as this paint is carried out following chemical compounds, and chemical examination is required in determining paint layers. The spectrography and diffraction method will therefore include the chemical compounds which have contributed to the formation of the substance, color, its resistance to natural phenomena, etc. This examination finally leads to the long-awaited result, whether it belongs to the car or not, the color and the paint parts on the bodywork or the clothes of the damage (Idem).

Metal parts from the car body

In the case of metal parts found on the spot, we can well say that there are some disadvantages in terms of analysis and determination of their provenance, because these parts can be found so small on the road as to make it impossible to join them and lead to an entire part which is presumed to be missing from the bodywork of the vehicle in question. Of course, not in all cases there are such problems faced by forensic experts, in most cases these pieces can be compatible with the missing part and thus determine if it comes from the car that caused the accident, this analysis is carried out using the spectrography method (Ward Smith 1957, 936).

Compared to the previous examination, in which we specified the way of analyzing the paint, in the case of metal parts, they have to be smaller than the paint parts, so that they can be checked in more detail under the microscope. For the analysis of metal pieces on the fabric, they shall be easily removed by means of a brush. However, in this case more attention must be paid to the handling of the text, because, because of the fabric, these fragments can be lost through the material and the work devolish. The most commonly known metallic materials which are both easy to identify and take are those materials derived from machine wear such as the age of the car by metal corrosion or if the vehicle has been involved in other road accidents in the past and has undergone changes (Idem).

Physical samples taken from the spot

- **Textile fibers.** In this subpoint we are talking about road accidents involving pedestrians. Thus, in this case, analyzing more detail, we notice that at the time of impact, small particles in the victim's clothing will be attached to the vehicle that touched it. For example, if the pedestrian is on the passing of pedestrians and inadvertently the driver of the car hits it at the time of impact there is the possibility that pieces of material remain on the car body. Of course, it is not just about clothing and accessories, let's say the glasses that fall and are not shed by the car's wheel, which is why small pieces of lenses will prick in tires; the purse of a lady who, as a result of the impact, because of the paper skyscracks the car body, say that because the majority of the purses have as chain or grave sheet accessories, which are made of metallic material and have a golden or silver color; and so on. This examination is carried out under the microscope and the type of textile fiber will be determined, the source of origin, the substances which were the basis of textile color

formation, etc. Whether we are talking about technical, chemical, biological data of textile material, these analyzes lead to the end of the same results as in the case of examination of paint or metal parts (Ward Smith 1957, 97).

- **The hairs.** As regards the examination of yarns, they may be framed together with the examination of fibers of material taken from the site. These examinations will determine the origin of the hair, i.e., if it comes from an animal or a human being and the treatment to which it was subjected, when removed from the root, cut, mechanically burned (i.e., due to friction) and the way in which he was previously treated by the victim, whether he was painted, trimmed, washed or not, whether he had split hairs, if there were traces of broth, and the list can continue. An interesting case to specify is the rare case faced by forensic experts, where the hairs analyzed come from someone other than the injured one (Ward Smith 1957, 97).

- **Biological sample – blood.** In addition to the physical, chemical and physico-chemical samples, there is also biological sampling from the scene, so we are talking here about blood and saliva caused by the victim as a result of the impact. I will look at this in general without going into the detail of the nature of the human biology. Biological samples arrive on the car body or on the road or in both combined situations, depending on where and how the impact is carried. For example, if the victim is hit in the chest, because the victim is left without air, he splits the saliva on the car body because involuntarily opens the mouth removing the air accumulated in the lungs as a result of the normal inspiratory-exhalation process. As a result of saliva analysis, it can be included in important biological substances such as blood leading to the identification of the victim. The porbits collected from the car body will be carefully analyzed in the laboratory and can even determine the blood group the victim has (Ward Smith 1957, 97; also see Buzatu 2009, 16-19).

Examination of the on-site samples taken from the engine of the car

Briefly, I will specify how many technical details of sampling the engine of the car, which may lead to the conclusion of the investigation in question, if two or more motor vehicles or a pedestrian vehicle were involved. Therefore, the impact between two cars will be considered to examine the surface of the two vehicles, the engine, in order to find evidence leading to the investigation (hairs, textile fibers, biological traces, etc.). If the investigation is carried out without evidence, it is up to the authorities to identify it. When the offense and the car concerned have been identified, careful consideration shall be given to whether the vehicle has undergone changes from the date of the accident to the date of its identification. If there was clear evidence itself showing that the machine has undergone changes within that time period, it will verify how the modifications made to it are made, and toward the end it remains within the powers of the research organ, to determine the circumstances which led to the deed committed by the defendant (Ward Smith 1957, 99).

Conclusions

The causes of road traffic accidents must not always be related to human error, but also to the mechanical and software errors of the car. We cannot always blame the driver for the accident, because there are many cases where accidents have occurred as a result of a mechanical fault caused when the vehicle is driven. The car has always been a means of public danger, being practically a legal weapon against man, a gun that can be controlled, legally supported and that kills tens, hundreds, thousands of people every day around the world, never banned, confiscated, etc. following statistics from 2012, it has been shown that since the car was manufactured it was the promoter of accidents that occurred day by day. This mechanical failure I speak of relates to the loss of control of the moving car, here we remind you of the vehicle's safety system (brake pads and discs, clutch, incorrect wheel

geometry, damage to the wheel axle, damage to suspension, parking brake, etc.) Another cause of road accidents could come from the tire, due to excessive filling of air causing rubber breakage and car derailment or due to weather conditions, a study showing that these causes are likely to happen at 0,2%. Therefore, in such cases, an examination of the circumstances which led to the accident will be necessary to determine whether the mechanical damage suffered by the car contributed to the unpleasant event (Duboka, 2/10).

Finally, I believe that road safety and behavior can lead to less road accidents and thus only be left with accidents caused by other sources such as the one from the driver. In fact, the major car manufacturers have come to the public with the smarter cars that are designed to ensure safe traffic, but there is still a dilemma as to whether these company solutions are a major percentage of benefit to the society in which we live.

References

- Buzatu, Nicoleta-Elena. 2009. "Investigation of road traffic accidents. Criminalistics aspects and forensic medicine". In *Magazine of students and masters students of the Faculty of Juridical and Administrative Sciences*. Bucharest: Pro Universitaria Publishing House.
- Buzatu, Nicoleta-Elena. 2013. *Forensics*. Bucharest: Pro Universitaria Publishing House.
- Duboka, Cedomir V. "Forensic evidence in road accidents caused by mechanical damage to the vehicle" In *26th JUMV Automotive International Conference: Belgrade, Serbia* volume: JUM-SP-1701 CD-ROM Conference Properties "Automotive Engineering for improved Safety", Vol. 26, No. 1, Paper NMV17SAF13, published in April 2017.
- Jacetta, Simona. 2020. "Forensic expertise and technical expertise in road traffic accidents - present and future." *Academia.edu*.
- Suciu, Camil. 1972. *Forensics*. Bucharest: Didactic and Pedagogical Publishing House.
- Ward Smith, H. 1957. "Physical evidence in the investigation of road accidents." *Criminal Law Journal and Criminology*, volume 48, Northwest University.