

# Illustration of Typical Situations of Fatal Traffic Accidents Involving Cyclists Within the Territory of the City of Belgrade

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**Abstract:** This paper analysed traffic accidents involving cyclists that occurred within the territory of the City of Belgrade, based on traffic technical forensics case files, over the period from 2009 to 2013. Within the analysed sample, identified and illustrated are typical situations in which there are fatal injuries of cyclists in traffic.

**Key words:** road safety, traffic accidents, safety of cyclists, belgrade, typical situations.

## INTRODUCTION

With significant increase of the use of motor vehicles and their contribution to serious environmental, economic and health problems led to increased interest in promotion of cycling as an alternative mode of transport, which has been greatly expanding of late. Increased popularity of the bicycle is also influenced by the fact that this mode of transport is very cheap, and poor economic conditions and increasing price of fuel stimulates the lower income population to use the bicycle more often (1).

Increased use of the bicycle resulted in cyclists' safety in traffic becoming a more prominent problem. Cyclists are the most vulnerable participants in traffic, and that vulnerability is from one side attributed to insufficient protection compared to other participants in the traffic (lack of adequate and suitable traffic infrastructure, busy existing traffic infrastructure, improper education, etc.), and from the other side to specific characteristics of cyclists behaviour (2).

The size of the problem in cycling traffic is illustrated by the fact that during 2013 there were 1633 traffic accidents involving cyclists in the Republic of Serbia, which is 8.5% of the total number of traffic accidents. Percentage of killed cyclists was 9.1% of the total number of fatalities in traffic accidents, while the percentage of injured cyclists was 8.5% of the total number of injuries in traffic accidents (3).

Various researches conducted in the Republic of Serbia (2) show that cyclists over the age of 60 are the most vulnerable and make 43.5% of the fatalities. As much as 30.4% of the killed cyclists died during low (night) visibility (most of the accidents happened

from 19:00 to 20:00 hours – 57.1%), while 43.5% traffic accidents with fatalities happened on local roads and streets.

Lately, increasing number of researches deals with the issue of vulnerability of cyclists in traffic. In order to manage the state of traffic safety, the first step is to establish the current state of play, which can be only performed if we observe both phenomenological and etiological aspects. Occurrence of fatal injuries of cyclists in traffic are established through phenomenological analysis, while the real causes of fatal injuries and specifics of traffic accidents involving cyclists are established through etiological analysis. In this way, and in order to improve the safety of cyclists in traffic, it is possible to define measures that correspond both to occurrences and specific causes of traffic accidents involving cyclists (4).

Bearing this in mind, as well as the importance of this issue, this paper analysed traffic accidents involving cyclists based on traffic technical forensics case files, over the period from 2009 to 2013, where within the analysed sample, identified and illustrated are typical situations in which there are injuries of cyclists in traffic in the City of Belgrade.

## ILLUSTRATION OF TYPICAL SITUATIONS WITH INJURIES OF CYCLISTS

The paper illustrates typical situations where injuries of cyclists occur in traffic in the City of Belgrade, based on forensic expert evaluation of traffic accidents involving cyclists, which were a subject of the Traffic Forensic Technical Committee of the Institute of the Faculty

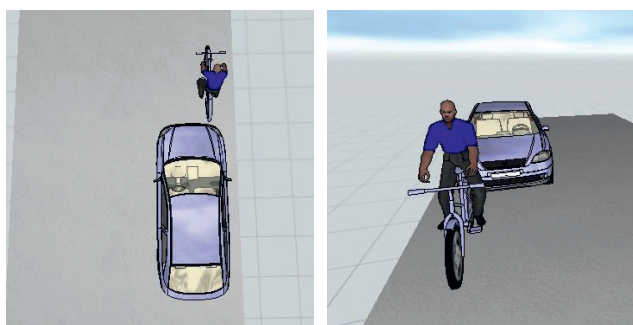
of Traffic in Belgrade over a five-year time period, from 2009 to 2013.

Based on the results of this analysis, which points out characteristics and mechanisms how traffic accidents with killed cyclists occurred, it is possible, in the best possible way, to define measures to avoid traffic accidents involving cyclists and by that increase the level of safety of this vulnerable category of participants in traffic.

#### Typical situation 1:

##### Other vehicle catching up with the cyclists

**Circumstances:** The most frequent case of fatal injuries of cyclists in traffic in the City of Belgrade is the case when another vehicle catches up with the bicycle. In most cases this situation occurs in conditions of low (night) visibility, i.e. on roads with poor lighting when the driver of a motor vehicle did not see the cyclist on time.

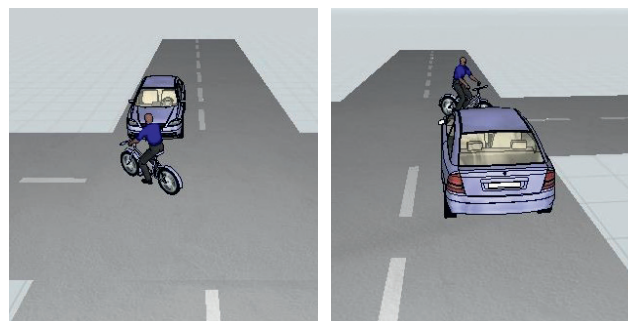


Picture 1. Illustration of a typical situation 1

**Problem:** In the situation above (Picture No. 1) the cyclist is moving along the right side of the road, in 83.3% cases, in low visibility (night) conditions riding an unlit bicycle. For drivers an unlit cyclist presents a sudden and unexpected obstacle on the road. That is why Article 81, Item 5 of the Law on Road Traffic Safety prescribes in detail the manner of marking cyclists during night and low visibility conditions on the road. By disobeying the traffic rules, the cyclist endangers himself, but also others because the driver is unable to see him on time, and therefore is unable to react sooner and avoid the accident. The main problems in this situation that led to the accident are most frequently disrespecting the traffic rules prescribed by the Law on Road Traffic Safety by cyclists and driver spotting the cyclist too late. Considering the situation, the possibility to avoid the accident is very small.

#### Typical situation 2: The cyclists is turning left across the trajectory of the incoming vehicle

**Circumstances:** Second most frequent case of fatal injuries of cyclists in traffic in the City of Belgrade is the case when the cyclist driving through a junction turns left across the trajectory of an incoming vehicle, coming from the opposite direction.

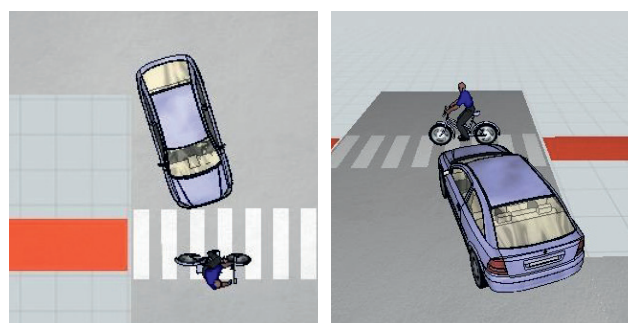


Picture 2. Illustration of a typical situation 2

**Problem:** In the situation shown in Picture No. 2, the cyclist is moving along the central line on the road and turns left in the junction across the trajectory of the incoming motor vehicle. The main problem in this situation is denying the right of way to the motor vehicle coming from the opposite direction. The cyclist could, by simply observing the road before making the turn see if the turn can be done safely and give up on the turn and give way to the incoming vehicle and avoid the dangerous situation and the traffic accident. By reckless behaviour the cyclist endangers himself and others. In this situation there is no low visibility at the site of the accidents, i.e. the accidents happened in conditions of daytime visibility.

#### Typical situation 3: Hitting the cyclist at the pedestrian crossing during a turn across the cycling track

**Circumstances:** In this situation (Picture No. 3) the driver of the motor vehicle during a right turn at a junction cuts across the cycling track and knocks down the cyclist who was riding on the pedestrian crossing, i.e. the cycling track crossing over the road.



Picture 3. Illustration of a typical situation 3

**Problem:** The main problems that lead to the accident are most commonly insufficient attention of the driver to other participants in traffic, i.e. disobeying the rules by the driver who does not stop at the cycling track on the road in order to give way to the cyclist, poor visibility of the cyclists due to physical characteristics, as well as insufficient attention to the forward area of his movement.

The Article 99 of the Law on Road Traffic Safety

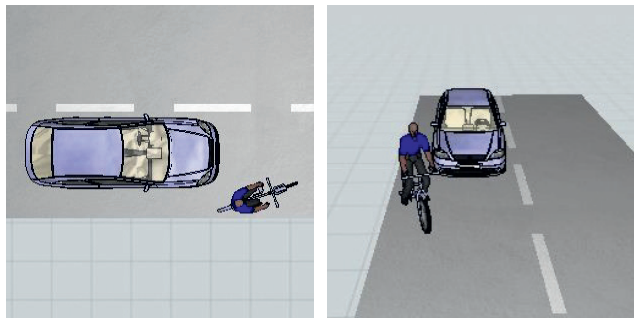
prescribes that if the traffic on the pedestrian crossing is not regulated by traffic lights or police officers, the driver must adjust the speed of the vehicle so that in any situation he spots or might have a reason to foresee he could safely stop the vehicle in front the pedestrian crossing and give way to the pedestrian who has already stepped or is stepping on the pedestrian crossing or demonstrates intention that he would step onto the pedestrian crossing. On the other hand, this Law prescribes that if the traffic at the pedestrian crossing is regulated by traffic lights or a police officer, the driver must, if by any such signal is allowed to drive over such crossing, give way to the pedestrian who has already stepped on the crossing or demonstrates intention to step on the crossing if that pedestrian was given permission to cross by a traffic sign or by a police officer. This article of the Law on Road Traffic Safety refers also to the crossing of cyclists across the road at the pedestrian crossing, i.e. cycling track crossing over the road.

Presence of a pedestrian crossing, i.e. cycling track crossing over the road can to some extent give confidence to a cyclist, i.e. the cyclist in such situation can behave more freely and carelessly due to the fact that he is located on a pedestrian crossing, i.e. a cycling track crossing.

In this situation there is no low visibility at the site of the accidents, i.e. the accidents happened in conditions of daytime visibility.

#### Typical situation 4: Collisions during parallel driving

**Circumstances:** Fourth most frequent case with fatal injuries of cyclists in traffic within the territory of the City of Belgrade is the case when a cyclist makes a sudden parallel turn to the left in front of or near an incoming vehicle.



Picture 4. Illustration of a typical situation 4

**Problem:** In the situation shown in Picture No. 4, the cyclist moves along the right hand side of the road, and then makes a sudden turn to the left in front and close to the incoming vehicle, without first making sure whether it is possible to make a safe turn, i.e. without previously informing other participants in traffic on his intentions. With his reckless behaviour the cyclist endangers himself because the driver has

no special reason to expect a sudden change of direction by the cyclist, and with that the driver in this suddenly occurred dangerous situation does not have enough time to react adequately and avoid the danger and traffic accident.

The main problem in this situation that leads to the accident is reckless behaviour of the cyclist, i.e. the cyclist failing to look back and observe the traffic, to indicate his intention to turn, to monitor and recognize the danger on the road on time and respond adequately (e.g. open car doors, potholes, works on the road, etc.). We cannot exclude that there is a possibility that the cyclist cannot hear the motor vehicle closing in due to use of headphones.

In this situation there is no low visibility at the site of the accidents, i.e. the accidents happened in conditions of daytime visibility.

#### Typical situation 5: Illegal or irregular overtaking and driving around when there is a cyclist coming from the opposite direction

**Circumstance:** Fifth most frequent case with fatal injuries of cyclists in traffic in the City of Belgrade is the case when the driver of a motor vehicle overtakes another motor vehicle and then there is a conflict with a cyclist coming from the opposite direction.



Picture 5. Illustration of a typical situation 5

**Problem:** This is the situation (Picture No. 5) in which the driver of a motor vehicle overtakes another motor vehicle and then there is a conflict with a cyclist coming from the opposite direction. Considering the fact that this is illegal or irregular overtaking, which very often involves speeding, a frequent cause of the most serious traffic accidents, Article 55 of the Law on Road Traffic Safety defines when it is allowed to overtake or go around with certain places and situations where it is forbidden to do such activities. In both cases the accident happened in the low (night) visibility conditions so we cannot rule out that the driver of the motor vehicle could not see the cyclists, if the cyclist was riding an unlit bicycle. The main problems leading to an accident are disobeying the traffic rules prescribed in the Law on Road Traffic Safety by drivers of motor vehicles, who in this way endanger themselves and others, as well as the inability of the driver of the motor vehicle to see the cyclist.

## CONCLUSION

Increased use of the bicycle resulted in cyclist safety in traffic becoming a more prominent problem. Cyclists are a vulnerable group of participants in traffic. Although traffic accidents involving cyclist are a small percentage of the total number of traffic accidents, when comparing the total number of vehicles and cyclists in traffic this percentage is very prominent and the consequences of such traffic accidents are often very severe.

The aim of this paper was to point out the dangers from disobeying the regulations by cyclists, especially dangerous situations in traffic that can result in case there are no lights on the bicycle in low (night) visibility, as well as when a cyclists turns left in front or near the incoming vehicle.

With the illustration and analysis of typical situations with fatal injuries of cyclists, the safety of this vulnerable category of participants in traffic can be influenced by using standard and systematic measures. By using preventive, educational, technical, regulatory, but also repressive measures we can provide safer and more secure traffic, which will directly decrease the number of traffic accidents and their severity.

Implementing measures to improve safety of cyclists, i.e. participants in traffic would initiate continuing research on a sample of findings and opinions, based on which it would be possible to monitor the implemented measures, but also taking preventive measures in order to improve the safety of cyclists in Belgrade.

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