Research Article

Krzysztof Olejnik*

Study of the population in terms of knowledge about the distance between vehicles in motion

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Summary: When using vehicles on the road, road users are exposed to accidents. The human factor contributes greatly to their occurrence. The article presents pilot studies on the state of knowledge of drivers referring to maintaining the necessary distance behind the preceding vehicle in road traffic. The state of knowledge governing applicable law in the field of distance between vehicles was also examined. They were carried out by a group of employees using road transport and students. Even with the new technical devices which determine distance, in addition to the lack of knowledge of drivers in the discussed area, dangers of hitting a preceding vehicle in extreme situations still exist. These are activities in the area of the active safety system in the operation of vehicles in road traffic. The conclusions indicate the need to conduct management training and to amend the provisions in the applicable road traffic law.

Keywords: vehicle operation, distance between vehicles, testing driver behavior, active safety

1 Introduction

The extraordinary ease of crossing national borders means that in the European Union (EU) there is a large proportion of foreigners on the roads. Poland is part of the European Union. The knowledge and skills of Polish citizens who are driving, as well as the knowledge and skills of citizens of other EU countries driving, affect the road safety system. Research and analysis of the Polish driving population will determine whether it is sufficient. Also, if the regulations are correctly formulated, clear, understandable and do not contribute to the occurrence of accidents. This applies to residents of a given country as well as foreigners staying in that country who travel in their own cars. Therefore, it is important to understand the behavior of drivers? automobile operators? in the investigated scope of proceedings and their knowledge of regulations, because it concerns a country that is part of the EU.

The next step should be to carry out similar studies in other EU Member States. Conducting pilot studies will allow for a preliminary assessment of the condition and (if necessary) to make a decision on conducting in-depth tests. Then consider making changes if these studies improve the safety of road users.

The thesis is as follows: drivers driving behind the vehicle ahead are not aware of what distance values should be observed in accordance with their regulations. They also cannot estimate this distance in traffic conditions.

The scope of the research was limited to pilot studies (a selected group from the population of traffic participants), in the area concerning maintaining distance between vehicles. The subject of the study is the population of drivers involved in traffic on EU roads. The subject of the research is the knowledge of the drivers regarding the applicable regulations on maintaining an appropriate distance and the knowledge of what distance value should be kept due to the security system. The provisions in force in Poland [1] are based on the Vienna Convention of 1968 on road traffic [2].

The car collision on a preceding vehicle, moving in a stream of vehicles, according to police statistics is a common cause of collisions and accidents. What impact does it have: maintaining the right distance, knowledge of the drivers, what has been written in road traffic regulations, and what is the practice of road users? Answers to these questions will allow one to consider possible changes in the safety system of road users. Preliminary assessment from traffic observations show that the distances between the vehicles in many cases are too small. Does it cause risk for an accident every time? These questions were the basis for addressing this problem and, as a result, conducting a pilot study, which was intended to be limited but would allow initial recognition of the topic.

The dilemma zone at the intersection, and distances too small between vehicles (which contribute to accidents), were discussed in publications [3–6]. The existence of the problem for drivers was shown. However, the publications did not refer to the law applicable to road users in this
Figure 1: Keeping the distance behind the preceding vehicle braking rapidly where:

\[ S_{rk} \] – distance traveled during the driver’s reaction,
\[ S_{ZAPAS} \] – a path resulting from time,
\[ S_{nh} \] – distance traveled during braking force build-up,
\[ S_h \] – distance traveled during braking,
\[ S_{z1} \] – road of a collision-free stop of the car No. 1

In addition, the impact of their clarity, precision and application and compliance on the security system has not been assessed. The provisions of law in force in Poland, based on the Vienna Convention on Road Traffic, are very vague [1, 2].

There is always a risk of collision or accident when using vehicles in traffic. The human factor, due to the mistakes made, is decisive here [2, 6, 7]. The correct formulation of traffic regulations, which are a kind of operating procedure, has a great impact on the safety system in car operation. One of the elements that influences the collision-free maintenance of vehicles is the regulation of rules for maintaining a sufficiently large distance between moving vehicles [6]. Maintaining a sufficiently large distance between vehicles involved in road traffic (Figure 1) in the event of sudden braking, of the car preceding and following it, helps to avoid a collision or accident [2, 6, 7].

In extreme situations, too small a distance between the vehicles may end in a collision on the road. It is extremely dangerous when a collision occurs in a tunnel. The limited space of the tunnel hinders the rescue operation and intensifies the negative effects of such an accident. Tunnels have increased security systems. Knowledge of the values of necessary minimum distances and the ability to correctly determine and maintain a basic condition of the safety system in the operation of vehicles. Observations of traffic participants’ behavior on the road indicate that there are many reservations to their correctness. In order to obtain initial information about the state of the drivers’ knowledge on the subject of maintaining the necessary minimum distance behind the vehicle ahead, pilot studies were planned and carried out.

The aim of the research is to obtain information on the knowledge of drivers (on a selected topic of the applicable law) in the distance between vehicles in road traffic. In addition, the purpose is also to examine the knowledge of the driver population regarding their behavior of the actual distance between vehicles at different vehicle speed values.

The proposed pilot study aimed at assessing the importance of the problem and possibly justifying the need for further in-depth research. They would constitute the basis for requesting a change in the law in order to reduce the hazards caused by vehicles. Vast technological advances and rapid development of devices are the solutions that support vehicles in this respect. The law should specify a framework that takes into account studies conducted by drivers who use vehicles in road traffic. This issue is not discussed in publications. In the scope under consideration, the following are not analyzed: knowledge of regulations by (authorities or drivers?), their application and compliance. There were no analyzes assessing existing provisions regarding the distance between vehicles and indicating the need for changes.

2 Analysis of records in applicable law

The basic legal act regulating and affecting the safety system in the operation of vehicles is the Road Traffic Act of 20 June 1997 (Journal of Laws 1997 No. 98, item 602 – as amended) [1] based on the Vienna Convention on Road Traffic [2]. Among other things, it defines the rules on road traffic applicable to its participants also in the scope of their use considered here. Provisions regarding the spacing between vehicles are included in art. 19 of the Act. The key recommendations are in paragraph 2 and 4 art. 19. In paragraph 2 point 3): “The driver is obliged to maintain the distance necessary to avoid a collision in the event of braking or stopping the preceding vehicle”. However, there are no detailed, precise guidelines for the driver, how to behave and what distance to keep. In paragraph 4 item 1) and 2) of the Act, it is saved “Outside built-up areas in tunnels of more than 500 m in length, the driver is obliged to maintain a distance from the preceding vehicle not less than:

1) 50 m – if he drives a vehicle with a maximum permissible weight not exceeding 3.5 Mg or a bus;
2) 80 m - if he manages a vehicle combination or a vehicle not listed in item 1”.

This record, only for a specific case, specifies the distance value – in a very long tunnel. Thus, in ordinary situations (except for the mentioned) drivers do not have specified precise distances between vehicles.

The analysis shows that devices for determining the distance between vehicles are available for sale. In addition,
car manufacturers introduce Adaptive Cruise Control (ACC) – devices supporting the driver in automatically maintaining the speed value and the necessary minimum distance behind the vehicle ahead. There are various detailed solutions for these devices [8].

Among others, they provide for the possibility of selecting and setting the preferred distance by the driver, e.g.: ‘far’, ‘medium’, ‘near’ (Figure 2). They support the driver in extreme situations, e.g. sudden braking of the car ahead. However, it is the driver who has to decide what distance should be selected and set in the device supporting it. In the event of a collision or accident, the authorities are entrusted with the decision whether the distance between the vehicles was too short and this caused the occurrence of the collision, regardless of whether the driver used the automatic assistance or independently maintained the distance behind the vehicle ahead.

3 Survey – research method

The research method is based on a statistical pilot study of drivers’ knowledge on a sample of a group of road users selected from the population using an anonymous survey. The group subjected to the study consisted for the most part of experienced drivers with a long driving experience and young drivers (students of technical universities) who relatively recently obtained the right to drive. It was assumed that the examined sample consists of better educated and more aware participants in relation to a representative sample of the assessed population. This assumption was taken into account in the final conclusions.

The obtained test results are presented in tabular form. Respondents’ answers in many extreme cases differed by three orders of magnitude. It was considered that presenting them on the charts would be illegible for inference. To obtain full clarity and reliability of the study, a questionnaire developed for the needs of this statistical pilot study was presented.

An anonymous survey was prepared (Table 1). Statistical research was conducted in a group of 160 participants. They were students and employees related to transportation. The group participating in the survey consists largely of educated young people – 70% of respondents who have recently obtained a driving license. They have undergone training and their outlook should be better than a representative sample for the population. The other part of the group were people working in transportation with extensive experience in driving – 30% of respondents.

The aim of the research is to learn about the features of the population in the discussed area. The above considerations and observations led to the formulation of the following research questions:

1. Do drivers know their applicable law regarding the maintenance of an adequate (minimum) distance when following the vehicle ahead?
2. Does the driver know what distance to keep behind the vehicle ahead?

The subject of the study is the population of drivers driving on public roads. The subject of the research is:
the state of knowledge, knowledge of regulations and their application in the studied population, including drivers.

The method of statistical research of a selected group from the population was surveyed. To obtain answers to these questions, an anonymous questionnaire was developed and pilot studies (preliminary, due to cost and time) were carried out on a narrow group of traffic participants. The results of these tests are to determine how the drivers of cars behave in the sample. In addition, they will answer the question: what is their state of knowledge, is there a need for in-depth research and what further actions should be taken. A view (Table 1) of the developed anonymous survey form has been posted. Points 1 and 2 of this survey are questions covering information contained in art. 19 paragraph 2 of the Act on Road Traffic [1] and actual knowledge about the necessary distances behind the previous vehicle.

In the relevant applicable regulations, we will not find the answer: accurate, precise, containing distance values for different speeds. The driver is to keep the distance necessary to avoid a collision, but how much is not specified. And if the car used was equipped with a device to maintain a constant distance behind the vehicle ahead, can we trust it?

Table 1: Form of the survey

Survey – anonymous 2020

| I have a driving license / I do not have a driving license |
|------------------------------------------------------------|

1. To avoid a collision or collision accident, keep the minimum distance following the vehicle ahead at the following speeds:

| L.p. | V [km/h] | S [m] – distance from the preceding vehicle | h. | Mark X the right reply |
|------|----------|-------------------------------------------|----|------------------------|
|      |          |                                           | I know | I guess | I don’t know |
| a.   | 50       |                                           |     |          |             |
| b.   | 60       |                                           |     |          |             |
| c.   | 70       |                                           |     |          |             |
| d.   | 90       |                                           |     |          |             |
| e.   | 100      |                                           |     |          |             |
| f.   | 110      |                                           |     |          |             |
| g.   | 140      |                                           |     |          |             |

2. Do the above values comply with the applicable regulations (mark X the correct answer)?

| I don’t know | Yes | No |
|--------------|-----|----|

3. What minimum distance should be kept behind the vehicle ahead in a tunnel with a length of more than 500 m in a unbuild-up area when driving:

j. – By car with a maximum permissible weight of up to 3.5 t or by bus: ........ m

k. – In other cases: ........ m

l. – Mark X the correct answer

| I know | I guess | I don’t know |
|--------|---------|-------------|

4. Do the above values comply with the applicable regulations (mark X the correct answer)?

| I don’t know | Yes | No |
|--------------|-----|----|
Points 3 and 4 of the survey are questions covering precise information contained in art. 19 paragraph 4 of the Act and the manager’s practical knowledge. In this case, the legislator precisely sets the minimum values for the distance to the vehicle ahead. For this instance, the provision distinguishes two groups of vehicles. For individual groups of these vehicles, precise minimum distances in the stream were determined and given: 50 m and 80 m. The legislator is not interested in how the driver is to determine these specific values by driving in a tunnel. This is a separate problem that needs to be resolved. The results of the survey will enable knowledge of the law to be acquired in the area in question (distance between vehicles). They will also show the state of practical information for drivers in respect of keeping their distance behind the vehicle in real traffic conditions when using vehicles on public roads.

Among 160 respondents, 11 of them declared that they did not have a driving license. The answers of these people were omitted in further considerations. 149 questionnaires were analyzed. Intervals between vehicles declared by respondents are summarized in the tables. Items 1.a ÷ 1.g relate to the speed values indicated in the survey. Then, in the tables, items 3.j and 3.k, the distances declared by the respondents collectively declared between the vehicles while driving in the tunnel are presented. Declarations regarding knowledge of the law and compliance of responses with applicable law, were collected and summarized in the tables, items: 1.h, 2, 3.l, 4. A large spread was observed in the declared distances between vehicles (from 1.0 m to 1000.0 m). It was considered that the presentation of the results obtained in the charts would be illegible. The answers are presented in tabular form. Including the obtained research results in the article gives the opportunity to evaluate, verify the observations and draw individual conclusions.

4 Test results

Distances declared when driving at different speeds in the stream

| N [pcs.] | Number of replies submitted | Scheme for presenting the results |
|----------|-----------------------------|----------------------------------|
| S [m]    | Declared distance – distance between vehicles |

1. a) – Answers for \( V = 50 \text{ km/h} \), vehicles driving one after the other

| N [pcs.] | 5 | 5 | 4 | 26 | 3 | 28 | 10 | 20 | 11 |
|----------|---|---|---|----|---|----|----|----|----|
| S [m]    | 1 | 2 | 3 | 5  | 8 | 10 | 15 | 20 | 25 |

2. b) – Answers for \( V = 60 \text{ km/h} \), vehicles driving one after the other

| N [pcs.] | 1 | 1 | 1 | 4 | 5 | 10 | 6 | 2 | 11 | 14 | 17 | 5 | 23 | 2 | 3 | 7 | 9 |
|----------|---|---|---|---|---|----|---|---|----|----|----|---|----|---|---|---|---|
| S [m]    | 1 | 2 | 3 | 4 | 5 | 6  | 7 | 8 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 50 | 60 |

3. c) – Answers for \( V = 70 \text{ km/h} \), vehicles driving one after the other

| N [pcs.] | 2 | 1 | 4 | 1 | 4 | 9 | 4 | 5 | 6 | 6 | 9 | 12 | 2 | 11 | 7 | 9 |
|----------|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|
| S [m]    | 1 | 2 | 3 | 4 | 8 | 9 | 10 | 12 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |

4. d) – Answers for \( V = 80 \text{ km/h} \), vehicles driving one after the other

| N [pcs.] | 5 | 6 | 1 | 8 | 5 | 5 | 4 | 6 | 1 | 1 | 1 | 2 | 2 | 12 |
|----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S [m]    | 60 | 70 | 75 | 80 | 90 | 100 | 120 | 180 | 200 | 400 | 250 | 500 | lack |
### 1.d) – Answers for $V = 90 \text{ km/h}$, vehicles driving one after the other

| N [pcs.] | 1 | 3 | 2 | 2 | 4 | 9 | 4 | 5 | 6 | 6 | 9 | 12 | 2 | 11 | 7 |
|----------|---|---|---|---|---|---|---|---|---|---|---|----|---|----|---|
| S [m]    | 1 | 3 | 4 | 5 | 8 | 9 | 10 | 12 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |

| N [pcs.] | 9 | 5 | 6 | 1 | 8 | 5 | 5 | 4 | 6 | 1 | 2 | 2 | 2 | 12 |
|----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S [m]    | 50 | 60 | 70 | 75 | 80 | 90 | 100 | 120 | 180 | 200 | 250 | 500 | lack |

### 1.e) – Answers for $V = 100 \text{ km/h}$, vehicles driving one after the other

| N [pcs.] | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 2 | 11 | 9 | 17 | 6 | 11 | 13 | 8 | 1 |
|----------|---|---|---|---|---|---|---|---|----|---|----|---|----|---|---|---|
| S [m]    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |

| N [pcs.] | 9 | 6 | 9 | 3 | 2 | 2 | 1 | 6 | 2 | 1 | 1 | 1 | 19 |
|----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S [m]    | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 200 | 400 | 500 | lack |

### 1.f) – Answers for $V = 110 \text{ km/h}$, vehicles driving one after the other

| N [pcs.] | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 11 | 9 | 5 | 1 | 4 | 4 | 3 | 5 | 7 | 6 |
|----------|---|---|---|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|
| S [m]    | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 50 | 55 | 60 |

| N [pcs.] | 5 | 10 | 4 | 11 | 10 | 5 | 11 | 3 | 2 | 1 | 1 | 1 | 21 |
|----------|---|----|---|-----|-----|---|-----|---|---|---|---|---|---|---|
| S [m]    | 70 | 80 | 90 | 100 | 120 | 150 | 200 | 300 | 350 | 500 | 800 | lack |

### 1.g) – Answers for $V = 140 \text{ km/h}$, vehicles driving one after the other

| N [pcs.] | 1 | 8 | 2 | 13 | 11 | 11 | 1 | 5 | 1 | 3 | 1 | 11 | 1 | 4 |
|----------|---|---|---|----|----|----|---|---|---|---|---|----|---|---|
| S [m]    | 1 | 2 | 5 | 7 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |

| N [pcs.] | 10 | 7 | 2 | 24 | 11 | 7 | 2 | 7 | 3 | 4 | 1 | 1 | 12 |
|----------|----|---|---|----|----|---|---|---|---|---|---|---|---|---|
| S [m]    | 70 | 80 | 90 | 100 | 150 | 200 | 250 | 300 | 400 | 500 | 1000 | lack |

### Distances declared when driving in the tunnel for selected vehicles

#### 3.j) – Tunnel responses for vehicles up to $3.5 \text{ Mg GVW}$ and buses

| N [pcs.] | 1 | 3 | 7 | 17 | 8 | 10 | 4 | 5 | 2 | 37 | 4 |
|----------|---|---|---|----|---|----|---|---|---|----|---|
| S [m]    | 1 | 3 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |

| N [pcs.] | 3 | 26 | 3 | 3 | 2 | 1 | 2 | 1 | 10 |
|----------|---|----|---|---|---|---|---|---|---|
| S [m]    | 80 | 100 | 150 | 200 | 250 | 300 | 500 | 900 | 1000 |

#### 3.k) – Tunnel responses for vehicles other than: up to $3.5 \text{ Mg DMC}$ and total buses (DMC) and buses

| N [pcs.] | 1 | 2 | 9 | 4 | 1 | 13 | 12 | 7 | 7 | 9 | 3 | 22 | 1 | 4 | 5 |
|----------|---|---|---|---|---|----|----|---|---|---|---|----|---|---|---|
| S [m]    | 1 | 2 | 5 | 8 | 9 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 50 | 60 | 70 | 75 |

| N [pcs.] | 0 | 1 | 13 | 2 | 4 | 8 | 3 | 1 | 1 | 1 | 1 | 15 |
|----------|---|---|----|---|---|---|---|---|---|---|---|---|
| S [m]    | 80 | 90 | 100 | 130 | 150 | 200 | 250 | 300 | 600 | 1000 | lack |
Declaration of knowledge of the respondent

1.h) – Declaration of the respondent’s knowledge - the necessary distance depending on their speed

| Question number | Number of replies provided [pcs] |
|-----------------|----------------------------------|
|                 | I know | I’m guessing | I don’t know |
| 1               | 11     | 115          | 23           |

It should be noted that in the applicable law there is no precise provision obliging the drivers to explicit behavior of maintaining a minimum distance while driving one after the other in a stream of vehicles. The vast majority of 115 people declared that they were guessing by providing the distance between vehicles for different values of their speed. A dozen or so answers were accidentally accurate, but guessing. Among the eleven “I know” declarations were three incorrectly given distances. Respondents answering “I don’t know”, however, answered and declared the values of the distance to the preceding vehicle. The answers show that the spread of the declared values is huge, it covers three orders of magnitude. There are surprisingly few correct answers.

2) – Declaration of knowledge as to whether the answer complies with applicable law depending on the car’s speed value

| Question number | Number of replies provided [pcs] |
|-----------------|----------------------------------|
|                 | I don’t know | Yes | No |
| 2               | 123          | 19  | 7  |

The vast majority of respondents, 123 people declared that they do not know if the values of the distance between vehicles given by them comply with applicable law. The legislator did not provide the value of the distance between vehicles in force in traffic for different speed values in the stream of vehicles. Among 19 respondents declaring “Yes”, 9 answers were incorrect. The answers obtained at this point to the great ignorance of car drivers in the field of their respective traffic laws.

The respondents answered “No” in this point, however, they provided answers and declared the values of the distance to the preceding vehicle as if they were aware of non-compliance with applicable law. They declared as if they knew that they had given values other than required by law.

3.l) – Declaration of the respondent’s knowledge of the necessary distance when driving in a tunnel depending on the vehicle category

| Question number | Number of replies provided [pcs] |
|-----------------|----------------------------------|
|                 | I know | I’m guessing | I don’t know |
| 3               | 7      | 121          | 21           |

Precise records regarding distance values oblige drivers to explicit behavior only when driving in very long tunnels. The vast majority of 121 respondents declared that they were guessing by giving the value of the distance between vehicles in force in the tunnel. Dozens of respondents (21) answered “I don’t know”. At the same time, despite this they gave answers and declared the values of the distance to the preceding vehicle. Among seven people declaring “I know”, however, five of them gave wrong answers, not as written in the applicable traffic law. The law in this one particular case establishes unequivocal, precise, measurable distance values between vehicles. Knowledge in the group of respondents in the vast majority is definitely insufficient.

4) – Declaration of the respondent’s knowledge of compliance with the driving license provision in tunnel

| Question number | Number of replies provided [pcs] |
|-----------------|----------------------------------|
|                 | I don’t know | Yes | No |
| 4               | 132          | 11  | 6  |

The vast majority of respondents, 132 people declared that they did not know if the values of the distance between vehicles they provided were in accordance with applicable law, which was precise for this particular situation. This proves that we are dealing with a huge ignorance of the applicable provisions of people in the group of respondents. Out of 11 people declaring “Yes”, 7 were wrong. The respondents (six people) that answered “No”, however, answered and declared the distance to the vehicle ahead as if they were knowingly inconsistent with applicable law. They declared as if they knew that they were providing values other than required by law. The majority of respondents confirm that they do not know the law in the scope analyzed during the survey.
5 Analysis of test results

Respondents’ answers (from items 1.a to 1.g) show a huge array of declared values of the distance between vehicles during their use in road traffic. The law is very general in this respect – “is obliged to maintain the distance necessary to avoid a collision”. Too small a distance between vehicles is declared by a significant part of the studied population, both at low and high values of speed of moving vehicles. Also a large proportion of respondents declare an excessive distance – in extreme cases several hundred meters. About 10% of respondents did not answer some questions in the survey.

Some respondents declared spacing several meters, even at the highest values of car speed. It seems that in addition to their ignorance of what this distance should be, they also cannot correctly assess the value of the length of sections on the road. A large number (the vast majority) of respondents declared that they did not know whether the values of the distance between vehicles given by them were in accordance with applicable law.

Particularly when driving in a tunnel, drivers show ignorance of (precisely in this particular case) the Highway Code. The provision of applicable law distinguishes two groups of vehicles and precisely gives the distance for them when driving in a very long tunnel. At the same time, it was not specified how to determine this distance when driving a car. Inaccuracy analysis and error discussion for the pilot study, which has the nature of qualitative evaluation of the phenomenon, indicates that the results can be accepted with sufficient confidence. Conducting in-depth studies on a sample representative of the population should confirm the conclusions of this study.

6 Summary and conclusions

The pilot study showed that the vast majority of drivers (almost all respondents) do not know the applicable law in respect of maintaining a minimum distance behind the vehicle ahead. The respondents are, to a large extent, educated young people who have recently obtained a driving license. They underwent training a few years ago and their view should be better than a representative sample. The survey also covered people working in transportation with extensive experience in driving. If the result obtained in this study group is negative (concerning their knowledge and skills), it should be assumed that the population in the scope of the conducted research is probably just as bad. It also follows that in-depth research should be carried out.

Drivers are not able to correctly assess the length value in front of the vehicle ahead. It seems obvious that the lack of knowledge leads to collisions and accidents. The simple question arises: why is the huge ignorance of the subjects observed and in practice not maintaining the correct distance behind the vehicle in each case does not end in a collision or accident?

The answer is: in car operation, sudden, sudden braking occurs sporadically. Daily driving too close behind the vehicle in front confirms drivers that this condition is not dangerous. On the other hand, if in a car a buffer is to control the behavior of the distance behind the car ahead, what algorithm should be used to determine the minimum allowable distance value in order to avoid collision in extreme conditions? Similarly, if the driver does not use the device and decides on the distance themselves – one should also specify the minimum distance values that apply.

This should be developed and clearly recorded in all traffic laws. Drivers who use vehicles in road traffic (contrary to everyday experience) should be trained and made aware of the importance of the need to maintain adequate distance. In addition, they should be made aware of what this minimum distance should be in order to avoid getting cut off when they or other road users change lanes. This should be continuous work, both on driving licenses and after obtaining a driving license, e.g. in mass media. In available publications this problem is not stressed nor noticed.

The rules set out in the law that apply to drivers are not precisely defined and described in current regulations. In addition, drivers should be assisted in determining the actual distance behind the previous car by appropriate markers on the road, etc. The aim of the research has been achieved. Pilot studies of the population driving vehicles in road traffic showed that there is a great lack of knowledge about the applicable legal regulations. Moreover, a large part of road users do not know how to behave safely when driving behind another car.

In-depth research should be carried out in the area considered in the article. If the results of these in-depth tests are confirmed, actions should be taken to eliminate the indicated irregularities. It is an important element of the safety system for road users. In addition, autonomous cars should use standardized algorithms developed and adopted under UN ECE regulations and EU directives on technical requirements for cars.
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