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ANALYSIS OF ROAD TRAFFIC SAFETY IN THE PIŁA POWIAT

Summary. Every year, a lot of people lose their lives and health on Polish roads, which at best ends up damaging the car. Resultantly, the high rate of accidents prompted this study in conjunction with the Poviát Police Headquarters in Piła to analyse road traffic safety in the Piła poviát. To this end, road events occurring in Poland and in the Piła poviát were analysed. In addition, the most common types of road incidents were identified alongside the main reasons for their occurrence. By analysing traffic incidents, a map of the most dangerous streets in Piła was created. A survey was conducted to verify the statistical data presented on the state of safety in the Piła poviát. The survey on road safety in the Piła poviát was created in cooperation with the Poviát Police Headquarters in Piła and was conducted among the residents of the Piła poviát. Inhabitants of the Piła poviát feel safe on the roads along the roads of their poviát.

Keywords: safety, Piła poviát, road traffic

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1. INTRODUCTION

Every year a lot of people lose their lives and health on Polish roads, which at best ends up damaging the car. The rate of accidents is very high. Despite the construction of new safer roads, the number of collisions is constantly increasing, and around 3,000 road users are killed each year. On average, forty-one thousand people are injured every year. The main causes of accidents are excessive speeding, non-conformity to current road conditions or regulations, driving under the influence of alcohol and random events.

Safety is a basic human need [1, 2]. Most people asked about their most important values mention work, respect, health, feelings, intangible goods and, above all, life. This translates into the fact that human safety is a natural and most important life need. None of us would like to live in insecurity. When getting into a car, we check its technical condition, because we want to be sure that everything is fine. Before we go to sleep, we check to make sure that the entrance door to the house is properly closed and before going on vacation we make sure that everything has been properly secured. It shows how at every step, we care about a high level of security and do not want anything bad to happen to us. Lack of sense of security causes a feeling of danger, anxiety and panic in man and social groups with attendant considerable difficulties. In view of this fact, man, social groups, institutions and international systems tend to operate and work towards ensuring the highest level of security to completely eliminate or at least effectively postpone as far as possible any such threat [3].

Safe travel on the road means compliance with a number of established rules and regulations, which should not be underestimated [4]. The improvement of road safety is affected by many elements related not only to the promotion of proper behaviour among drivers [5-7] but also to the proper organisation of traffic, the appropriate technical condition of roads and vehicles [8-11]. Equally important are training and exams for future drivers. Road safety is a scientific field that includes not only the abovementioned aspects but also issues related to traffic supervision, emergency medical services and transport psychology [12]. The problem of the exploitation of means of transport related to their safety was discussed in [13-15].

2. ANALYSIS OF ROAD INCIDENTS BETWEEN 2013-2018

According to the data of the Polish Police, 201,882 accidents occurred between 2013-2018 with 18,216 people killed, 243,973 people injured and 234,5741 collisions happened. This is shown in Tab. 1.

Analysing the data, it can be seen that the number of accidents was highest in 2013 and lowest in 2018. The same is true for data from the Piła powiat. Over the years, however, the number of collisions increased; there were 355,943 collisions in 2013, and 436,469 in 2017. The least collisions of 348,028 were recorded in 2014, a similar relationship as in the Piła powiat is evident. The number of injured people was the highest in 2013 - 44,059, and the lowest in 2018 - 37,359. The year 2013 recorded the highest number of people killed - 3,357, the least people lost their lives in 2017 - 2,831. It can be seen in the period under analysis that the number of injured people is higher than the number of accidents.

According to the data of the Poviats Police Headquarters in Piła, 488 accidents occurred in the Piła powiat in the period under review with 7,147 collisions, 635 people injured and 79 people killed, as shown in the table below.

Tab. 1

Road incidents in Poland in 2013-2018 [16]

Year	Number of accidents	Number of killed	Number of injured	Number of collisions
2013	35,847	3,357	44,059	355,943
2014	34,970	3,202	42,545	348,028
2015	32,967	2,938	39,778	362,265
2016	33,664	3,026	40,766	406,622
2017	32,760	2,831	39,466	436,469
2018	31,674	2,862	37,359	436,414
Sum	201,882	18,216	243,973	2,345,741
Average	33,647	3,036	40,662	390,957

Tab. 2

Road incidents in the Piła powiat in 2013-2018 [16]

Year	Number of accidents	Number of collisions	Number of injured	Number of killed
2013	117	1,109	169	14
2014	108	1,017	132	14
2015	74	1,115	93	8
2016	84	1,236	120	19
2017	55	1,338	63	12
2018	50	1,332	55	12
Sum	488	7,147	632	79
Average	81	1,191	105	13

Analysing the above data, it can be seen that the number of accidents was highest in 2013 and lowest in 2018. Over the years, however, the number of collisions increased. In 2013, 1,109 was observed and in 2017 – 1,338. The least collisions were recorded in 2014 – 1,017. The number of injured people was highest in 2013 - 169, while the lowest was in 2018 – 55. Both in 2013 and 2014, the number of people killed was 14, in 2015 this number dropped to 8, however, it increased to 19 in 2016. In 2017 and 2018, 12 people were killed. It can also be observed that in the period under review, the number of injured people was greater than the number of accidents.

The number of accidents between 2013 and 2018 decreased by as much as 57%, the group of injured people likewise decreased by 67%, which is a very good result. People killed in road accidents between 2013 and 2017 decreased by 14%, however, if we take data from 2016, where the number of fatalities was the highest, we get a decrease of 37%. The year 2016 showed a drastic increase in the number of fatalities - 19, shortly after dropping to 8 people in 2015. Comparing these two years, 2016 brought an increase of 137 people. However, the number of collisions also increased by 21% over the period considered.

The total number of accidents that occurred in the Piła powiat over five years represents 0.26% of accidents throughout Poland in this period. The number of collisions is 0.30%, which is more than the incident of road accident cases. In the Piła powiat, 0.44% of

the victims lost their lives and 0.28% of the people involved were injured compared to data from the whole country.

The most common road events in the analysed period include: hovering over a tree and side and frontal collision of vehicles.

The biggest direct cause of road incidents in the Piła powiat are drivers who do not adjust their speed to the driving conditions or give way. This demonstrates the reckless attitude of drivers and/or ignorance of traffic rules. Data on this subject in the accessed period are presented in the table below.

Tab. 3

Main causes of traffic incidents [16]

	Speed mismatching	Failure to give right of way
2013	236	299
2014	210	296
2015	239	297
2016	246	300
2017	254	278
2018	187	285
Sum	1372	1755

From year to year, a progressive upward trend of road incidents and victims is being recorded. These disturbing data is attributable to the slow rate of modernisation of "cities" in relation to the constantly growing number of cars and drivers in the Piła powiat.

Over the past four years, the largest number of road incidents in the Piła powiat occurred in Piła on Aleja Wojska Polskiego (Tab. 4). It can be drawn from observation that they most often occur at the roundabout, where drivers disregard the lights and force their way. More so, it is an exit road from the city and a road leading to the beltway, which means that drivers run at a higher speed. The two-lane route leading out of the city is Aleja Powstańców Wielkopolskich, the second street in the table. Interestingly, Poznańska Avenue is similarly a dual-lane exit street, which encourages drivers to disobey road speed regulations and yet is the last in the table. The most dangerous streets in Piła are presented in Fig. 1. It is worrying to note that almost all the main streets of the city are affected.

Tab. 4

The most dangerous streets in Piła [16]

Street	2014		2015		2016		2017		2018		Sum	
	<i>C</i>	<i>R</i>	<i>C</i>	<i>R</i>	<i>C</i>	<i>R</i>	<i>C</i>	<i>R</i>	<i>C</i>	<i>R</i>	<i>C</i>	<i>R</i>
Av. Polish Army	57	5	39	4	46	2	56	2	44	3	242	16
Av. Powstańców wlkp.	42	5	52	1	46	0	50	1	54	1	244	8
Av. Piastów	32	2	29	1	26	1	31	2	39	0	157	6
Av. John Paul II	28	3	35	1	22	0	28	2	36	1	149	7
st. Bydgoska	23	3	36	2	31	2	35	2	49	1	174	10

Av. Poznańska	21	2	32	1	18	1	28	1	30	1	129	6
Av. Niepodległości	<i>n/d</i>		27	1	24	0	23	1	26	0	100	2
st. Zygmunta Starego	<i>n/d</i>		34	1	29	0	26	0	24	3	113	4
st. Okrzei	<i>n/d</i>		11	4	21	2	17	1	14	3	63	10
st. Kossaka	<i>n/d</i>		13	0	17	2	16	2	11	1	57	5

C - collision; *R* - road accident; *n/d* - no data available



Fig. 1. Map of the most dangerous streets in Piła [17]

3. RESEARCH

A survey was conducted to verify previously presented data on the state of safety in the Piła powiat. The survey on road safety in the Piła powiat with the cooperation of the Powiat Police Headquarters in Piła was conducted among the residents of the Piła powiat in December 2018 to February 2019 with 133 participants in the survey. 58% were female and 42% male. A significant proportion of the surveyed persons were adults. 33.3% of them are young people between 20 and 40 years old. Persons between 40 and 50 years old constituted 15.2% and above 50 years old 7.6%. 10.6% of the participants declared they were under 20 years old. Most of the respondents lived in the Piła commune (87.8%), fewer people lived in the commune; Szydłowo – 3.1%, Kaczory – 3.1%, Wysoka - 1.5%, Wyrzysk – 1.5%, Ujście – 1.5%, Łobżenica – 0.8% and Białośliwie – 0.8%, respectively. The data is presented in the chart below.

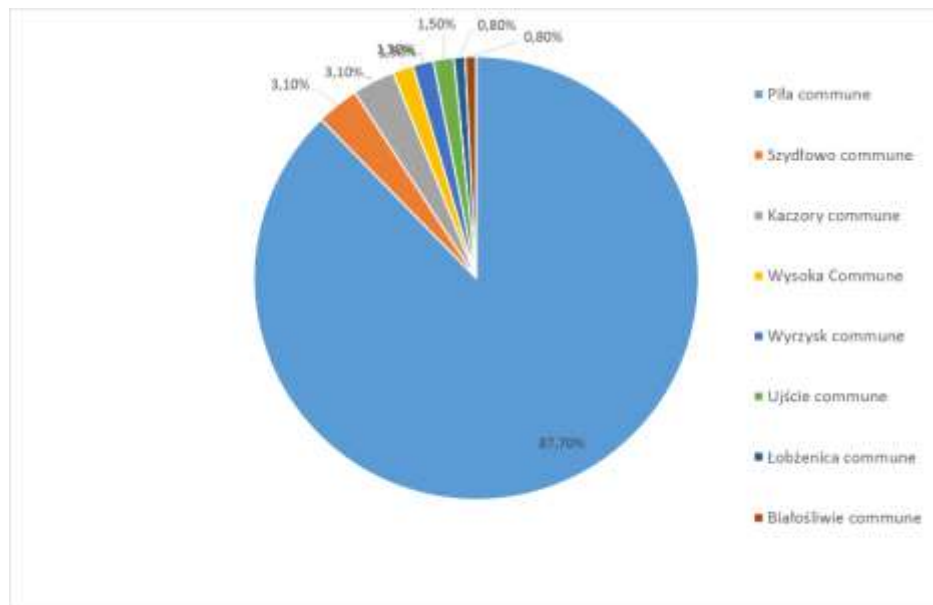
Question 1. Place of residence

Fig. 2. Answers given

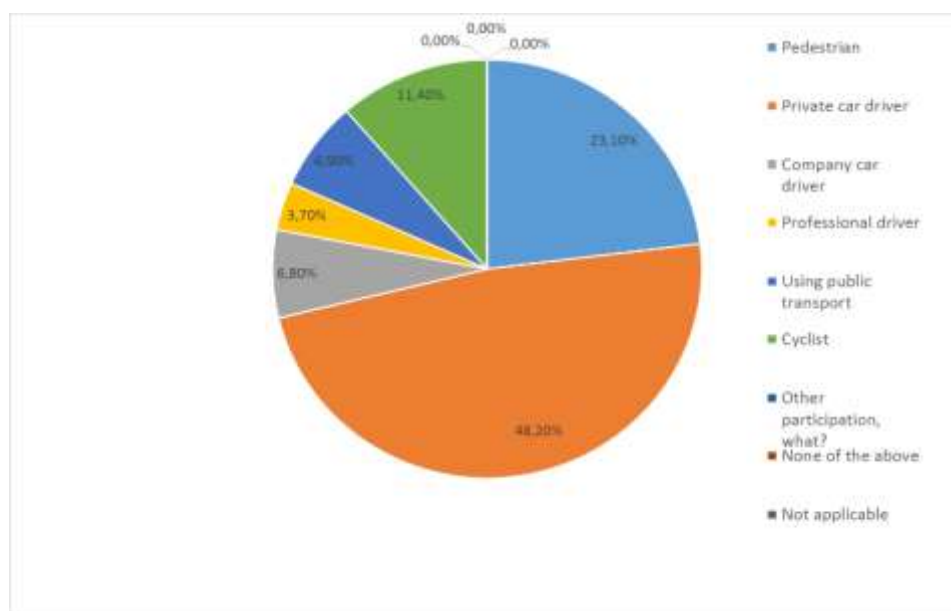
Question 2. Dominant form of participation in road traffic

Fig. 3. Answers given

Private car drivers constituted the largest group among those surveyed (48.2%). A much smaller proportion were drivers of company cars (6.8%) and professional drivers (3.7%). The respondents include 23.1% of pedestrians, 11.4% of cyclists and 6.8% of people using public transport.

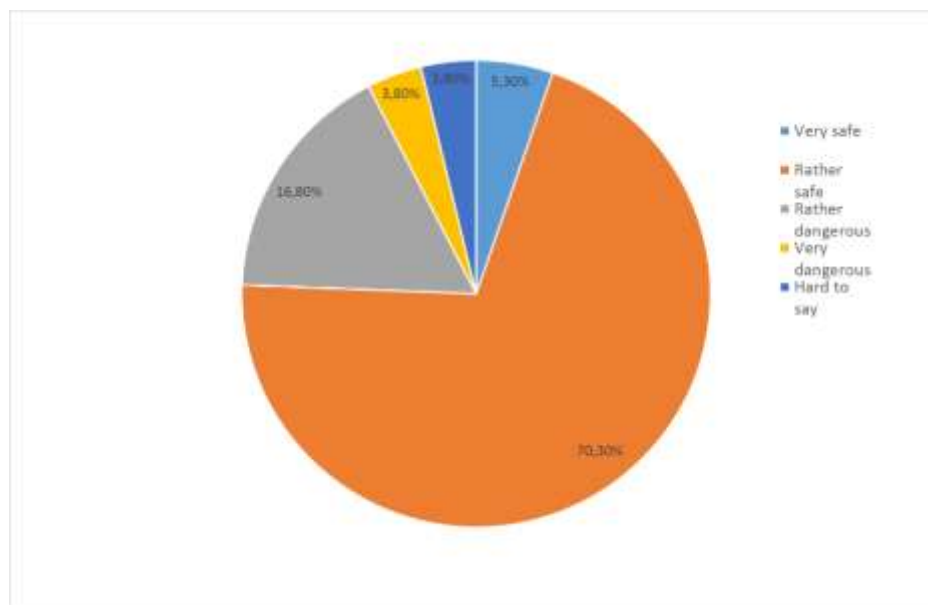
Question 3. Do you feel safe on the road?

Fig. 4. Answers given

As many as 70.3% of respondents declared that they felt rather safe, while 5.3% felt very safe on the roads of the Piła poviat. On the other hand, fewer respondents felt unsafe or uncertain: rather dangerous (16.8%), very dangerous (3.8%) or difficult to say (3.8%). This means that the majority of the Piła poviat feel safe on the roads.

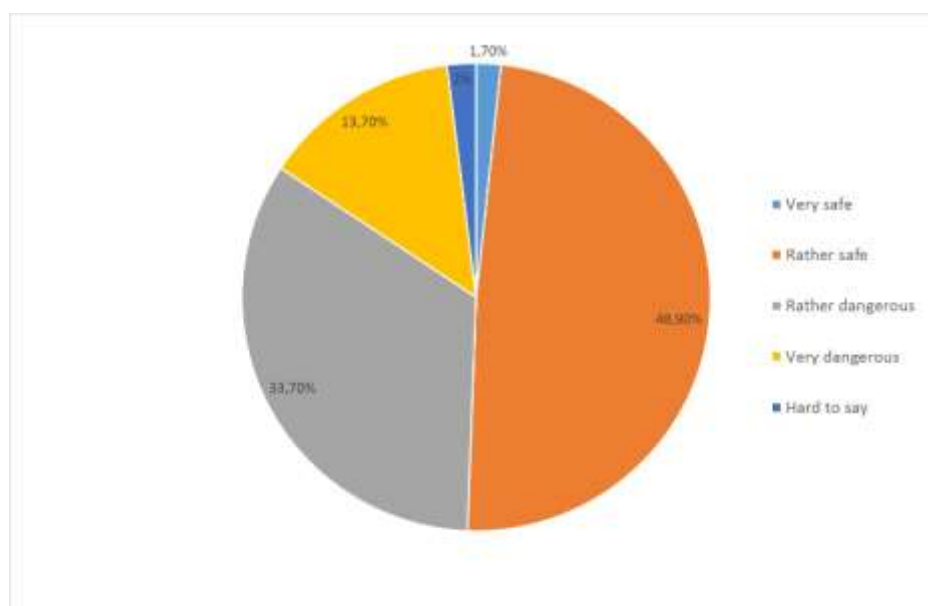
Question 4. Do you feel safe at pedestrian crossings in your surroundings?

Fig. 5. Answers given

Similar answers can be seen at the next question regarding safety at pedestrian crossings on the roads of the Piła powiat. Almost half of the people surveyed-48.9% feel rather safe and 1.7% very safe at pedestrian crossings in the Piła powiat. In contrast, the other half were of the opinion that being at the same pedestrian crossings were rather dangerous (33.7%) or very dangerous (13.7%). The remaining 2% of respondents declined to answer this question.

Question 5. How do you assess the activities of the services responsible for road safety?

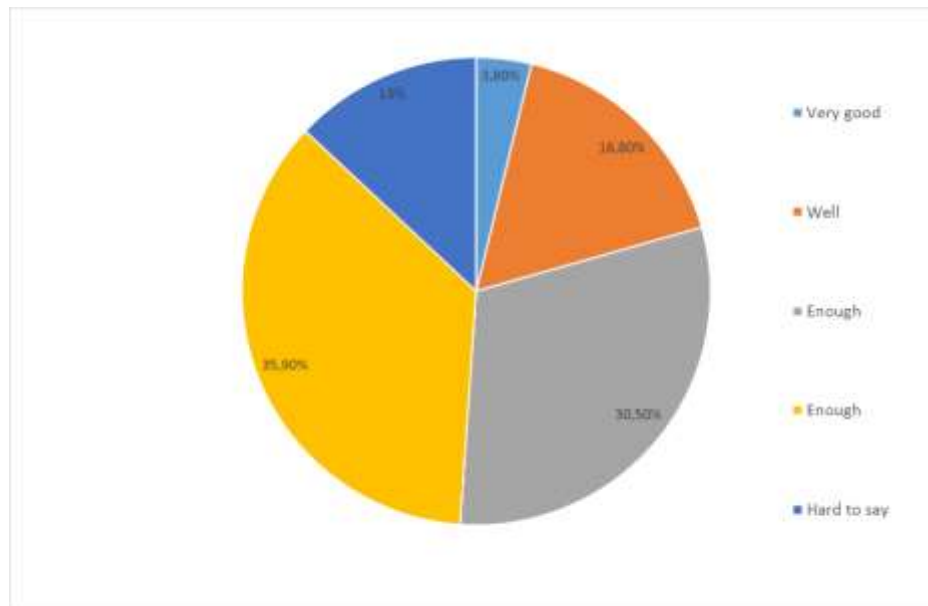


Fig. 6. Answers given

The National Road Safety Council is responsible for road safety in Poland. It is equivalent to the US National Highway Traffic Safety Administration - NHTSA. In addition, road safety is the shared responsibility of the marshal, the voivode and the voivodship police chief as well.

According to respondents, these services do well (35.9%), enough (30.5%) and good (16.8%) and only five (3.8%) very well. As many as seventeen people (13%), indicated difficulty answering this question.

Question 6. Have you or someone from your immediate surroundings been hit at a pedestrian crossing?

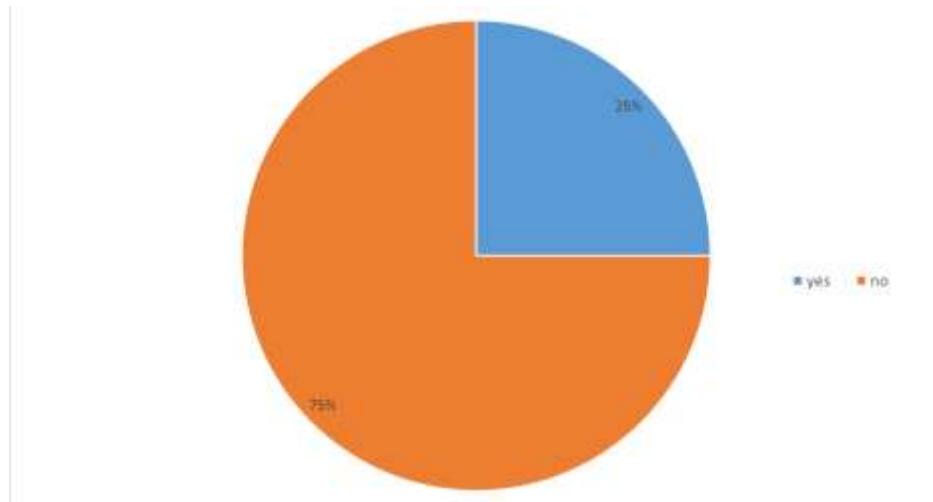


Fig. 7. Answers given

When asked whether the respondents or people in their immediate surroundings were once hit on a pedestrian crossing, as many as 25% answered yes. This is a very high value. In addition, in this case, the respondents also had the opportunity to provide a written answer showing that in many cases this would have happened if not for the quick response of pedestrians. This suggests that the values would have been higher if not for the quick reaction of pedestrians. The responses, however, included those indicating death resulting directly from a deduction at a pedestrian crossing.

Question 7. Did you or someone from your immediate surroundings take part in the traffic incident?

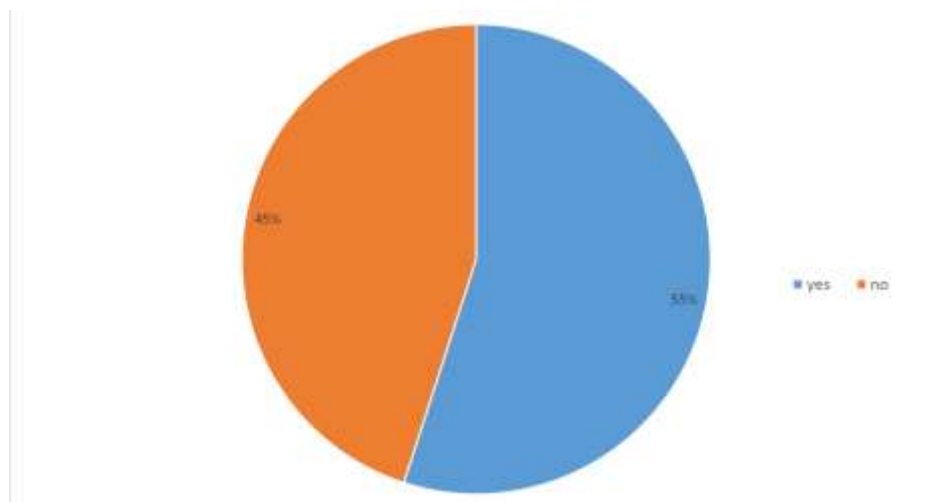


Fig. 8. Answers given

In the next question about participation in the traffic incident, more than half answered in the affirmative (55%), which is quite a large and worrying figure. On the contrary, 45% of respondents were in the negative.

The interviewers also had the opportunity to provide a written answer, which shows that they were mainly bumps or minor road collisions. Furthermore, the answers include those that show that an accident occurred at a railroad crossing, which at the time of this study have become a fairly common incident due to the fault of the driver.

Question 8. Should road infrastructure in the Piła powiat be further developed?

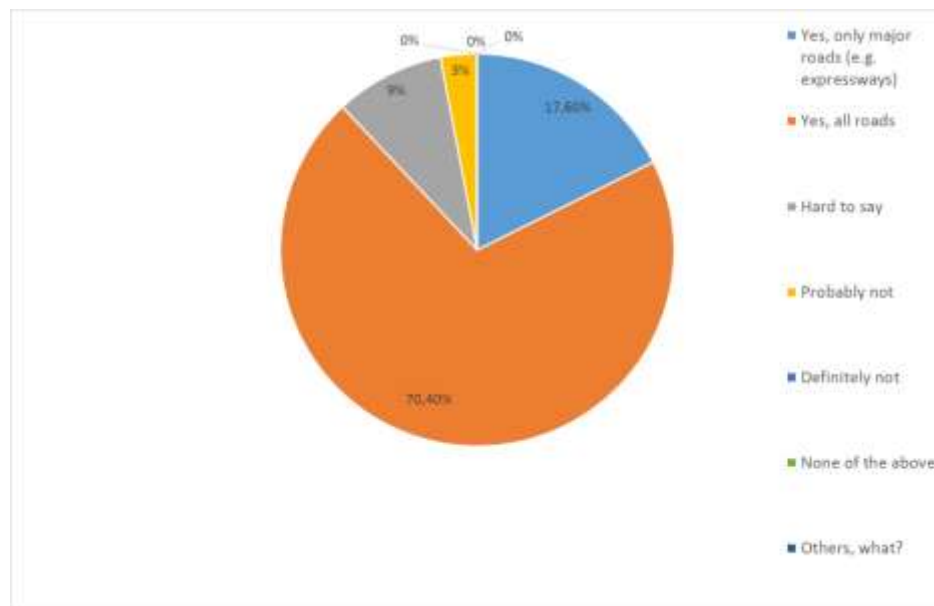


Fig. 9. Answers given

Road infrastructure in the Piła powiat is constantly improving as far as budgetary possibilities are concerned. This is an extremely important aspect of increasing the level of road safety, for example, the condition of the surface significantly affects how the car behaves while driving. The pollsters agreed that the road infrastructure in the Piła powiat should be developed as much as possible. 70.4% of participants in the survey agreed that all roads should be renovated and 17.6% that it should focus mainly on "more important" roads (for example, construction of expressways). Only 3% of respondents were of the opinion that the improvement of the surface condition is rather unnecessary, and 9% could not answer this question.

Among the open answers, the interviewers pointed out the need for the lighting of pedestrian crossings and the construction of elevated pedestrian crossings in front of each school, and that road infrastructure in the Piła powiat should be planned and continuously improved.

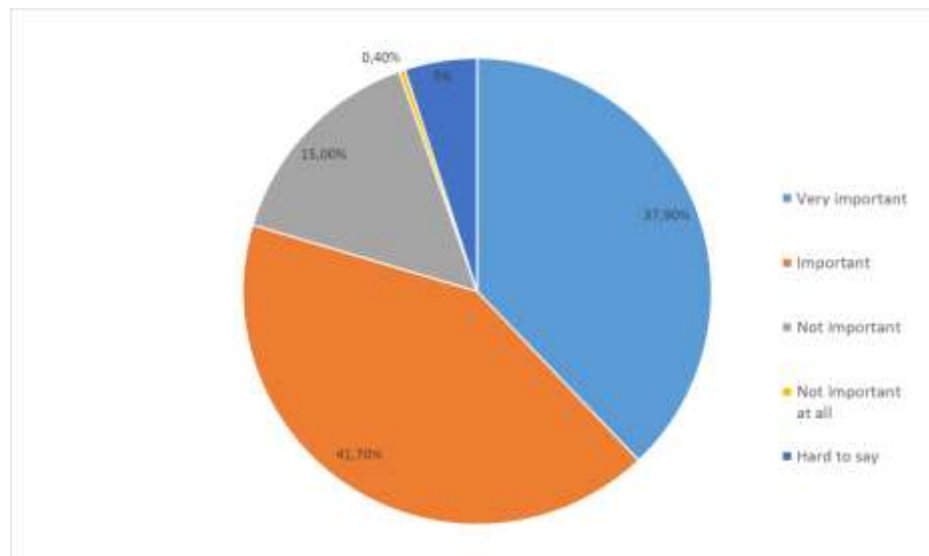
Question 9. How do you assess the role of the Police in shaping road safety?

Fig. 10. Answers given

According to respondents, the Police play an important (41.7%) and very important (37.9%) role in shaping road safety. The role of the Police is not limited to only roadside checks, it includes action as well, leading to increased public awareness about the safety and responsibility of each road participant. Only 15% of respondents said that the Police play little or no role in shaping road safety and 5% of respondents did not answer this question.

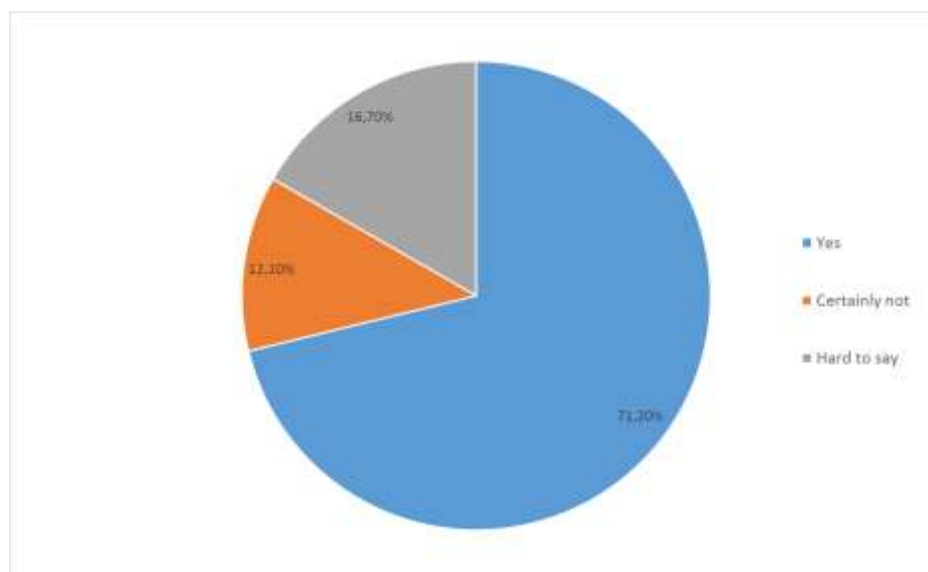
Question 10. Do you or your children have lessons at school on road safety?

Fig. 11. Answers given

Education starts from an early age and it is very important that children are taught how to behave properly on the road. Bad habits perpetuated for years can result in unpleasant events. Thanks to the lesson on road safety, young people can acquire appropriate habits and learn about the effects of ill-considered behaviour. 71.2% of respondents affirmed that they or their children had lessons on this subject at school. 16.7% of respondents were unsure. This may be due to the fact that children do not always tell their parents everything they learnt at school. 12.1% of respondents stated that they and their children certainly did not have such lessons in schools.

Question 11. Do you think that roadside inspections in the Piła powiat should be carried out more often?

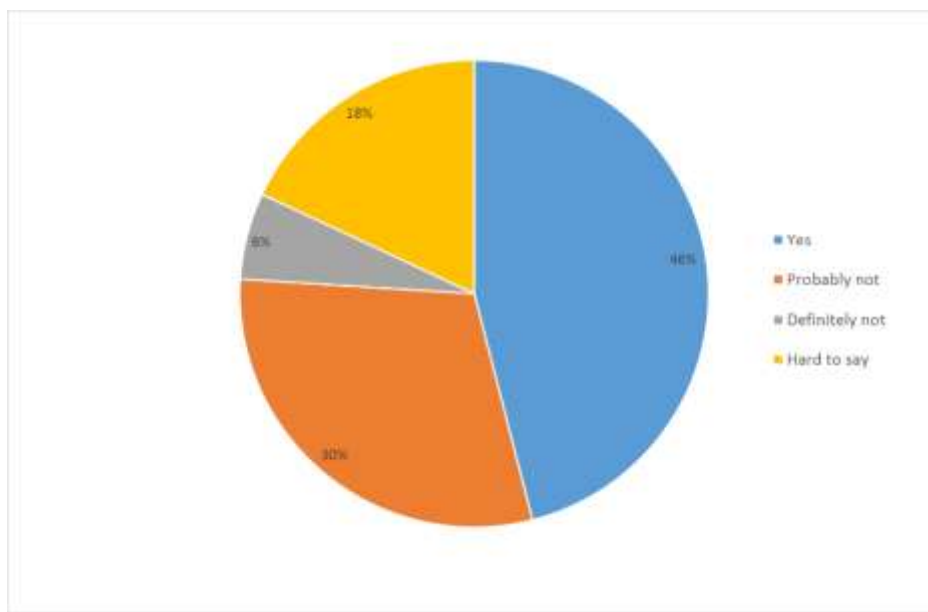


Fig. 12. Answers given

When driving on Piła roads, you commonly find road checks being carried out by the Police. This is to improve road safety and eliminate drivers who pose risks to traffic. According to respondents, the Police should carry out such checks much more often. 46% of respondents subscribed to this idea and only 30% concurred that there was no need or definitely not (6%). 18% of respondents could not answer this question. This group of people may include road users who do not use a car on a daily basis.

Respondents equally had the opportunity of providing an open answer, which they willingly used. These people mainly provided places where roadside inspections should be carried out frequently, that is, school areas, national roads or areas outside the city. It is a definite mistake to carry out checks constantly in the same places. Drivers know places where you should "pull your foot off the gas" and there they behave safely, however, this can not be said about places where nobody expects control.

Question 12. As a cyclist, do you feel safe on the roads of the Piła poviat?

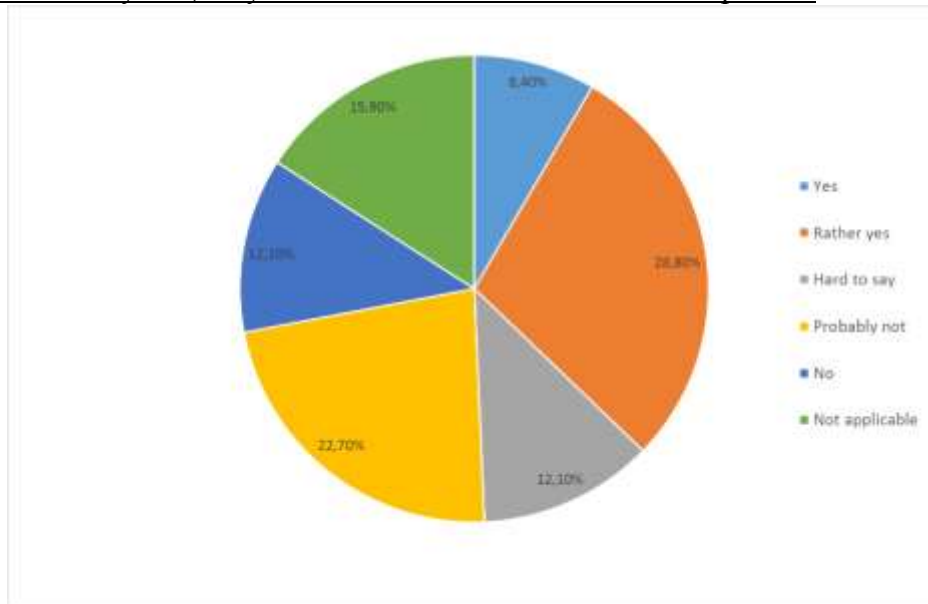


Fig. 13. Answers given

Cyclists make up a large proportion of road users. Over the years, more and more bicycle paths are being built in the Piła poviat to improve cyclists' safety. In the question about road safety for cyclists, majority-28.8%, responded that they felt rather safe, however, a similarly large number of people-22.7%, declared that they felt rather dangerous on the roads of the poviat Pila. The smallest group of answers with strong affirmative for the safety of cyclists were only 11 people - 8.4%. However, 3.7% more people replied that they did not feel safe on the roads of Piła as cyclists. And 15.9% of interviewers were not concerned by this question. They probably do not use bicycles.

Question 13. Do you as a pedestrian feel safe on the roads of the Piła poviat?

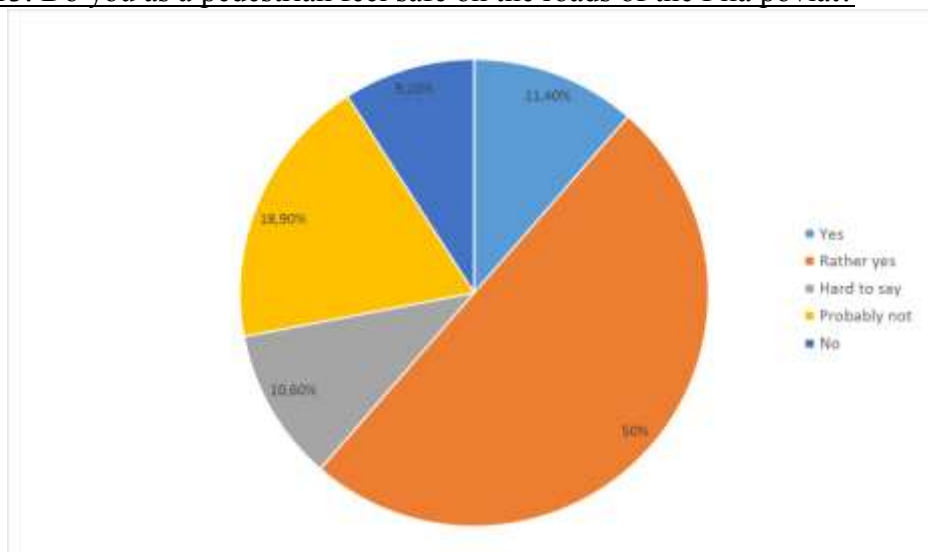


Fig. 14. Answers given

A similar question appeared in the survey in regard to pedestrians in traffic. 50% of people surveyed felt rather safe and 11.4% safe and only 18.9% rather dangerous and 9.1% dangerous. However, 10.6% of respondents could not answer this question. They may be people who move on the roads of the Piła poviát only as car drivers.

Question 14. Do you feel safe as a driver/passenger on the roads of the Piła poviát?

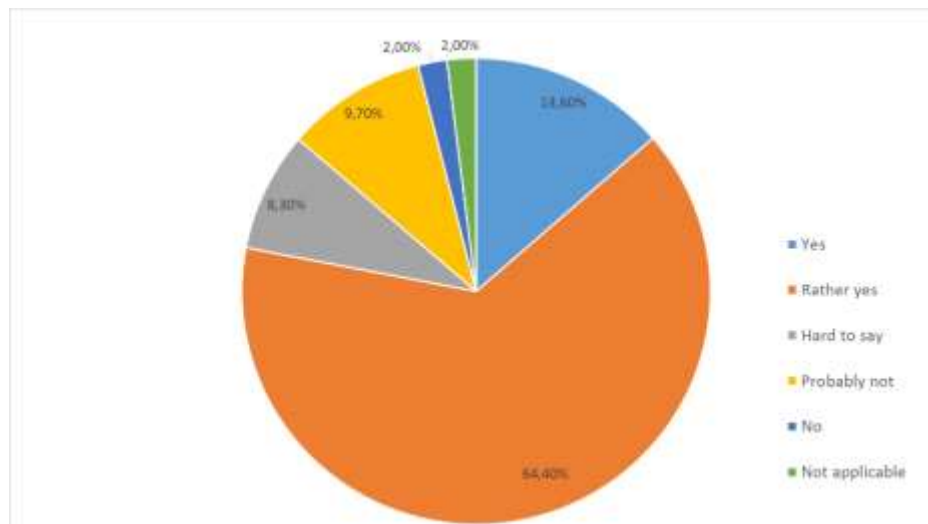


Fig. 15. Answers given

A significant number of respondents were drivers of private or business cars. For this reason, a question arose to check whether drivers in the Piła poviát feel safe on the roads. Most of the respondents feel rather safe (64.4%) or safe (13.6%) and only 9.7% feel rather dangerous, while 2.3% dangerous on the roads of the Piła poviát.

Question 15. How often do you enter lanes without first looking at the road?

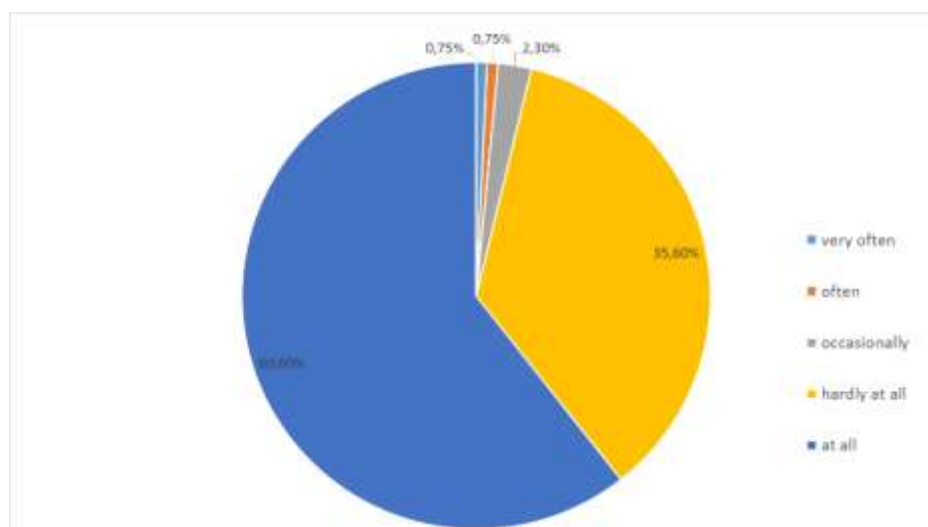


Fig. 16. Answers given

The next question about entering lanes without first looking at the road was to verify the constantly occurring situation where pedestrians usually looking at their phones, get on the road without making sure that there was no oncoming traffic. The driver has the duty to be careful when approaching pedestrian crossings, however, most situations are unpredictable, thus, it falls on pedestrians to take care of their own safety. 60.6% of respondents admitted that they never got on the lanes without first looking out, which is a very good result. Nevertheless, 35.6% of respondents gave almost no answer. Noteworthy is 2.3% of respondents who happened at least once. For this reason, preventive action should be taken in this respect.

Question 16. How often do you enter the street using a cell phone?

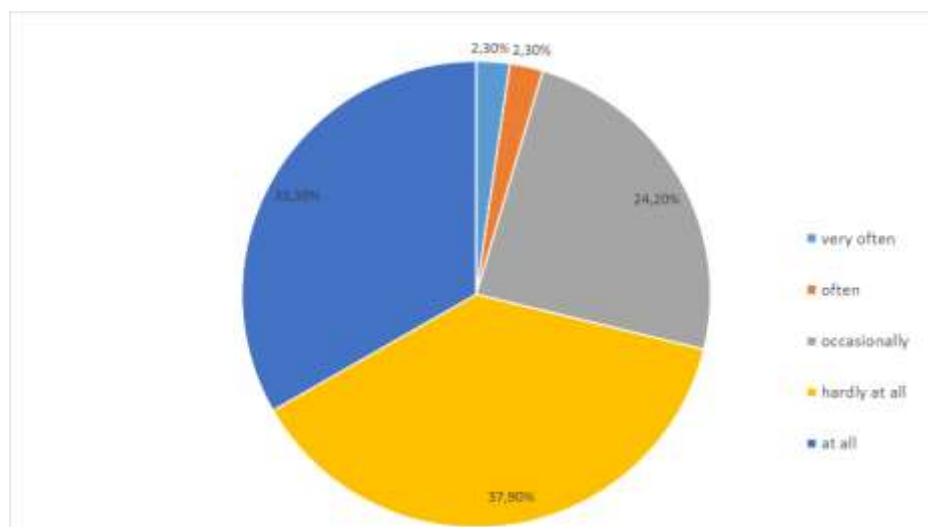


Fig. 17. Answers given

This question is closely related to the previous one, although the use of a telephone when passing through a pedestrian crossing is not synonymous with not looking at it or being certain that there was no traffic. First, on the road is the principle of limited trust, hence one should not enter the pedestrian crossing, even those with traffic lights, without prior confirmation on whether there is traffic or not. Pedestrians should focus and make several checks to ensure that there is no traffic before safely proceeding to cross the street.

It often happens that the car in the second lane will not notice the pedestrian, therefore not stop. A pedestrian looking around is able to notice it, and possibly, avoid the event. It is worth noting that the majority of respondents (70%) do not use their mobile phones at a pedestrian crossing at all. Nevertheless, it is important to note that the respondents used their mobile phone: sporadically (24.4%), very often (2.3%) and often (2.3%) at the transition.

It should be noted that pedestrians are not aware that road safety also depends on themselves as well. They are of the wrong notion that only drivers are responsible for it, for example, it is difficult to spot a pedestrian if he enters the road, especially in the evening hours and he/she is dressed in dark colours. In this case, preventive actions should be carried out in this respect

Question 17. How often do you get involved in traffic without first making sure that are no incoming?

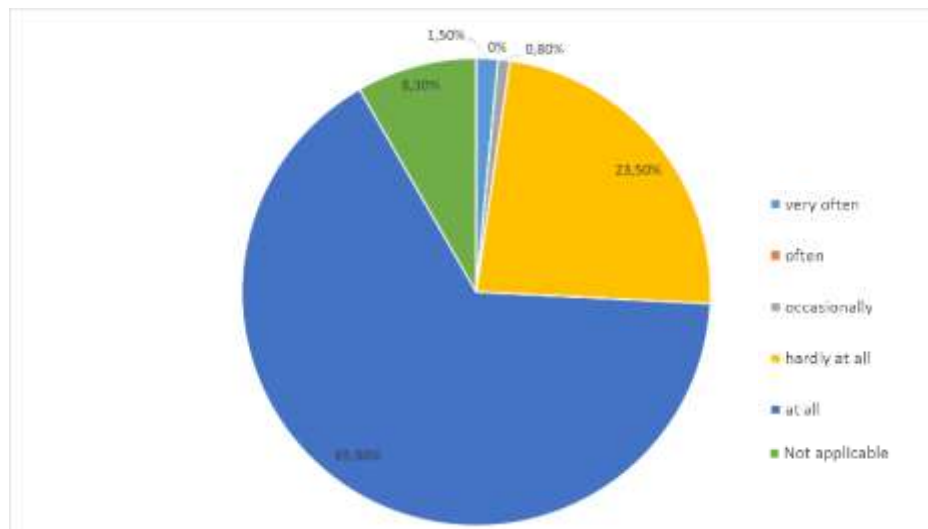


Fig. 18. Answers given

In the Piła powiat, a growing number of collision-free intersections are created, giving rise to fewer road incidents. However, there are still roads, especially housing estates, where there is a need for increased vigilance and ensurance of no incoming before joining the traffic. According to respondents, there are still people who sometimes get involved in traffic without first ensuring that there is no incoming. Almost 90% of respondents replied that it did not happen at all. It is worth noting that sporadically (0.8%) or very often (1.5%) respondents join the movement without being sure. For this reason, preventive actions in this regard are justified.

Question 18. Please indicate dangerous road places in the Piła County

In the next question, the respondents were asked to indicate places that they think are dangerous places that the Police should focus on for more frequent inspections. Prevalent among the answers were pedestrian crossings, intersections, areas around schools and kindergartens, as well as specific streets. Moreover, interviewers indicated the lack of proper lighting on roads mostly in the Piła district. The following table confirms this data.

The places indicated by the respondents coincide with the map of threats earlier presented with Avenue of the Wojska Polskiego, Avenue of the Piastów, Avenue of the Powstańców Wielkopolskich, Avenue of the Poznańska, and streets: Okólna and Bydgoska featured. Respondents paid attention to dangerous pedestrian crossings usually caused by poor lighting or lack of it. Limited visibility and difficulty of exiting most intersections are serious enough to force drivers to give adequate priority to them. Another problem is the lack of lighting for the bicycle path and pavement on the way to Piła hospital.

Tab. 5

The most common answers

Street / place	Number of responses provided
Pedestrian crossings	18
Intersections	16
Avenue of the Polish Army	3
Avenue of the Piastów	3
st. Okólna	2
Avenue of the Powstanców Wielkopolskie	2
st. Bydgoszcz	2
Avenue of the Poznan	2
Górne housing estate	2

According to respondents, driving schools, of which there are a lot, pose as dangers on the roads in the Piła poviat. It is true that there are many cars from outside Piła, leading to situational encounters of several or even a dozen driving school cars at the intersection. Despite the constant modernisation of the city, there is still a problem with bicycle paths, facilities for the disabled and road lighting.

Question 19. What do you think could improve road safety?

When asked the question “what could improve road safety”, the respondents cited above all better lighting not only for pedestrians but for streets and improving their surface as well. Other important issues are the behaviour of drivers, police checks and sensitisation of the public on road safety and their role in the matter. Additionally, issues of more bicycle paths, the introduction of slow-down thresholds before pedestrian crossings and more frequent education of road users were addressed.

Question 20. Have you recently met with preventive activities carried out by the Police to improve safety on the roads of the Piła poviat?

The last question was about preventive activities carried out by the Police to improve safety on the roads of the Piła poviat. Unfortunately, as many as 77% of respondents admitted that they had not been in contact with such activities and only 23% answered in the affirmative. Those interviewed had the opportunity to answer this question in writing. The responses showed that the inhabitants of the Piła poviat do not meet the Police during promotional campaigns apart from controlling or improving traffic, and the Police conduct a lot of them.

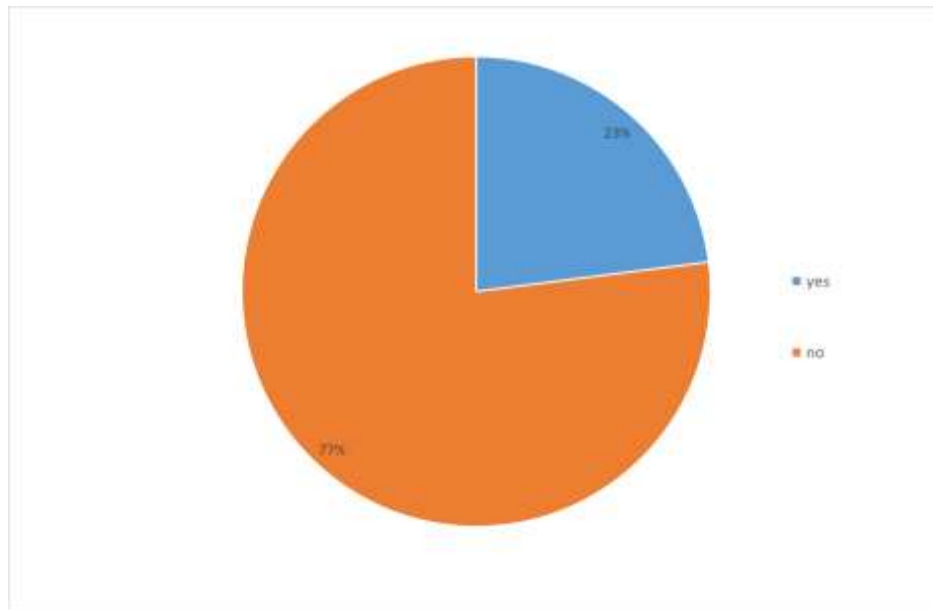


Fig. 19. Answers given

Summary of research

One hundred and thirty-three residents of Pilski poviats took part in this survey. The largest group of respondents were private car drivers and pedestrians, while the smallest were professional drivers.

Inhabitants of the Piła poviat felt rather safe on the roads. Half of the respondents positively assessed the activities of the services responsible for road safety. In addition, they believed that roads should be repaired and preventive actions taken to increase safety in the Piła poviat. This is especially justified for pedestrians entering the crossings without being assured, not once using cell phones and drivers joining the traffic recklessly.

According to respondents, roadside inspections should be carried out more often than before and in different places previously unknown to drivers. Moreover, they believe that pedestrians and cyclists are not safe on the roads of the Piła poviat.

Inhabitants of Piła poviat often indicate pedestrian crossings and around schools as dangerous places in the Piła poviat. Road conditions and lighting have great impact on safety.

4. SUMMARY

Pilski Poviat is 1,268 km², covering nine municipalities, however, majority of the road incidents occurs in Piła. This is due to the large area and the number of inhabitants. The number of drivers and cars that are not always safe on the road increases yearly. A large number of young drivers and elderly people who may have problems with efficient car traffic results into an ever-increasing statistics of road incidents. Every year, 5,000 people die on Polish roads making it the second highest in Europe. We meet with victims of car accidents often. Man can lose everything in a second. It is disturbing to note how many people from the immediate environment of each person can say that someone from his family or friends was a victim or perpetrator of a road accident. Millions of people are either killed on the roads every year or are doomed to the end of their lives.

According to police statistics, the number of accidents is decreasing each year, but the number of people killed and injured is still quite high. The number of road collisions involving injured persons is similarly, rapidly increasing. National statistics is reflected in the Piła poviat. Although the decreasing number of accidents goes hand in hand with a large increase in road collisions, the number of people killed is constantly at the same level. This shows that this is not just a poviat problem but a nationwide problem. Poles drive aggressively, too fast and do not comply with traffic rules. The most common occurrences are: hovering over a tree, hovering over a pedestrian, hovering over a stationary vehicle, hovering over an animal, side collision of vehicles as well as rear and frontal collision of vehicles. Most often, the driver is guilty of not speeding up to traffic conditions, incorrect reversing or failure to give right of way.

Inhabitants of the Piłski poviat do not have much confidence in the Police. They believe that it is hard for one to come across them in the street but usually find them at festivals or city/county parties. Conclusively, it is important that residents feel „important” and are aware that the Police are doing everything in their power to maintain the highest level of security in the Piła poviat and the country in general.

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