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ROAD SAFETY AND THE CAUSES OF ROAD ACCIDENTS IN POLAND

Summary. The number of road traffic accidents in the world has been increasing. This is mainly related to the constant increase in road traffic. The aim of this article is to examine the causes of road accidents in Poland in terms of road traffic safety. For this purpose, road incidents that occurred in Poland were analysed. In order to verify the presented statistical data on the state of safety in Poland, a survey was carried out to indicate the factors that most often cause traffic accidents. Possibilities for increasing the efficiency of traffic safety and an evaluation of the level of safety in vehicles were also part of the survey. The results showed that the state of RS, in the opinion of the respondents, is poor. The respondents correctly indicated the most frequent causes of road accidents, which confirms their knowledge in the field of road safety. The survey also showed that the activities of the police and programmes for increasing safety need improvement. According to the respondents, the actions that should be taken to improve safety are, first of all, the improvement of the technical condition of roads and the modernisation of road infrastructure. In addition, the survey showed that most men are car drivers, while women primarily travel on foot; the results also showed that the knowledge of RS is better among women.

1. INTRODUCTION

The automotive market in Poland is growing steadily, with the exception of 2020 and the prevailing pandemic. In 2019, the number of registered passenger cars reached 23,360,166 units [1]. Just 10 years ago, 16,079,533 cars were registered. The number of vehicles per 1,000 inhabitants is also increasing year on year. According to the European Automobile Manufacturers Association in 2011, Poland was in 15th place in Europe with 470 vehicles per 1000 inhabitants. However, the latest data shows that, in 2021, this number increased to 747 vehicles per 1000 inhabitants, putting Poland in second place in Europe, just behind Luxembourg [2]. Based on the European Automobile Manufacturers Association data, the average age of cars on Polish roads exceeds 14 years, whereas the average is 11.5 years for the whole EU [3]. Undoubtedly, Poland's accession to the EU and entry into the Schengen area contributed to this. As a result, international trade developed and the mass import of vehicles started. According to the data of Polish Association of Automotive Industry, in 2003, the number of imported cars amounted

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to less than 50,000 cars, whereas in May 2004 (after Poland's accession to the EU), 130,000 vehicles were imported [4]. Fig. 1 presents the number of motor vehicles and tractors registered in Poland [1, 5].

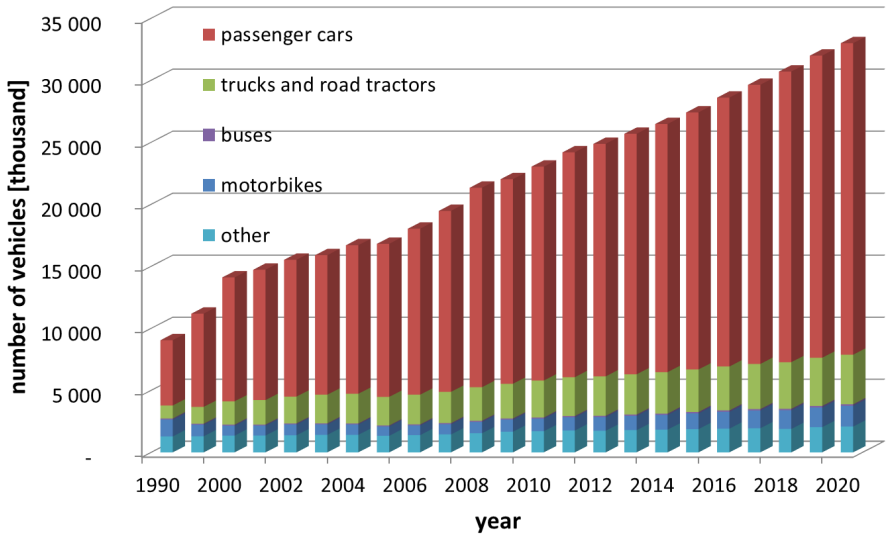

Fig. 1. Number of registered vehicles in Poland between 1999 and 2020 [1, 5]

According to the data of the Polish Police, from 2013-2020, there were 255,710 accidents, 23,616 people were killed, 305,913 people were injured, and 3,183,241 collisions occurred (Table 1). From the data, it can be seen that the number of accidents was the highest in 2013 and the lowest in 2020. Over the years, however, the number of collisions increased, with the exception of 2020, when there were fewer vehicles on the roads due to the prevailing pandemic. In 2013 there were 355,943 collisions; in 2019 there were 455,454. The lowest number of collisions (348,028) was recorded in 2014. The number of injured people was the highest in 2013 with 44,059 and the lowest in 2020 with 26,463. The year 2013 also had the highest number of people killed with 3357; the fewest people lost their lives in 2017 (2831). It can also be observed that the number of injured people was higher than the number of accidents during the analysed period [6]. A collision is said to occur when no one is hurt in a traffic incident, while an accident is said to occur when there are victims. As can be seen, the number of accidents is very high. For this reason, the purpose of this article is to study the causes of road accidents in Poland in terms of road traffic safety (RS) and to gather drivers' opinions about RS.

Table 1

Road accidents in Poland between 2013 and 2020 [6]

Year	Number of accidents	Number of deaths	Number of injuries	Number of collisions
2013	**35,847**	**3357**	**44,059**	355,943
2014	34,970	3202	42,545	348,028
2015	32,967	2938	39,778	362,265
2016	33,664	3026	40,766	406,622
2017	32,760	2831	39,466	436,469
2018	31,674	2862	37,359	436,414
2019	30,288	2909	35,477	**455,454**
2020	23,540	2491	26,463	382,046
Sum	**255,710**	**23,616**	**305,913**	**3,183,241**
Average	**31,964**	**2952**	**38,239**	**397,905**

Safe driving means adhering to a number of established principles and rules, and they should not be disregarded. The improvement in RS is influenced by many elements linked not only to the promotion of appropriate behaviour among drivers but also to the correct organisation of traffic and the proper technical condition of roads and vehicles. Training and examinations for future drivers are also important in this regard. RS is also a scientific field that includes not only the above-mentioned aspects but also issues related to road traffic supervision, medical rescue and transport psychology [7].

The problem of RS has been discussed in many publications. Pałegą identified risk factors in road traffic [8]. Wachnicka analysed factors influencing RS at the provincial level [9]. RS in Poland, with special emphasis on heavy vehicles, was analysed by Rafalski [10]. Moreover, the causes of road accidents were discussed in other works [11, 12]. Gądek-Hawlena and Los analysed the types of dangerous behaviours of professional drivers and the assessment of solutions introduced in heavy vehicles affecting RS [13, 14]. General information on RS can also be found in various books [15-16] and publications [17-18]. This topic is also included in road accident statistics [19-26] and reports [27, 28]. Problems of operation of means of transport related to their safety have been addressed in previous works [29-37].

The road traffic environment is an important subject of research, including the phenomena occurring in it and the relations between the behaviours of the participants and the consequences of their actions. The subject of the present research is road accidents in the aspect of RS. The intention of this research is to find the causes of road accidents and to gain knowledge about the sense of safety among drivers. This study involves a survey that is intended to gather drivers' opinions on the effectiveness of the activities associated with implemented safety improvement programmes and to assess drivers' knowledge of RS. The survey also aimed to obtain information on how accidents happen most often and what impact they have on RS. The survey will also answer the following questions: What is the most frequent cause of road accidents? What is the state of RS in Poland? What steps should be taken to reduce the number of accidents and improve safety?

2. METHODOLOGY

The survey was conducted between December 2020 and January 2021 via the Google Forms platform. Due to the SARS-CoV-2 virus pandemic, the survey was conducted exclusively electronically. The survey was shared on the social network Facebook among groups of people related to road transport from communities whose members are daily road users. The survey was also made available by municipalities from different parts of Poland on their websites and social media. The survey consisted of 24 closed- and open-ended questions, and in some cases, respondents could provide their own answers. Before conducting the target survey, a pilot study was conducted on a selected group of respondents. These individuals were asked the questions prepared for the target survey. The conclusion of the pilot survey was that a larger number of respondents could have been surveyed.

An important step during the implementation of survey research is the calculation of the research sample. For Poland (which has 38 million inhabitants), assuming a confidence level of 95% and a maximum error of 5%, the required number of people for the survey was 384 respondents. For this reason, the survey was conducted on 640 individuals [38, 39].

The 640 participants comprised 394 women and 246 men. The majority of respondents were women (62%). The age structure of the respondents was more or less equally distributed between 18 and 65 years. On average, 25% of respondents were between 18 and 25 years old, 26 and 35 years old, 36 and 45 years old and 46 and 65 years old. Only 1% of the respondents were under 18 years old and over 65 years old. The vast majority of respondents lived in urban areas (61%), and only 39% lived in rural areas. Respondents were asked to select an estimate of the population of their locality. Most respondents lived in towns with less than 10,000 inhabitants (40%). Another 19% of respondents lived in towns with more than 500,000 inhabitants, and 16% lived in towns with 10,000 to 50,000 inhabitants. The high percentage of respondents living in the smallest towns was due to the fact that the survey was made available by portals of communes all over Poland (Table 2).

The largest number of respondents lived in the Małopolskie Voivodeship (20%), and the fewest respondents came from the Świętokrzyskie and Warmińsko-Mazurskie Voivodeships (0.3%). Several

voivodeships received an almost similar number of respondents (from 9% to 12%). The collected results indicate that the survey was attended by inhabitants throughout Poland (Table 2). The selected group of respondents on which the study was conducted may constitute a representative group of the Polish population. When asked in what capacity they most often act as road users, the respondents most often indicated that they were drivers (68%). Meanwhile, 15% of them most often walked on the road, and 8% used public transport or were passengers in a car driven by another person. Only 2% most often chose a bike as a means of transport (Table 3). Among the respondents, 90% had a driving licence, and 10% declared that they did not have this document. In the group of people authorised to drive motor vehicles, the highest percentage comprised drivers holding such licences for 4–10 years (32%). The second largest group of respondents held a driving licence for between 11 and 20 years (28%). These responses reflect the question about the age of the respondents (Table 3).

Table 2

Socio-demographic characteristics of survey respondents

Category	**n**	**%**	**Category**	**n**	**%**
Gender:			*Place of residence:*		
Female	394	61.56%	Dolnośląskie	78	12.19%
Male	246	38.44%	Kujawsko-pomorskie	65	10.16%
Age:			Lubelskie	66	10.31%
Under 18 years	5	0.78%	Lubuskie	41	6.41%
18–25 years	149	23.28%	Łódzkie	62	9.69%
26–35 years	181	28.28%	Małopolskie	126	19.69%
36–45	170	26.56%	Mazowieckie	28	4.38%
46–65 years	128	20.00%	Opolskie	4	0.63%
Over 65	7	1.09%	Podkarpackie	3	0.47%
Place of residence:			Podlaskie	5	0.78%
Urban area	391	61.09%	Pomorskie	20	3.13%
Rural area	249	38.91%	Śląskie	8	1.25%
Number of inhabitants:			Świętokrzyskie	2	0.31%
Less than 10,000	256	40.00%	Warmińsko-mazurskie	2	0.31%
10,000–50,000	104	16.25%	Wielkopolskie	58	9.06%
51,000-100,000	55	8.59%	Zachodniopomorskie	72	11.25%
101,000-250,000	22	3.44%			
251,000-500,000	79	12.34%			
Over 500,000.	124	19.38%			

3. RESULTS

Respondents expressed their opinions on RS. Of the respondents, 38% were not able to assess the level of RS, while 38% considered it low and 15% considered it rather low. Only 8% of respondents claimed that safety on Polish roads is high, and only 1% expressed that it is very high. The answers of respondents who had difficulty in defining the state of RS did not support safety. If safety was high, such a large group of respondents would have had no problem identifying this and would have rated it

positively. More than half of the respondents (53%) assessed safety as low or rather low. RS in Poland was assessed as high by only 9% of respondents (Fig. 2).

The next question asked respondents, 'How would you rate your level of knowledge about road safety?' More than half of the respondents (55%) rated their knowledge in this area as high, and 8% rated it as very high. Another 26% of respondents said they could not determine their level of knowledge, while 10% of respondents rated their state of knowledge as low and 1% rated it as very low. The data show that the majority of respondents had a high level of knowledge about RS, accounting for 63% of all respondents (Fig. 3).

Table 3

Data on traffic participation and driving licence possession

Category	n	%	Category	n	%
Traffic participant:			*Period of validity of the driving licence:*		
Driver	438	68.44%	Up to 3 years	58	10.02%
Car passenger	48	7.50%	4–10 years	184	31.78%
Cyclist	11	1.72%	11–20 years	164	28.32%
Passenger of a public means of transport	50	7.81%	21–30 years	109	18.83%
Pedestrian	93	14.53%	Over 30 years	64	11.05%
Driving licence:					
Yes	579	90.47%			
No	61	9.53%			

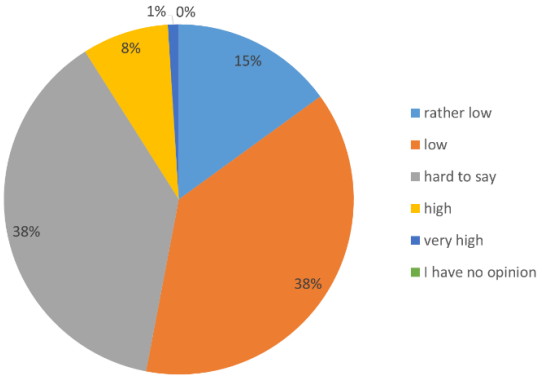

Fig. 2. Opinions on RS

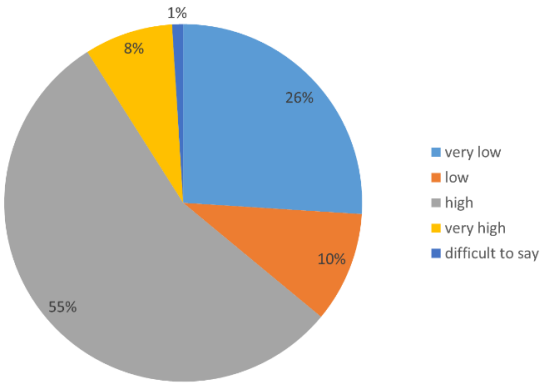

Fig. 3. Respondents' assessment of their knowledge of RS

Next, respondents were asked what factors they think affect their sense of safety on the road. The question was of a multiple-choice nature. Respondents gave the most votes to compliance with traffic regulations (37%), followed by proper road markings (29%) and pedestrian crossings (23%). According to the respondents, the factor with the greatest influence on road safety is the behaviour of other road users (Fig. 4).

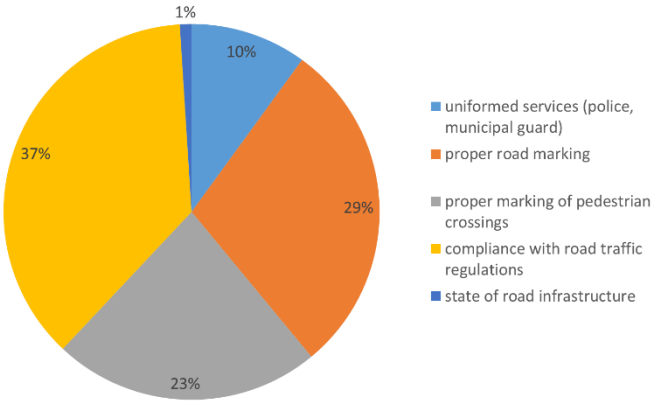

Fig. 4. Factors most frequently influencing the sense of RS

The next question asked about the factors that most often cause road accidents. Respondents could choose more than one answer and add their own suggestions. According to the respondents, the factors with the greatest influence on the risk of a road accident are the behaviour of drivers and other road users and weather conditions. These were followed by other driving activities such as phone use, the technical condition of the vehicle and the state of the road infrastructure. Human factors were the factors most frequently chosen by respondents (76% of all factors) (Fig. 5). The above data confirm the results of police research on the causes of road accidents [6].

In the next part of the survey, respondents were asked to answer the following question: What do you think are the most common causes of traffic accidents? Respondents could again choose more than one answer this time. The most frequent causes chosen by the respondents were speed, disregard for road conditions, driving under the influence of alcohol and other substances, incorrect overtaking and failing to yield the right of way. The least important factors were improper behaviour of pedestrians and driving on the wrong side of the road (Fig. 6).

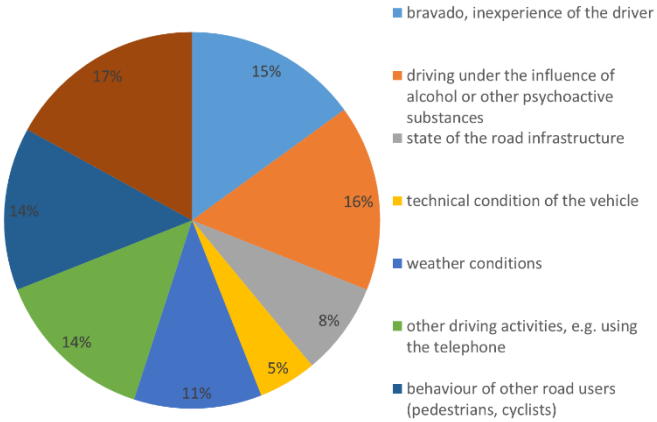

Fig. 5. Factors contributing to causing a traffic accident

The next part of the survey was based on the respondents' experiences. When asked if they had ever been involved in a road accident, 34% of respondents said yes, and 66% said they had not been involved in any accidents. Of those who answered yes to the above question, more than half (59%) had been involved in an accident as a driver, and 31% of respondents had been involved as a passenger. The

smallest percentages of respondents involved in accidents were pedestrians (4%), cyclists (1%) and other road users (5%) (Fig. 7).

Next, the respondents were asked a multiple choice question to indicate the causes of the road accident in which they were involved. The most frequently indicated causes were failure to give priority (25%), failure to keep a safe distance between vehicles and failure to adapt the vehicle's speed to the road conditions (23%). The remaining responses were almost equally distributed among the remaining responses (Fig. 8).

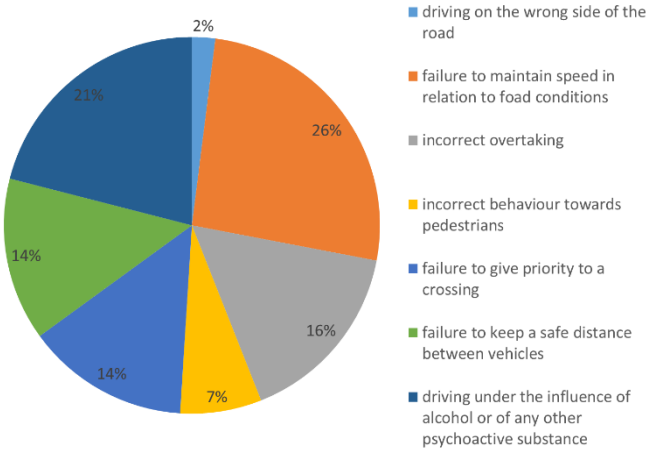

Fig. 6. The most frequent causes of road accidents according to respondents

The next part of the questionnaire dealt with vehicle safety systems, safety improvement programmes and actions to be taken to improve the road situation. The next question asked respondents to rate the effectiveness of the RS improvement programmes in place. Of the respondents, 28% rated the programmes as rather ineffective, and 40% were unable to say. Another 11% of respondents had never heard of such programmes. This data shows that the activities carried out to improve safety are not reaching the audience. These activities are ineffective and inefficient, as only 9% of respondents rated them as effective, and only 1% rated them as very effective. In total, 39% of respondents negatively evaluated the implementation of RS improvement programmes, and more than half (51%) were unable to evaluate these programmes (Fig. 9).

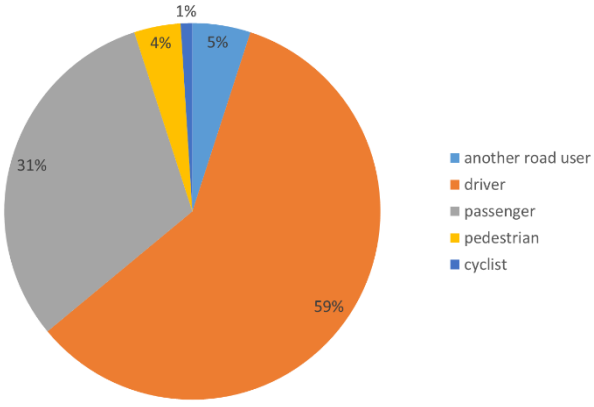

Fig. 7. Distribution of road accident participants

Next, respondents were asked to rate vehicle safety systems in terms of their impact on RS. Anti-lock braking systems (ABSs) (85%), electronic brakeforce distribution (EBD) (79%), Acceleration Slip Regulation (ASR) (77%) and brake assist systems (BASs) (76%) received the most positive feedback. ABSs are the most effective system, as only 2% of respondents expressed a negative opinion. All systems mentioned in the survey, with the exception of traffic sign recognition (TSR), received 50% or

more affirmative responses. This demonstrates survey participants' confidence in vehicle safety systems (Table 4).

Respondents considered the TSR system as having little impact on RS, as it received the fewest yes responses. Respondents felt that the TSR system only slightly improves safety. The driver fatigue monitoring system also raised the most doubts, as 34% of respondents could not tell whether it was helpful or not. The automatic braking system and the lane keeping assist system also received similar percentages of 'hard to say' responses. This may be due to the fact that these systems are newly available and only the latest car models are equipped with them, so they are not yet as common as other systems.

From analysing the responses, it can be concluded that the systems most familiar to car users were positively evaluated, which raises the level of RS. The latest safety systems can be difficult to access for most drivers in Poland (especially young ones), and knowledge of how they work is negligible. Men were more knowledgeable about new security systems in use than women (Table 4).

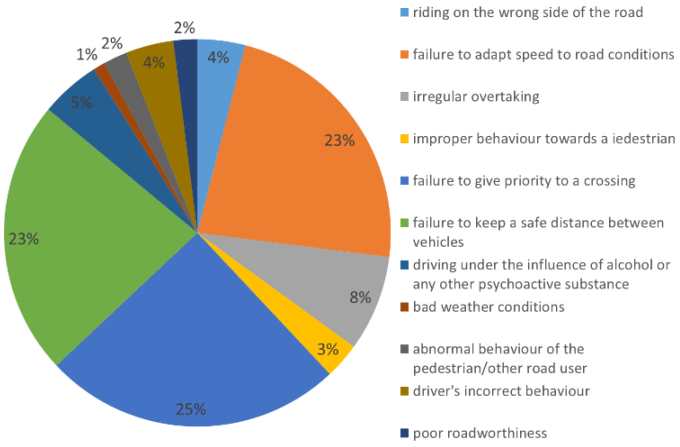

Fig. 8. Causes of road accidents involving respondents

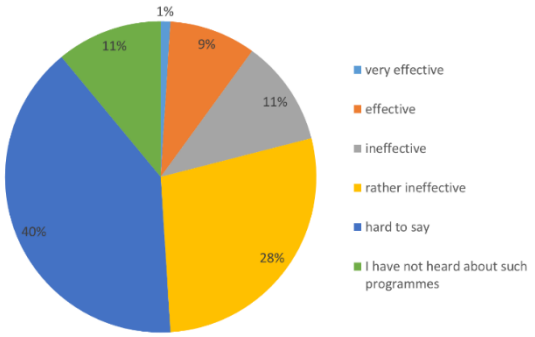

Fig. 9. Effectiveness of current safety improvement programmes

Respondents were also asked to identify which RS improvement systems they used. Most drivers used the ABS (84%) and ESP (47%). These were followed by ASR (37%) and the BAS (35%). The fewest respondents used systems such as driver fatigue systems, TSR, BLIS, automatic braking systems and lane keeping assist (Fig. 10).

The answers obtained are in line with the conclusions drawn from responses to the previous question. Most of the respondents had contact with systems which have been on the market for a long time. Since every third car in Poland is more than 20 years old, the latest safety systems are not widely available to road users because such vehicles do not have them.

Table 4

Assessment of vehicle safety systems according to gender

Type of security system	Female						Male					
	Yes		No		Difficult to say		Yes		No		Difficult to say	
	n	%	n	%	n	%	n	%	n	%	n	%
ABS	313	79.44%	5	1.27%	76	19.29%	231	93.90%	5	2.03%	10	4.07%
EBD	303	76.90%	11	2.79%	80	20.30%	201	81.71%	12	4.88%	33	13.41%
ASR	310	78.68%	10	2.54%	74	18.78%	183	74.39%	26	10.57%	37	15.04%
TSR	174	44.16%	68	17.26%	152	38.58%	113	45.93%	64	26.02%	69	28.05%
Lane keeping assist	208	52.79%	50	12.69%	136	34.52%	140	56.91%	41	16.67%	65	26.42%
BAS	300	76.14%	13	3.30%	81	20.56%	186	75.61%	14	5.69%	46	18.70%
ESP	261	66.24%	17	4.31%	116	29.44%	199	80.89%	17	6.91%	30	12.20%
BLIS	262	66.50%	23	5.84%	109	27.66%	182	73.98%	14	5.69%	50	20.33%
Automatic braking system	209	53.05%	45	11.42%	140	35.53%	128	52.03%	44	17.89%	74	30.08%
Driver fatigue monitoring system	205	52.03%	39	9.90%	150	38.07%	140	56.91%	36	14.63%	70	28.46%

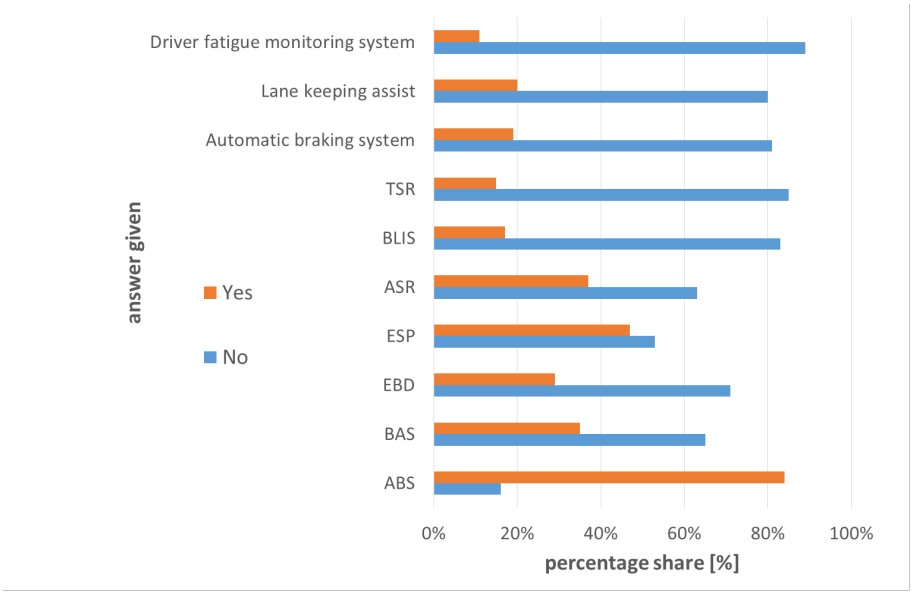

Fig. 10. Safety systems in vehicles used by respondents

In the next question, respondents were asked to indicate the actions of uniformed services and state bodies that they think have the greatest impact on RS. The most positive answers were given for illuminating pedestrian crossings (96%), improving the technical condition of roads (92%) and building pavements, footbridges and cycle paths (91%). The construction of bypasses and reconstruction of roads and intersections were also frequently indicated answers, which were indicated by 89% and 86% of respondents, respectively (Table 5).

Respondents were most hesitant in identifying the beneficial impact of RS improvement schemes, as almost half of the participants indicated neither a positive nor a negative answer. Based on the results, it can be concluded that 49% of respondents do not have an opinion on the programmes implemented for RS and 22% believe that they do not improve RS. Considering the answers to the previous question about the effectiveness of such programmes, 40% of the respondents could not identify their beneficial impact and 39% spoke negatively about the effectiveness of the programmes. These findings may indicate the failure of strategies and systems to improve RS.

The highest number of 'yes' responses to this question was for upgrading and expanding road infrastructure. Respondents saw under-lit pedestrian crossings as the biggest problem, while road checks and speed cameras or a lack of preselection scales had the least impact on safety.

In the next question, respondents were asked to indicate to what extent the police and other services are involved in improving RS. Of the participants, 35% declared that the police and other services are insufficiently involved in improving road safety levels. Another 41% of respondents could not take sides, while only 19% approved and 5% declared that the police and other services are definitely involved in improving safety (Fig. 11).

In summary, the feelings of respondents were unequivocally negative. Those who chose the answer 'It is difficult to judge' (40%) found it difficult to assess the effectiveness of the services, which means that the actions of the police, among other entities, may be unnoticed by respondents or evoke ambivalent feelings.

The last part of the survey concerned the security in the districts inhabited by the respondents. Many respondents assessed the feeling of safety in their district as rather high or high (a total of 40%). As many as 35% of respondents were unable to determine the level of security in their place of residence, and 25% declared that the level of security is low or rather low (Fig. 12).

Table 5

Activities of uniformed services and other bodies affecting RS

Type of activity	Yes	No	Difficult to say
Roadside checks	58%	30%	12%
Setting up of speed cameras	39%	45%	15%
Implementation of RS improvement programmes	30%	22%	49%
Reconstruction of roads, junctions	86%	5%	8%
Improvement of the technical condition of roads	92%	4%	5%
Launching of preselection scales on roads	24%	28%	48%
Construction of pavements, footbridges, cycle lanes, etc.	91%	4%	5%
Construction of road barriers	62%	14%	25%
Construction of town bypasses	89%	4%	7%
Illuminating pedestrian crossings	96%	2%	3%
Cutting down trees causing danger on roads	64%	17%	19%

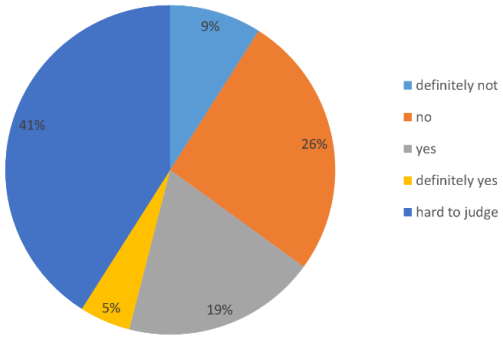

Fig. 11. Degree of involvement of the police and other bodies in improving RS

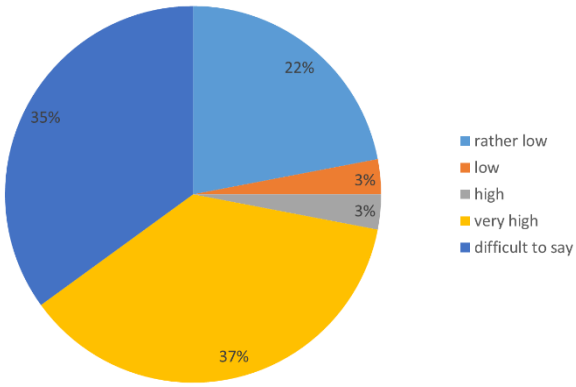

Fig. 12. Assessment of RS in districts inhabited by respondents

The last question was about the actions that should be taken to improve RS. Respondents could select more than one answer and add their own answers. Respondents expressed that they would like to see the following in their county: improvement of roads and pavements (21.7%), marking and lighting of pedestrian crossings (18.8%) and construction of cycle paths (16.7%). The respondents also mentioned the introduction of educational campaigns in schools (11.1%), organising campaigns to distribute reflective elements (9.7%) and increasing the number of road controls and speed cameras (9.5%).

Among the ideas proposed by the respondents, there were such proposals as the construction of ring roads in cities (0.7%), tightening penalties for breaking the law and increasing the amount of fines (1.3%) and improving supervision over vehicle inspection stations (0.1%). The respondents also clearly indicated the need to organise retraining sessions for drivers with many years of experience (0.3%) and to organise social campaigns in the mass media (0.3%). Respondents also suggested changing the training system for trainees so that young drivers learn not how to pass a driving test but how to use the acquired practical knowledge in the future and become good drivers (1.0%) and expanding the city monitoring system (8.7%).

In the next step, the answers given by the respondents were correlated by gender. Based on the research, it can be concluded that the gender of the respondents depended on the number of inhabitants in the town where they resided, whether they held a driving licence, the traffic participants and the respondent's state of knowledge about RS. More women than men lived in big cities and had a driving licence. In addition, most men were car drivers, while women were predominantly pedestrians. Finally, the state of knowledge about RS is better among women (Table 6).

Table 6

Correlation of answers given according to gender

Criterion	df	α	χ^2	χ^2_d	Conclusion
Age of respondents	5	0.05	9.34	11.07	No correlation
Place of residence	1	0.05	0.20	3.841	No correlation
Number of residents	5	0.05	18.54	11.07	Correlation exists
Driving licence held	1	0.05	10.04	3.841	Correlation exists
Road traffic participant	4	0.05	37.58	9.49	Correlation exists
Road traffic safety on Polish roads	5	0.05	1.53	11.07	Correlation exists
State of knowledge on road safety	4	0.05	12.24	9.49	Correlation exists
Road accident participant	1	0.05	2.08	3.841	No correlation

Note: df – degrees of freedom, α – significance level, χ^2 – Chi-square statistic, χ^2_d –critical Chi-square value (determined from the tables that determine whether the null hypothesis is rejected).

4. CONCLUSIONS

In total, 640 respondents took part in the survey. The survey revealed how most road accidents happen, the level of safety on Polish roads and what actions should be taken to improve RS. The survey showed that the state of RS, in the opinion of the respondents, is poor. Respondents correctly indicated the most frequent causes of road accidents, which signifies their knowledge in the field of RS.

Respondents negatively assessed the activities of the police and other services and ranked the effectiveness of implemented safety improvement programmes at a low level. According to the respondents, the actions that should be taken to improve safety are, first of all, the improvement of the technical condition of roads and the modernisation of road infrastructure. Based on the survey results, half of the respondents ranked the state of safety as low or very low. The respondents indicated that human factors (i.e. the behaviour of the driver and other road users, driving while intoxicated or using the phone while driving) have the greatest influence on road accidents.

Among the most frequent causes of road accidents, respondents identified speeding, drunk driving, failing to yield the right of way and improper overtaking. The answers indicated by the respondents coincide with the most frequent causes of accidents according to police statistics. The respondents had great difficulty expressing their opinions on the effectiveness of the safety programmes implemented and assessing the involvement of the police and other services in improving the level of RS. Despite the fact that the level of RS was assessed as low by the respondents, as many as 40% declared that they feel safe in their neighbourhoods. This may be due to the fact that respondents made a general assessment of RS without reference to their own experiences but were guided by opinions put forth in the media or other sources. In reality, however, respondents do not feel unsafe in their place of residence; after all, 66% of respondents had never been involved in a road accident. The survey showed that, according to the respondents, in order to increase the level of safety, it would be necessary, among other efforts, to light up pedestrian crossings, improve and upgrade road infrastructure, organise campaigns to distribute reflective elements, introduce educational campaigns and increase the number of road checks and speed cameras.

The purpose of this study was to analyse the causes of road accidents in terms of RS. The issue of RS was taken up by the authors due to the fact that, on average, eight people die every day on Polish roads and the consequences of road accidents affect not only social and economic aspects but also mental health [6]. Road accidents in Poland are an important issue, and state authorities and road users do not treat this issue as a priority. The analysis of road accidents has shown that the biggest problem on Polish roads is excessive speed, failure to yield priority and improper overtaking.

RS depends on three elements: human factors, vehicles and infrastructure. Human beings and their incorrect behaviour have the greatest influence on the risk of accidents and decreased RS.

Research has shown that the level of RS in Poland is low and that the state authorities are not sufficiently involved in improving RS. The analysis showed that the implemented programmes to improve the safety conditions are not effective and that a large number of respondents had difficulty assessing their effectiveness, which indicates the ineffectiveness of these measures. It was also found that a higher number of women than men live in large cities and have a driving licence. In addition, most men are car drivers, while women are overwhelmingly on foot, and knowledge of RS is higher among women. The results of the research on the state of RD obtained in this article can be used in the future to formulate further measures to improve the state of RD in the analysed country. These measures may include, for example, the introduction of higher fines for traffic offences on Polish roads starting on January 1, 2022.

The authors plan to take into account a larger number of factors affecting the level of RD accidents in future studies. We may include traffic volume, day of the week or age of the accident perpetrator, among other factors.

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