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THEORETICAL CONSIDERATIONS OF INTERDISCIPLINARY EXPERTISE IN TRAFFIC

ABSTRACT

Interdisciplinary traffic expertise is being increasingly applied in road traffic. It is not possible to determine whether an accident had been intentionally set up without such expertise. The interdisciplinary expertise is the result of mutual work of several different interdisciplinary experts. The paper analyses the basic characteristics of interdisciplinary investigation of set-up traffic accidents. Special attention has been paid to interdisciplinary expertise of set-up traffic accidents involving injured persons or fatalities.

KEY WORDS

road traffic, investigation, interdisciplinary expertise, set-up traffic accidents

1. INTRODUCTION

The main assumption of interdisciplinary expertise is the knowledge that in case of any traffic accident the natural person driving the vehicle and the passengers in the vehicle form one single unit with the traffic vehicle. For instance, the body of a pedestrian and the body of the person in the traffic vehicle act on each other, and the result are the injuries both of the pedestrians and of the person driving the vehicle, as well as damages to the traffic vehicle.

Interdisciplinary expertise needs to be carried out also in case of fake, that is set-up traffic accidents. In litigations some fake, i.e. rigged traffic accidents have appeared in which drivers make arrangements before the accident occurs, about the way in which they would set up a traffic accident in order to get from the insurance company compensation for the damage. Compensation is paid on the basis of the insurance policy against the third party or the vehicle insurance policy. The staged traffic accidents are mainly those less serious ones, with more or less material damage. In case of greater material damage, the participants are mainly owners of new, expensive and modern automobiles, and one of them usually carries foreign licence plates.

To determine whether a traffic accident has been set up requires extremely complex interdisciplinary expertise and the expert has to have great knowledge and experience. The expertise, namely, should determine whether the accident can be related to unintentional damaging.

The interdisciplinary traffic and toxicological expertise is more and more often present in road traffic. Every legal documentation about a traffic accident at the Magistrates', Municipal, County and Supreme Court contains the Report and the Arbitration on the degree of intoxication and the influence of narcotics or drugs on the persons participating in the traffic accident. *Whether alcohol or some other narcotic had caused the accident or not, that lies in the field of legal profession, i.e. the magistrate, state attorney and private attorney.*

Interdisciplinary traffic and finance expertise occurs in calculating the values of traffic vehicles and calculating the damage done to the vehicles. In order to determine the values of traffic means, the following elements are taken into consideration: the value of the new traffic means, obsolescence of the type, accessories not included in the price of the new transport vehicle, the value of the traffic vehicle according to the age, driving effect (travelled kilometres and operating hours), general condition of the vehicle, number of owners, exploitation method, investment and country of manufacture (origin), demand and supply on the market.

The interdisciplinary traffic and crime investigation expertise is carried out in such a way that the traces found by investigation at the scene of the traffic accident are used in crime investigation analysis to find the traffic accident participant or participant of some other event, who is related to the accident.

Interdisciplinary expertise is the result of mutual work of the traffic and technical experts, forensic experts, toxicology experts, criminology experts and the work with investigating, legal, state attorney and police authorities.

The application of expert knowledge in the field of interdisciplinary expertise in order to implement the

Acts is becoming more intense every day, both in the world, and in our country. The judiciary requirements are such that certain important facts in the court procedure need to be determined and assessed, and a special discipline that studies the applied sciences is called forensic science. The achievements in these sciences are not sufficiently known to the public, and this field of work is not sufficiently covered in literature.

2. BASIC CHARACTERISTICS OF INTERDISCIPLINARY TRAFFIC EXPERTISE OF "SET-UP" TRAFFIC ACCIDENTS

In order to start an interdisciplinary traffic expertise at all it is necessary to carry out the accident investigation. At the request of the investigating authorities, various forensic experts of different professions are present at the investigation of complex and rigged traffic accidents.

Article 4 of the Act on Road Traffic Safety says: "Traffic accident is such an incident on the road which involves at least one moving vehicle and in which at least one person was killed or injured or there is material damage."

Investigation is always carried out when direct observation is necessary in order to determine or clear some important facts in the procedure.

Investigation is a complex and extremely responsible task. The investigation authorities need to gather as much data as possible on the site of the traffic accident, and they need to make an Investigation Report, situation plan of the traffic accident as well as a photo-elaborate, and, if necessary, they need to record the location by video digital camera.

Skills, fast work and thoroughness are the main elements of a high-quality investigation. Possible failures during the investigation of a traffic accident may be professionally eliminated by interdisciplinary expertise. Thus e.g. interdisciplinary traffic expertise has determined precisely that the death of the "co-driver" has not been caused by the traffic accident (set-up accident), but it was the result of some other action.

2.1. On-the-spot investigation plan of the traffic accident

In general, the investigation plan contains as follows:

- securing the scene of the accident,
- report on the measures undertaken during securing,
- operation methodology on the scene of the accident,

- determination of significant indicators for interdisciplinary expertise of the traffic accident,
- planning of the possible accident versions,
- precise determination of the time of the accident,
- determining weather conditions and visibility at the time of the accident,
- identification of the participants in the traffic accident together with vehicles,
- selective determining of the traces at the scene of the accident, and
- determining other data on the scene of the accident.

2.2. Analysis of investigation in case of a "set-up" traffic accident

During the investigation, new facts are introduced on purpose and with a plan, so as to explain those facts which are not quite clear or to confirm certain collected data, which is called *part reconstruction or investigation experiment*.

In order to check the derived facts or to determine the facts which are important to explain the things, the authority leading the procedure may request reconstruction of the accident, so that all the actions or situations have to be repeated under the conditions of the accident itself according to the derived proofs. The presence of experts during the traffic accident reconstruction is very useful, in order to get the best possible Report and Arbitration.

Interdisciplinary expertise needs to check whether the accident can be related, that is, whether it can be conformed with unintentional accident, starting from the assumption that the driver and the vehicle are ready for the drive.

First of all the documentation of the given traffic accident is estimated, and the photos which are relevant for the estimation are reproduced, i.e. blown-up sections of photos need to be developed. Further, it is also necessary to describe the damages done to the vehicles and to reconstruct the position of the vehicles at time of the collision.

After that, the collision speeds of single vehicles participating in the accident are determined. And based on this, the behaviour of each driver during the journey is reconstructed. Furthermore, an attitude is defined regarding the following question, e.g. is the turning off the road an unintentional harmful event, or not.

The interdisciplinary traffic-forensic expertise needs to be done regarding the way which brought about the accident, answering the question whether persons in the vehicles should have been injured or not.

By analysing a great number of "set-up" traffic accidents, the following secondary phenomena can be obtained:

- "Driving forward" due to being overtired, happens more on the roads where a section is straight and then turning into a curve. Thus, when the driver is too tired, the turning off the road occurs at the beginning of the curve, rather than within the curve. The attention at entering the curve does not correspond to the drive forward due to overtiredness.
- "Set-up" traffic accidents happen most often during bad weather conditions, in winter, and poor visibility, and by night from 9 p.m. to 12 p.m.
- Road sections where traffic accidents are set up have several successive curves, and the point where they are set up is between two curves with a distance between them approximately 50 m.
- Speeds are never the cause for skidding off the road. Relatively low speeds in all cases are not convincing for the sections of the roads where traffic accident is set up, because this is an intentionally caused incident.
- The starting vehicle speed in the majority of set-up accidents was within the range of collision speeds, and the braking of at least one of the two vehicles prior to collision is non-existent. Due to low speeds, it would be no problem to stop the vehicle by retarding, so that there would be no reason to turn right off the road.
- According to the type of traffic accident, the set-up ones are: head-on collisions of vehicles, head-on collision of vehicles with one vehicle skidding off the road, head-to-tail collision, head-to-tail collision with one vehicle skidding off the road, and skidding of both vehicles off the road.

- In all the cases the description of the accident given by the participants in the event is presented deliberately and completely wrong.
- After interdisciplinary investigation has been carried out, in the majority of cases the participants admitted that the traffic accident had been set up, and in no cases were there any injuries.
- Based on the interdisciplinary traffic investigation, all doubts regarding the way in which the traffic had been set up can be eliminated, i.e. one may conclude whether the event can be related to an unintentional event, and this can be in turn used by police and legislative authorities in further procedure.

2.3. Graphical examples of several "set-up" traffic accidents

Figure 1 shows 4 collision positions of set-up accidents in road traffic.

3. INTERDISCIPLINARY INVESTIGATION OF "SET-UP" TRAFFIC ACCIDENTS WITH INJURED PERSONS AND FATALITIES

One of the extremes when set-up traffic accidents are concerned is the placing of an injured or even dead person on the accident site, with the cause of injury or death being something completely different, having no connection whatsoever with the given set-up accident.

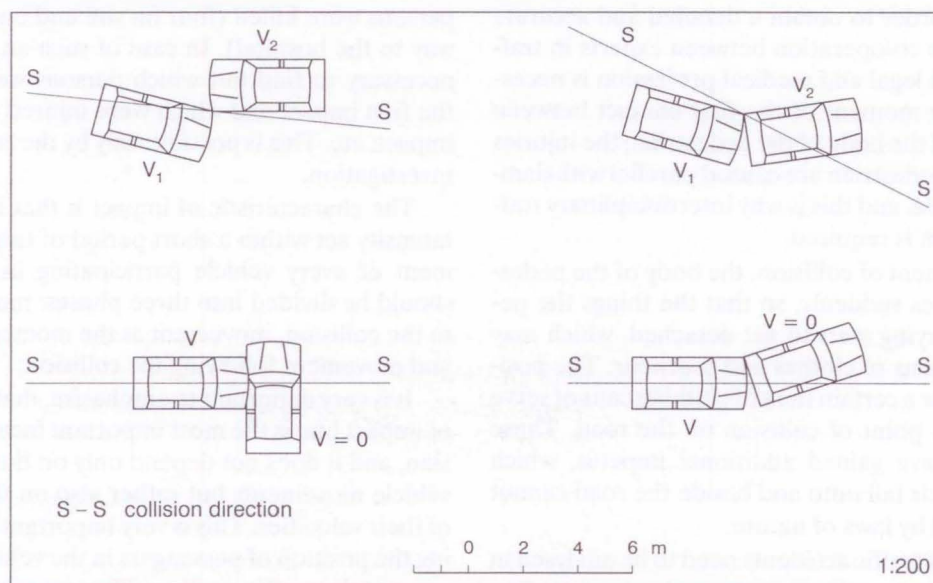


Figure 1 - Four collision positions a, b, c, and d of set-up accidents in road traffic

3.1. Vehicle - pedestrian collision

In case of vehicle-pedestrian collision, pedestrian's clothes (cap, shoes, trousers, scarf) can be found on the site, things carried by the pedestrian (umbrella, bag, stick), traces of pedestrian - base contact caused by the collision with the traffic vehicle (traces of the body, blood and tissue). The methodology of determining traces has to proceed in the direction of the vehicle movement, i.e. the traces on and outside the carriageway have to be found in the direction of the vehicle and forward. On the scene of the accident it is often possible to find traces such as body smears, bloodstains, traces of blood, etc. Also, due to collision, apart from tyre traces one can often find on the scene of the accident, the traces of scraping of parts of the vehicles, paint particles from the vehicle, fragments of glass, broken plastics, dust, soil, mud, traces of spilled liquids, etc.

Interdisciplinary traffic-forensic investigation provides indicators which help identify the drivers involved in hit-and-run accidents.

Example: traffic accident in which two female persons were killed as pedestrians, and the driver ran away in his vehicle from the scene of the accident.

By investigation on site carried out by a traffic and a medical expert it was determined that the safety lock on the boot lid of the passenger car Zastava 850 must have been broken by the impact of the collision of the front end with the pedestrians. By visual examination of the bodies, and the height of the safety lock of the boot lid in relation to the carriageway, it was possible to identify precisely the make of the car that hit the pedestrians. These data were of extreme importance in finding the driver and the vehicle.

Vehicle - pedestrian collision was the mechanical event, and in order to obtain a detailed and accurate arbitration, the co-operation between experts in traffic as well as in legal and medical profession is necessary. From the moment of the first contact between the vehicle and the body of the pedestrian, the injuries caused to the pedestrian are caused parallel with damaging the vehicle, and this is why interdisciplinary traffic investigation is required.

At the moment of collision, the body of the pedestrian accelerates suddenly, so that the things the pedestrian is carrying start to get detached, which may also include items of clothes and footwear. The position of a shoe or a certain item of clothing cannot serve to identify the point of collision on the road. These items could have gained additional impetus, which means that their fall onto and beside the road cannot be determined by laws of nature.

This type of traffic accidents need to be analysed in order to determine the interdependence regarding space and time of the movements of those involved in

the accident, both the vehicle and the pedestrian. It is also necessary to determine the direction and speed of the pedestrian movement. It is very rarely the case that the speed of the pedestrian can be precisely determined. It can be determined interdisciplinary on the basis of the lateral shift of the damage on the vehicle. However, this speed can be determined approximately, and very seldom with certain accuracy. Vehicle - pedestrian collision often happens when the pedestrians move in the opposite direction, usually in case of three or more traffic lanes.

Each traffic accident is a new event, in which interdisciplinary expertise should meet the requirements of a litigation, including: the position of the body of the pedestrian with regard to the vehicle, point of colliding with the pedestrian, driving speeds of the vehicle prior to collision and at the moment of collision, the interval of perceiving the danger on the road, and the possibility of avoiding collision with the pedestrian. Therefore, interdisciplinary traffic investigation is by far the proof of highest quality in litigation.

3.2. Vehicle - vehicle collisions

In vehicle-vehicle collisions, traces are found from the point of collision towards the periphery, having in mind that below layers of mud the vehicle tyre traces at the moment of collision, can be found.

At the scene of the traffic accident the drivers of the vehicles have to be identified immediately. Photos need to be taken of the interior of the vehicle, in order to compare the damage to the vehicle and the injuries of the passengers, and take out from the vehicle mats, rubber coatings from the pedals and shoes of the passengers.

A traffic accident - double collision - in which five persons were killed (four on site and one died on the way to the hospital). In case of such an accident it is necessary to find out which persons were injured at the first impact and which were injured at the second impact, etc. This is possible only by the traffic-forensic investigation.

The characteristic of impact is that forces of high intensity act within a short period of time. The movement of every vehicle participating in the collision should be divided into three phases: movement prior to the collision, movement at the moment of collision and movement following the collision.

It is very important to emphasise, that the direction of impact line is the most important factor in the collision, and it does not depend only on the directions of vehicle movements but rather also on the magnitude of their velocities. This is very important for determining the position of passengers in the vehicle at the moment of the traffic accident. The reconstruction of the accident needs to be carried out as soon as possible,

determining also the direction of vehicle movement at the moment of collision and following the collision.

Apart from determining as correctly as possible the distribution and form of damage inside and outside of the vehicle, all the items that were in contact with the body of the passenger immediately before the collision and at the moment of collision need to be found and taken from the vehicle.

The driver sitting behind the steering wheel in the vehicle is usually safer than the person sitting at his side, if none has fastened their seat-belts. It is possible to determine the position of persons in the vehicle during the drive by means of interdisciplinary traffic-forensic investigation.

3.3. Vehicle skidding off the road

The tyre traces of the vehicle are often present at the scene of a traffic accident, such as traces of driving, braking, rolling, swerving, skidding, and other irregular traces. Vehicles off the road, motorcycles and bicycles need to be photographed additionally from various sides so that their damage is recorded.

In case of skidding off the road, the person sitting behind the steering wheel during the drive needs to be identified. There are cases, when a person admits at the scene of the accident to have driven the vehicle, but when the passenger (co-driver) in the car dies due to the injuries, then the driver changes the statement. It is precisely therefore necessary to identify, if possible, already at the scene of the accident the person steering the vehicle using interdisciplinary investigation.

An example of skidding off the road, i.e. a traffic accident in which the driver alone in the car driving along a straight section skids off the road, under the influence of alcohol, and is killed on site. However, the driver was ejected from the vehicle long before it stopped.

It was determined by interdisciplinary traffic-forensic expertise that, in overturning, the body of the driver was caught by a big rock, throwing the body forwards out of the car. Thus, the body did not stop at the point where the car did.

In the following example, the interdisciplinary traffic investigation determined that the death of the "co-driver" participating in the skid-off accident was not caused by the accident itself. The death was caused elsewhere, thus indicating that the traffic accident was set up. It happened namely, in such a way that the driver placed the body of the co-driver beside the car in the late night hours, previously letting the car a bit down the embankment slope (to make it look as if the car had skidded off the road). The interdisciplinary forensic and traffic investigation showed that in that concrete case the cause of death was murder and not traffic accident.

The interdisciplinary investigation needs to find the answers to the questions of: the speed of the vehicle at the moment when the skidding off the road started, the speed during overturning, and the speed of the vehicle at the moment the driver's (co-driver's) body was ejected from the car. It is also necessary to answer the question regarding the circumstances in which the car would not have skidded off the road. This example, namely, shows what needs to be determined by interdisciplinary investigation.

4. CONCLUSION

Using interdisciplinary traffic expertise, the experts in traffic and forensic profession and based on the knowledge regarding the dynamics of various types of traffic accidents, jointly determine the circumstance which led to the injuries and damages on the vehicle.

After having investigated the accident, all doubts regarding the cause of death may be eliminated by means of interdisciplinary traffic investigation, also identifying the person steering the vehicle during the drive.

Interdisciplinary traffic investigation can provide valuable indicators about the fact whether the traffic accident was intentionally set up or not, thus helping further procedure led by the relevant authorities.

Interdisciplinary traffic - toxicological investigation is used to determine the degree of intoxication and the influence of narcotics or drugs as causes of traffic accidents. However, it is the legal profession which regulates the possible cause of death, if alcohol or some other narcotic is in question.

This paper is just a small segment of a whole series of interdisciplinary investigations which result from co-operation between the traffic experts, forensic experts, toxicology experts, criminology experts and the co-operation with police, investigating authorities, legal authorities, government-solicitor's office and other relevant authorities.

SAŽETAK

TEORIJSKA RAZMATRANJA INTERDISCIPLINARNIH VJEŠTAČENJA U PROMETU

Interdisciplinarno prometno vještačenje sve se više primjenjuje u cestovnom prometu, bez takvog vještačenja nije moguće razotkriti insceniranu prometnu nezgodu. Interdisciplinarna vještačenja su rezultat zajedničkog rada više različitih interdisciplinarnih stručnjaka. U radu su analizirane osnovne značajke interdisciplinarnih vještačenja insceniranih prometnih nesreća. Posebno su obrađena interdisciplinarna vještačenja insceniranih prometnih nesreća sa ozljeđenim i poginulim osobama.

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