

## SAFETY IN TRANSPORT OF PERSONS AND GOODS IN POLAND

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### **Summary:**

*The problem of road safety is an important problem that accompanies mankind from the very beginning of the development of communication. Based on the statistics, the article presents the analysis of road traffic safety in our country over the past few years and shows how it shapes compared to other European Union countries. The main reasons, which lie behind the situation, are also identified as well as the ways and directions of actions that are taken to minimize the effects of road accidents. The pace of reduction of the number of fatalities and injured on Polish roads is still unsatisfactory and therefore far-reaching measures to counteract such a situation have to be taken. These steps are based on normative provisions and long-term actions supported by the media and various types of advertising campaigns. The article also presents the issues related to the road transport of dangerous goods, which, due to the specific nature of the cargo carried, is subjected to special treatment and governed by international regulations and arrangements under the ADR Agreement.*

### **Keywords:**

*transport, safety, dangerous goods*

## INTRODUCTION

The continuous development of automotive technology entails a continuous increase in the number of traffic participants, which in turn translates into a greater likelihood of adverse traffic events [7]. Furthermore, the continued development of the economic sector, including transport, also contributes to the growth in the number of traffic participants using mainly heavy equipment when driving on our roads. This situation, in addition to the increasing traffic volume, also poses a greater threat to the environ-

ment and the continuing and progressive wear of surfaces of national roads and motorways. For this reason, road safety is a major problem for the contemporary human, since it is an element of daily existence. In recent years in our country the situation related to the number of highways and motorways has improved considerably in such a way that many new road sections have come into service, however, their number is still insufficient. The work is continuing on main arteries, allowing for uninterrupted traffic running east - west and north - south. These include: A1 motorway in the Piotrów Trybunalski - Częstochowa - Katowice section and A2 motorway in the Warsaw - Siedlce - border crossing point Kukuryki section, as well as highways - S3 - Bolków - Nowa Sól and S5 - Wrocław - Poznań [2]. There is a huge number of construction projects that are still underway, but according to the assumptions of the General Directorate of National Roads and Motorways on their completion, in line with the 'Program for the Construction of National Roads for the years 2014-2023', the end of the year 2023 seems to be a fully achievable date.

### 1. THE STATE OF SAFETY IN PUBLIC COMMUNICATION AND TRANSPORTATION IN POLAND AGAINST THE EUROPEAN BACKGROUND

Despite great investments and huge financial expenditures for the development of the national road network and motorways in recent years, Poland continues to occupy the unflattering position in the European Union with the highest rate of road accident victims [8]. In the year 2015 there were 32967 road accidents that cost 2938 lives and 11200 people were seriously injured. When comparing the above figures with previous years and the year 2014, a downward trend has been observed. For comparison, in 2013 there were 35,385 accidents in which 3291 people died and 11669 people were seriously injured [1]. Table 1 compares the number of road events and casualties for the years 2013-2015.

**Table 1.** Number of events and victims for the years 2013 - 2015

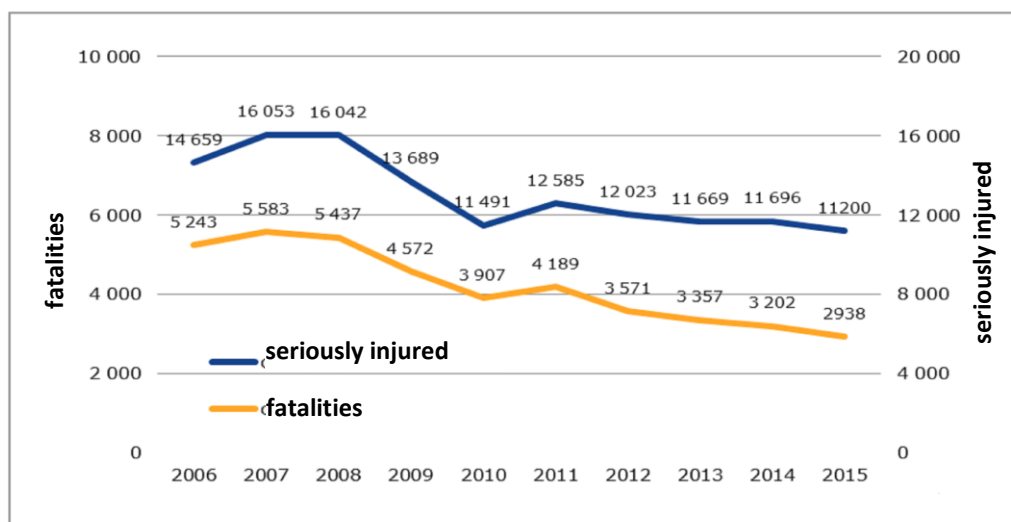
No.	Specification	2013 [number]	2014 [number]	2015 [number]	Decrease compared with 2013 [number]	Decrease compared with 2013 [%]
1	Road accidents	35385	34970	32967	- 2418	- 6,8
2	Fatalities	3291	3202	2938	- 353	- 10,7
3	Injured	11669	11696	1120	- 469	- 4

*Source: own elaboration*

By comparing road statistics for the first quarter of 2016 with the same period of the previous year, there is a continuing downward trend not only for road events but also for their participants. In the first quarter of this year, there were 6188 accidents, which is 614 fewer than in the first quarter of 2015. In the same period of 2016, 549 people died on the road, resulting in the number of casualties lower by 88 compared to 2015.

The total sum of traffic collisions increased by 3% in that period and amounted to 86,288. The main causes of road accidents are still overspeeding, not giving way, and behavior towards pedestrians that is inconsistent with law [4].

Figure 1 depicts the graphical comparison of the number of accident victims and severely injured for the last decade.



**Fig. 1.** Numerical indicator of accident victims and seriously injured in Poland in the years 2006 - 2015

*Source: materials of the Police Headquarters*

The constant and sustained downward trend of both indicators has been observed here, particularly since 2007, which also confirms the improvement of our road infrastructure and the well-managed policy of the National Road Safety Council, but compared to other EU countries, these results are not yet fully satisfactory. In general, it should be stated that the dynamics of improving safety on Polish roads is much smaller than that assumed, which in turn causes that the direct risk of death on our roads is still higher than the average in Europe. The strategic goal of the current National Road Safety Program for the years 2013-2020 (NPBRD) is to reduce the number of fatalities to less than 2000 and seriously injured people to 6900. Table 2 shows how the Polish demographic rate shaped against other European Union countries over the past few years.

**Table 2.** Demographic index per 100 thousand EU residents in 2015

Country	Fatalities 2014	Fatalities 2015	Fatalities 2015 vs 2014 [%]	Demographic index 2014	Demographic index 2015	Demographic index 2015 vs 2014 [%]
Austria	430	475	+10,5	5,1	5,5	+8,5
Belgium	727	755	+3,9	6,5	6,7	+3,2
Bulgaria	660	708	+7,3	9	9,8	+8,0
Croatia	308	348	+13,0	7,3	8,2	+12,8

Country	Fatalities 2014	Fatalities 2015	Fatalities 2015 vs 2014 [%]	Demographic index 2014	Demographic index 2015	Demographic index 2015 vs 2014 [%]
Cyprus	45	57	+26,7	5,2	6,7	+29,4
Czech Republic	631	660	+4,6	6,5	6,3	-3,6
Estonia	78	67	-14,1	5,9	5,1	-13,5
Finland	229	258	+12,7	4,2	4,7	+12,3
France	3384	3464	+2,4	5,3	5,2	-1,5
Ireland	193	166	-14,0	4,2	3,6	-14,6
Lithuania	267	241	-9,7	9,1	8,2	-9,3
Luxembourg	35	36	+2,9	6,4	6,4	-0,1
Germany	3377	3475	+2,9	4,2	4,3	+1,9
<b>Poland</b>	<b>3202</b>	<b>2938</b>	<b>-8,2</b>	<b>8,4</b>	<b>7,6</b>	<b>-9,1</b>
Romania	1818	1893	+4,1	9,1	9,5	+4,7
Slovakia	259	274	+5,8	4,8	5,1	+5,3
Slovenia	108	120	+11,1	5,2	5,8	+11,9
Sweden	270	260	-3,7	2,8	2,7	-4,7
Hungarian	626	647	+3,4	6,3	6,6	+4,3
<b>EU</b>	<b>25882</b>	<b>26077</b>	<b>+0,8</b>	<b>6,1</b>	<b>6,0</b>	<b>-1,4</b>

*Source: National Road Safety Council (KRBRD) Secretariat - based on Eurostat data [3]*

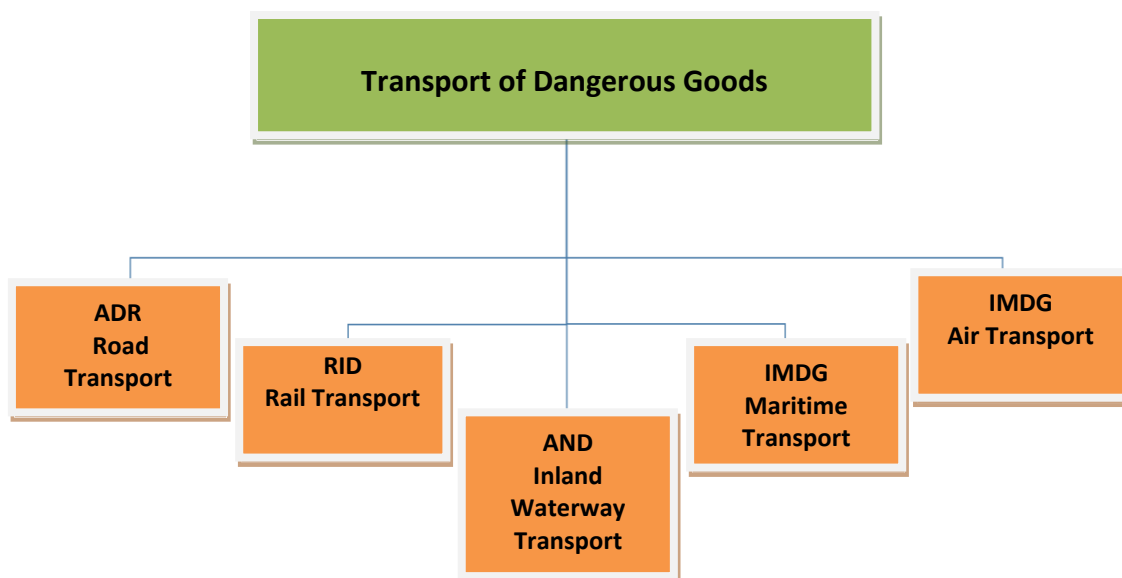
It can be seen that there are significant differences between the EU member states, where the demographic index per 100 thousand inhabitants is in the range of 2.7 - 9.8. The best situation is in Sweden, Ireland, Germany and Finland, where it is in the range of 2.7 - 4.7. Slovakia, Estonia, France and Austria are just behind those countries, with ratios ranging from 5.1 to 5.5. Poland, unfortunately, occupies a position at the end of the table with the demographic indicator of road accident victims of 7.6. Next are Lithuania, Romania, Croatia and Bulgaria. All this means that Poland is still among the countries where the risk of death or serious injury from road accidents is the highest in the European Union. It is important to keep a steady downward trend of the index, which encourages looking into the coming years with optimism.

## 2. SAFETY IN TRANSPORT OF DANGEROUS GOODS

Road transport of dangerous goods, which for our country accounts for an average of about 10% of all goods transport, is potentially the biggest threat, mainly due to the specificity of the goods being transported. A roadside collision involving a vehicle carrying hazardous inflammable or explosive materials can lead to massive damage to the infrastructure itself, as well as a direct threat to the lives and health of bystanders. That is why it is so crucial that the risk associated with the occurrence of such a situa-

tion is minimal. For this reason, the transport of dangerous goods has been subject to specific surveillance and the principles for the transport of goods have been properly regulated and introduced into the system of the international and domestic law [6].

Road transport of dangerous goods in Europe is subject to harmonized international regulations known as the *ADR European Agreement (European Agreement concerning the International Carriage of Dangerous Goods by Road)*. The contract was signed on 30 September 1957 in Geneva but it was only ratified by Poland in 1975 and incorporated into the legal system by the Act of 28 October 2002 on the Road Transport of Dangerous Goods (Journal of Laws No. 199, item 1671, with amendments) [8]. Transport of dangerous goods, in addition to ADR road transport also covers other types of transport shown in Figure 2.



**Fig. 2.** Types of transport of dangerous goods

*Source: own elaboration*

According to the ADR Agreement there are three ways of transporting dangerous cargo depending on how it is packaged. There are distinguished among others:

- a) transport of consignments:
  - in original approved packages adapted for the transport of a particular material, properly labeled with warning labels and the UN number, e.g. barrels, boxes, canisters;
  - vehicles suitably prepared for carriage on load platforms with fasteners that prevent the cargo from moving and getting damaged.
- b) Carriage in bulk:

- directly on a load platform or in a container without additional packaging taking into account the tightness and resistance of the platform/container to chemicals;
  - used to transport materials of low degree of risk.
- c) Carriage in tank-containers:
- mainly liquid materials in specially constructed tanks, authorized for use on the basis of a certificate issued by the Transport Technical Supervision.

Due to the level of risk posed, dangerous goods during the organization of transport are included in the appropriate packaging group, which is critical in the process of selecting the adequate packaging, and the whole transport process depends on it.

There are three groups of packaging:

- packing group I - high risk material;
- packing group II - medium risk material;
- packing group III - low risk material.

After selecting the method of packaging and having dangerous goods packed, each commodity - a parcel is appropriately marked with warning labels and the UN number corresponding to the product class [11]. According to the ADR Agreement [12], the obligations relating to the organization of transport of dangerous goods and the responsibility for the lawful conduct of such transportation lies with the transporting entity, referred to in the Agreement as a *participant*<sup>1</sup>. The responsibilities of a participant in the transport of dangerous goods are as follows:

- undertake all possible security measures to prevent hazards to persons, property and the environment;
- in the event of an accident or failure, immediately notify the emergency personnel and emergency services, including the emergency response center, the fire protection unit and, in the case of a military vehicle's participation, the appropriate local unit of the Military Police;
- equip persons performing activities related to the transport of dangerous goods with necessary documents;
- train persons performing activities related to the carriage of dangerous goods;
- designate, at own expense, at least one adviser on the matters of the transport of dangerous goods;
- submit the annual report on activities related to the transport of dangerous goods in the system until 28 February to the Provincial Road Transport Su-

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<sup>1</sup> A person performing activities related to the transport of dangerous goods – a natural person employed by a participant of dangerous goods transport or performing activities on his/her behalf – the Act of 19 August 2011 on the transport of dangerous goods - Article 2(9).

pervisor (ADR), to the President of the Rail Transport Authority (RID), to the Director of the Inland Waterway Administration (ADN).

In addition, all persons involved in this transport supervise its safety. These persons are respectively: a sender of the goods, a carrier, a driver, a consignee, a shipper, a packer, a filler and a tank-container operator. According to ADR regulations [12] *'all participants in the transport of dangerous goods should take appropriate security measures, depending on the nature and extent of foreseeable risks, to prevent detriments and injury and, if appropriate, to minimize their effects'*.

### **3. IMPROVING ROAD SAFETY**

The continued development of the public communication and transport sector should be one of the main elements of the domestic policy of a well-functioning state and one of the key determinants of economic development, including industry and agriculture. The transport sector development, sustainable in economic, spatial-technical and ecological terms, should provide the society with constant and efficient satisfaction of ever-increasing economic needs. To make this development effective, it must be open to all kinds of new organizational and technical solutions, regulations and modifications as well as it should be capable of implementing innovations as quickly as possible. In recent years the rank of safety in road traffic around the world has been constantly growing for both ethical and also economic reasons. It is evidenced by the statistics cited above, as well as those related to the costs incurred by the public for the treatment of victims of road accidents and collisions, and due to the loss of freight. The economic effect of road accidents is on average 1 to 3% of GDP per year for individual countries in the world, which can be estimated at an average of about \$ 500 billion.

In recent years, road safety has become not only a regional but also a global problem, and any international organization working to improve it has realized that only common, long-term and planned actions can deliver the expected results. Only adequately financed national and international programs and long-term strategies based on measurable results will help to increase the road safety effectively. Therefore, the Commission for Global Road Safety in its 2009 Report called for the Decade of Road Safety Action to be launched. The United Nations and the World Health Organization expressed immediate support for this initiative, as they saw in it the potential for long-term and coordinated actions to increase road safety internationally, nationally and locally. On 11 May 2011, the United Nations General Assembly established the Decade for Action on Road Safety for the years 2011-2020, which generally sets out the legal framework for creating national and local action plans while allowing coordination at the global level at the same time. The Plan is an open document addressed to representatives of state and local government authorities and other social organizations working for road safety.

According to this Plan [9], all the actions were divided into the following five pillars:

- traffic safety management;
- improving the road infrastructure safety and ensuring mobility and accessibility for all traffic participants;

- improving vehicle safety;
- shaping and changing behavior of road users;
- roadside and post-accident assistance.

In response to the established UN Decade for Action on Road Safety and the European Union's recommendations, Poland developed its own National Road Safety Program 2013-2020. The National Road Safety Council adopted this document by Resolution No. 5/2013 of 20 June 2013 and it has been the basis for local activities undertaken by local governments with the aim to improve road safety. The Program [9] focuses on the above five pillars constituting the basis for modernization and improvement of the entire road safety system. The main assumption of the National Road Safety Program 2013-2020 is a safe system where a person is the one who is most likely to make mistakes, experiencing their most severe consequences simultaneously. Being the weakest link in the whole chain, a human has always made mistakes and therefore the traffic and transport system and infrastructure should be modernized and adjusted so that the possible consequences of these mistakes can be minimized as much as possible. For this reason, thorough reconstruction of the whole transportation network, improvement of vehicle safety, change of drivers' behavior and development of a more effective medical rescue system are necessary. Such actions make it possible to achieve in the future the long-term *Vision Zero* on the Polish roads, which assumes 0 deaths in road accidents. Thus, the Program has adopted two strategic objectives to be achieved by 2020:

Reducing by 50% the number of people killed on the roads:

- the number of fatalities on the roads is not to exceed 2000 people in 2020.

Reducing by 40% the number of seriously injured:

- the number of people seriously injured in road accidents is not to exceed 6900 people in 2020.

Achieving the objectives set out in each of these pillars can only be achieved through targeted actions including:

Engineering -introducing new technical solutions:

- roads - raising road traffic safety level,
- vehicles - protection of drivers and passengers in the event of an accident.

Supervision - control of the compliance with applicable provisions.

Education - raising awareness in order to change attitudes.

Within the road safety activity the current Implementation Program for the years 2015 - 2016 assumes focusing on two main areas: pedestrian protection and road speed management. Its key directions are as follows:

- activities related to the development and modernization of road infrastructure. Using road traffic safety control and audit tools;



- legislative activities related to the infrastructure safety and traffic control, drivers' education and testing, punishment for offenses, vehicle control stations and the use of new safety technologies in vehicles;
- education and training of staff at various levels of traffic safety management;
- rescue, including optimization of the rescue system and modernization of equipment and further equipment for the rescue services (primarily fire brigade);
- research and analyses concerning, inter alia, behavior of road users, impact of solutions applied on safety, and effectiveness of new technologies used in vehicles;
- programming and strategic planning of activities to improve efficiency of the road safety system;
- implementation of Intelligent Transport Systems (ITS) for transport management, traffic control and rescue systems support;

The realization of the aforementioned tasks within the directions of action will not completely eliminate accidents on Polish roads, but it will definitely contribute to reducing their numbers and as a consequence the number of victims.

## CONCLUSIONS

The article presents the state of road safety in our country and how it shapes against the background of other European Union countries. The statistics show that this situation is not entirely satisfactory, but owing to long-term actions, based on legal regulations and supported by the media and advertising campaigns, the number of people killed and injured in road accidents is decreasing year by year. Moreover, the development of road infrastructure, including the construction of motorways, highways and modern communication routes has significantly improved this situation. The article also discusses the issues associated with the road transport of dangerous goods, which in our country accounts for about 10% of all road transport. Due to the specific nature of the freight being carried, this type of transport is subject to special treatment and regulated by legislation that has been implemented practically throughout the European Union. Safety related to the carriage of this type of cargo is particularly important because of its specificity, i.e. oftentimes the high risk of a single cargo unit for people's life and health in the immediate vicinity of the goods being transported. Thus, all legal regulations and actions taken at all levels of the national administration leading to the minimization of the effects of road accidents involving different types of vehicles are extremely crucial for each of us.

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