



National  
ROAD SAFETY  
COUNCIL

# **NATIONAL ROAD**

## **Safety Programme**

# **2013–2020**

Document adopted by the National Road Safety Council on 20.06.2013



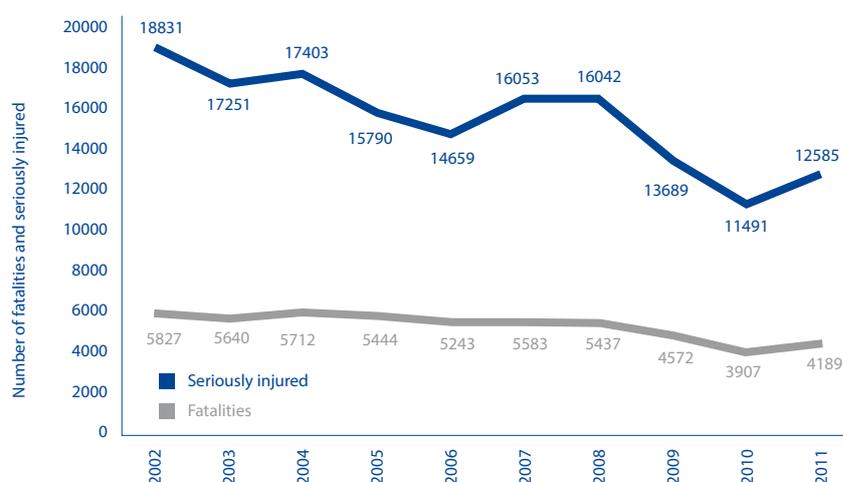
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# THE DIAGNOSIS OF ROAD SAFETY IN POLAND

Over the past 10 years (2002–2011) more than 51 thousand people died and approximately 596 thousand were injured (of which 154 thousand people seriously injured) on Polish roads. During this decade, the number of fatalities decreased by 28%, the number of accidents by 26%, and the number of seriously injured by 33%<sup>1</sup>.



**FIGURE 1.1.**

Fatalities and seriously injured in road accidents in Poland during the period of 2002–2011<sup>2</sup>

<sup>1</sup> In this work, data from the databases mentioned below were used: System Ewidencji Wypadków i Kolidacji (SEWiK) [The Registration System of Accidents and Collisions], the database of GDDKiA (Generalna Dyrekcja Dróg Krajowych i autostrad) [Directorate General of National Roads and Motorways], the database of Gdańsk University of Technology, the database of ERSO (Europejskie Obserwatorium Bezpieczeństwa Ruchu Drogowego) [The European Observatory of Road Traffic Safety], the database of the Motor Transport Institute (Instytut Transportu Samochodowego) and the Roads and Bridges Research Institute (Instytut Badawczy Dróg i Mostów – IBDIM).

<sup>2</sup> Since 1<sup>st</sup> July 2006 the SEWiK database has been transformed and the definition of a seriously injured person has been changed. Currently, in Poland, a seriously injured person is a person who sustained severe disability, severe terminal disease or long-term disease causing real hazard to one's life, permanent mental disease, total or serious permanent inability to work or permanent, significant body disfigurement or deformation, and injuries in the form of, for example, fractures, injuries of the internal organs, severe cuts and lacerated wounds.

## The existing programme for road traffic safety

In 2005 the National Road Safety Programme (Krajowy Program Bezpieczeństwa Ruchu Drogowego) *GAMBIT 2005*<sup>3</sup> was adopted by the government. In the programme it was established that:

1. The Polish far-reaching and ethically empowered vision of road safety will be the **ZERO VISION**.
2. The main objective to be attained by the year 2013 is a decrease in the number of fatalities by **50%** over 10 years, i.e. the number of fatalities is to drop to **2800** in the year 2013.
3. In Poland, the high-risk groups most likely to be killed in a road accident include: vulnerable road users (pedestrians, cyclists, motorbike drivers, motorcyclists), children, and young drivers.
4. The main problems regarding road safety include:
  - a) dangerous behaviours of road users,
  - b) poor quality of road infrastructure,
  - c) lack of an effective system of road safety management.

In order to reach the main objective, 15 groups of priority actions and 144 tasks grouped into five detailed objectives were established:

1. Creation of a basis for conducting effective and far-reaching operations enhancing road traffic safety.
2. Shaping safe behaviours of road users.
3. Protection of pedestrians, children and cyclists.
4. Construction and maintenance of safe road infrastructure.
5. Reduction of the severity of accidents.

The assessment of the *GAMBIT 2005* Programme implementation, as per its status in the year 2010<sup>4</sup> indicates that:

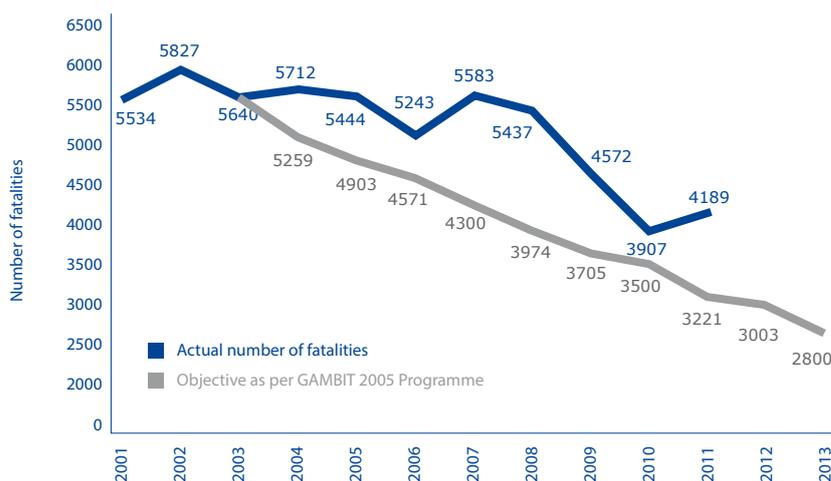
1. In what concerns national roads, the set objective has not been attained – the objective was to reduce the number of fatalities down to 770 (the target value was exceeded by 82%).
2. As for the remaining road categories, the stage objectives were attained – the number of fatalities for these road categories is 4–15% below predictions.
3. In relation to the base year (2003) a decrease of 19% – 40% in the number of fatalities occurred in all voivodeships.
4. In three voivodeships the objective for the year 2010 has been attained.

In the years 2008–2010 a very encouraging decrease in the number of fatalities could be noticed. It was due to the actions undertaken in that period, as well as to the long-term effects of the changes and measures undertaken in preceding years (Figure.1.2).

<sup>3</sup> National Road Traffic Safety Programme 2005 – 2007 – 2013 – *GAMBIT 2005*, Warsaw 2005

<sup>4</sup> Jamroz K., Michalski L. and others: *Ocena realizacji Krajowego Programu BRD G MBIT 2005 i doświadczenia z tego wynikające*. Foundation of Civil Engineering Development at the commission of Secretariat of National Road Traffic Safety Council, Gdańsk 2012.

During the period in which the *GAMBIT 2005* Programme was in force, many educational, preventive and infrastructural actions, in line with the programme directions, were undertaken at the national level. Unfortunately, only 84 out of 144 (58%) planned tasks were undertaken. At the same time, in many cases, political and administrative decisions were incompatible with the *GAMBIT 2005* Programme.



**FIGURE 1.2.**

Objectives set by the *GAMBIT 2005* Programme and the actual number of fatalities in road accidents

In Poland, road accidents are still not perceived as a sufficiently important problem, and the poor effectiveness of actions at the institutional level is the result of the principle of shared collective responsibility for the problems with road safety management.

Despite the problems mentioned above, a systematic decrease in the number of fatalities due to road accidents is taking place in Poland. An increased activity of Polish experts on the international arena may be observed, as well as a fairly extensive number of the undertaken actions for road traffic safety, within which the *GAMBIT 2005* Programme continues to play an essential role.

## Conclusions:

1. The strategy and action plans for road safety were properly developed under the *GAMBIT* programmes.
2. Trainings for road safety professionals increase the number of experts in this area at different levels. Poland participated in certain trainings conducted abroad (the Netherlands, France, Sweden) and is a well-informed member of the international community handling road safety issues.
3. One essential problem was the failure to implement actions *en masse* under the *Gambit 2005* Programme and the lack of assessment of their effectiveness. Unfortunately, sources of funding for these actions were also very limited. As a result, the scope of the undertaken actions was not extensive.

4. The existing regional GAMBIT programmes were properly developed, but the effective implementation of actions under such programmes requires the support from the central level, improvement of databases and performance assessment
5. The identification of agencies leading in the governmental structures (leaders), performing the tasks regarding road safety indicated an insufficient political will behind the actions for road safety (lack of a political and operational leader, and the institutional problems in the area of cooperation).

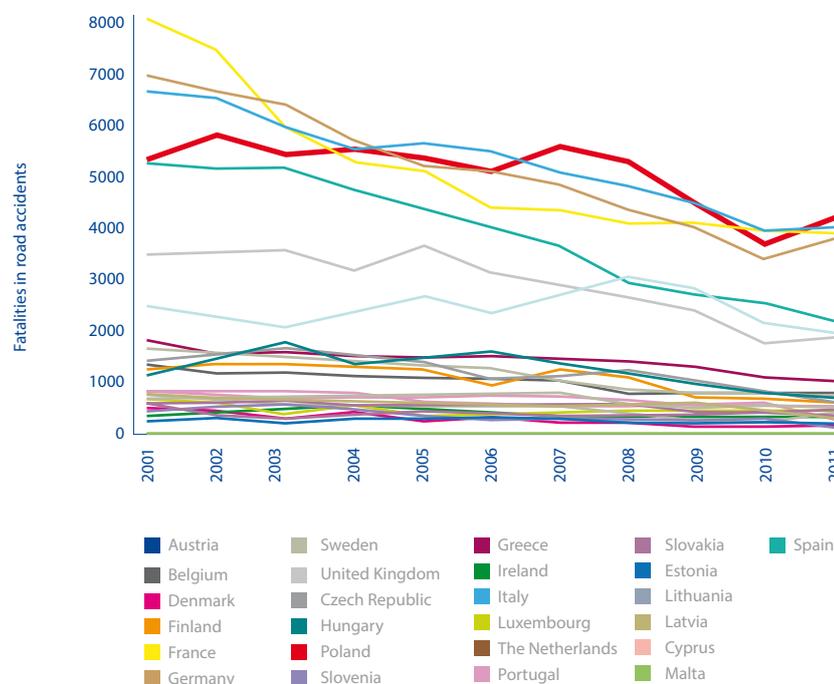
## Current situation

**Scope and characteristics of the problem.** Based on the available statistical data, it can be stated that per 100 accidents on Polish roads, there are approximately: 11 fatalities, 31 seriously injured people, and 93 moderately and lightly injured people.

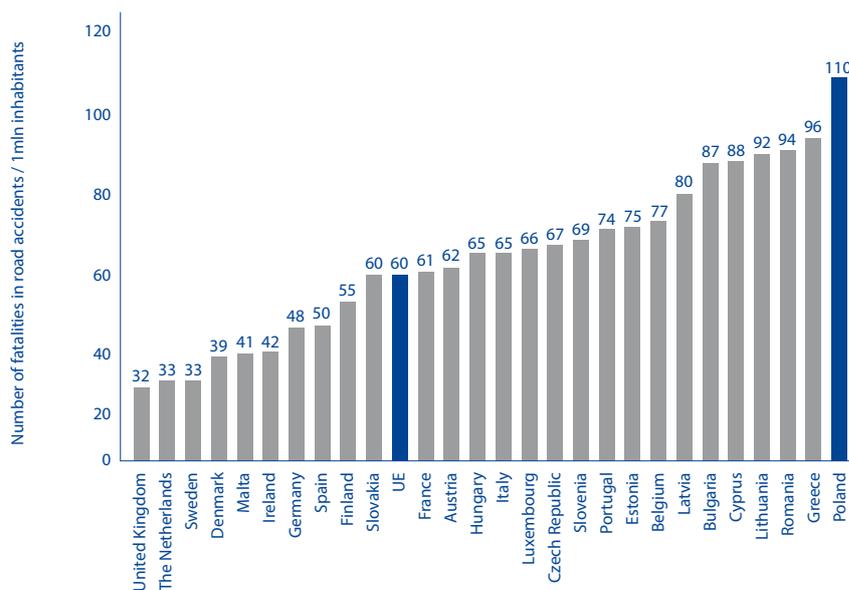
**Poland against the background of the European Union.** Since 2007 Poland has been an inglorious leader among the European Union countries as regards the number of fatalities in road accidents. The share of Poland in the total number of fatalities amounts to 14%, although Polish population accounts for only around 8% of the total number of residents in the European Union (Figure 1.3.).

**FIGURE 1.3.**

Number of fatalities in road accidents in the years 2001–2011 – Poland compared to the EU countries



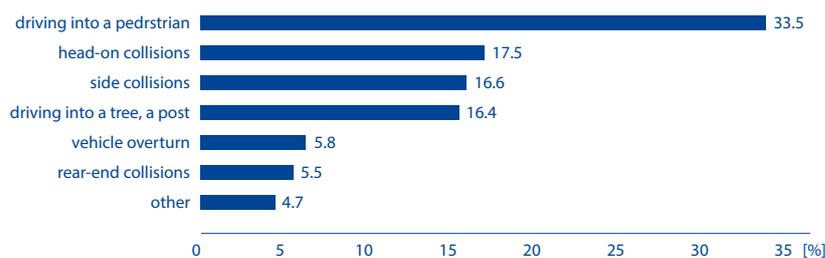
The risk of loss of life on Polish roads is twice as high as the European average in this respect, and over three times higher than in the countries leading in the area of road traffic safety, such as Great Britain, the Netherlands, or Sweden. The most frequently used rate for international comparisons is the mortality rate, which is the number of annual fatalities per 1 million inhabitants, and this rate for Poland amounted to 110 fatalities. Therefore, in 2011 Poland was a leader among all the countries of the European Union also in this classification (Figure 1.4.).



**FIGURE 1.4.**

Number of fatalities in road accidents per 1 mln inhabitants in 27 UE countries in 2011

**Types of accidents.** For many years now, most people killed in road accidents (over 33% of the total number of fatalities) die in accidents connected with running over a pedestrian, which sets us apart negatively not only from Europe, but also from the world. These are the accidents connected with pedestrians moving on a street. Another group of accidents with a high mortality rate (15–20%) are accidents caused by a head-on collision, the reason for which is often the lack of divided roads. There are frequent side collisions on intersections and entries/exits, which can also have fatal consequences. Equally dangerous are the accidents connected with driving into an obstacle (a tree or a post) located too close to the edge of the road (Figure 1.5.).



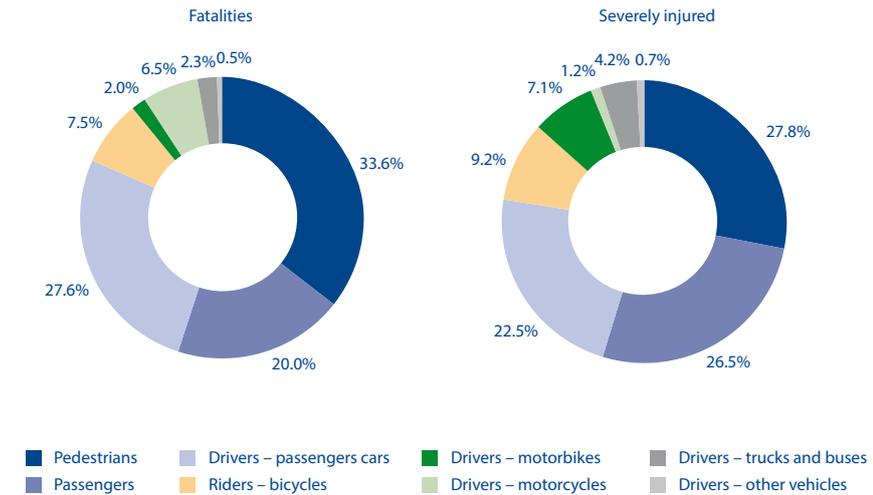
**FIGURE 1.5.**

Types of road accidents with fatal consequences in 2011

**Victims of road accidents – groups of high risk.** From all the victims of road accidents, pedestrians represent the largest group (34% of fatalities and 28% of seriously injured) (Figure 1.6). Among drivers, the largest group of victims are the drivers of passenger cars. Cyclists should be taken into consideration, as they amount to approximately 8% of fatalities and 9% of seriously injured, while their share in the road traffic accounts for around 1%. The share of motorcyclists and motorbike drivers in the number of road accidents victims is also increasing.

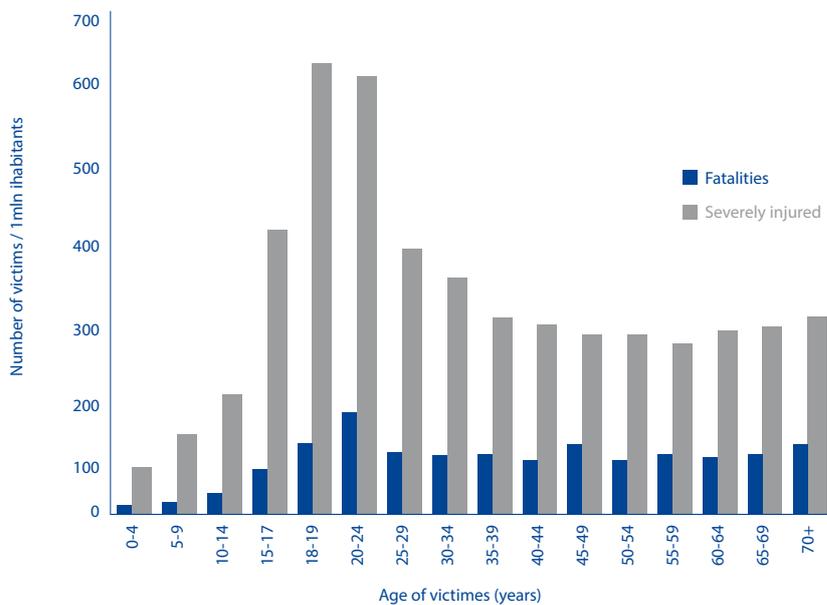
**FIGURE 1.6.**

Share of fatalities and seriously injured divided into road traffic users in 2011.



The accidents in which pedestrians are the victims take place mainly in urban areas, while accidents in which drivers and passengers of vehicles are the victims take place mainly on country roads. However, a huge severity of the accidents with the participation of pedestrians (25% fatalities and 30% seriously injured in comparison to the total number of victims) takes place on the national roads.

**The age of the victims of accidents.** The highest mortality rates (number of fatalities per 1 million of inhabitants) concern young people (aged 15 to 24) and people over 65 years old (Figure 1.7).



**FIGURE 1.7.**

Number of victims of road accidents per 1 mln inhabitants in defined age groups

**The circumstances and causes of road accidents.** The circumstances which lead to road accidents with fatalities most often include:

- the behaviour of road users (maladjustment of speed, failure to give the right of way, incorrect overtaking, incorrect behaviour towards a pedestrian, drunk driving and the lack of protection among road traffic users) – Figure 1.8.,
- external conditions (mainly: limited visibility and adverse weather conditions).



**FIGURE 1.8.**

Fatalities in road accidents caused by drivers in 2011 – percentages

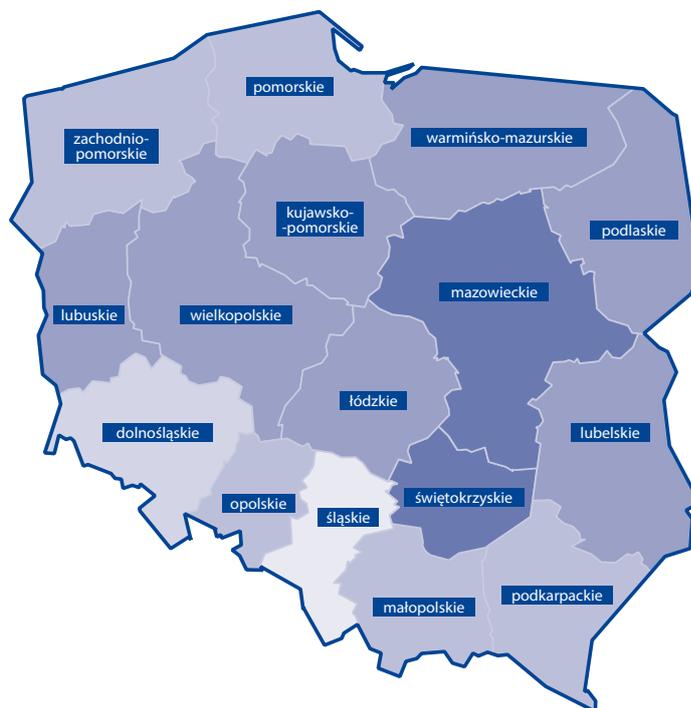
**The geography of accidents and their victims.** The largest number of fatalities is recorded in the Mazowieckie Voivodeship, and then in the following voivodeships: the Wielkopolskie, Łódzkie, Łódzkie and Małopolskie Voivodeships. The combined number of fatalities in these five voivodeships accounts for over 50% of the all road accident fatalities in Poland.

**FIGURE 1.9.**

Map of the social risk measured by the number of road accident fatalities on national roads per 1 mln inhabitants in voivodeships in 2011

**Risk**

- Very Low
- Low
- Medium
- High
- Very High



However, in relation to the number of inhabitants, the highest mortality rate in road accidents and, consequently, the highest risk (Figure 1.9.) exists in the Świętokrzyskie and Mazowieckie Voivodeships. It is also quite high in the Podlaskie, Łódzkie, Warmińsko-Mazurskie, Wielkopolskie, Lubelskie, Lubuskie and Kujawsko-Mazurskie Voivodeships. It results, among others, from the low standard of the road network, high transit traffic in these voivodeships, and inappropriate behaviours of road traffic users.

**Socio-economic cost of road accidents.** Since 2012 the cost of road accidents in Poland is estimated by a commission of the National Road Safety Council. The method of the valuation of the costs of road accidents is based on the generally accepted practice in transport economics and comprises of the following components: medical costs, cost of the lost productivity power (lost production), cost of damage to property and administrative costs. This method does not factor in the cost of human suffering resulting from road accidents. Additionally, the research conducted by the Road and Bridge Research Institute does not take account of the cost of collisions, i.e. accidents without any victims (estimated cost of 8 billion zloty). In the future, this element should be included in the methodology of accident costs valuation.

According to the data from 2011, the greatest share of the annual accident cost in Poland is represented by the costs related to the injuries (57.3%). The costs related to fatalities account for 1/3 of the annual total (32.6%). The smallest share is represented by the cost of material losses (10.1%). The annual cost of road accidents<sup>5</sup> in 2011 exceeded 20 billion zloty. Factoring in the collisions raises the total cost of road accidents up to over 28 billion zloty.

	Number	Average cost per road accident (in thousands zloty)	Cost of road accidents (in billions zloty)	Share in the total cost of road accidents (%)
Fatalities	4 189	1 558	6.572	33
Injured	49 501	244	11.607	57
Accidents	53 246	51	1.953	10
<b>Total</b>			<b>20.132</b>	<b>100</b>

**TABLE 1.10.**

The cost of road accidents in Poland in 2011

**Unfavorable forecast.** Forecasts regarding demography and motorization in Poland indicate that, in the years 2011–2020: the number of inhabitants may decrease by 1–4%, the number of vehicles may increase by 15–25%, i.e. reach the number of 30 million vehicles, and mobility of citizens (measured by transport performance) may increase by 30–35%. The stagnation or the limitation of preventive activities in the following years may halt the decreasing tendency in terms of the number of road accidents and the fatalities resulting from them. It is estimated that, in such a situation, over 40 thousand people may be killed and over half a million may be injured in road accidents by 2020. The value of both property and social loss of these road occurrences may reach 225 billion zloty. Therefore, it is necessary to take effective steps in order to protect the lives and health of road users.

**Diagnostic conclusions.** The research allowed for the identification of main problem areas in road safety in Poland:

1. Protection of pedestrians in road traffic.
2. Shaping the habits of driving with an allowed speed.
3. Shaping safe behaviours of road users.
4. Adaptation of road infrastructure to basic standards of road safety.
5. Promotion and use of safe vehicles.
6. Development of road rescue system.
7. Development of road safety management system as a basis for the effective solution of the aforementioned problems.

<sup>5</sup> Road accident – an accident relating to traffic on public roads resulting in death or injury of their users.

# INTERNATIONAL AND NATIONAL CONDITIONS

This programme was developed within the context of other existing, accepted and planned programmes and strategies – both international (UN and EU) and national.

## International determinants

**UN recommendations for national strategies.** In 2010, the UN General Assembly adopted a resolution concerning the plan for actions of all countries for the improvement of road safety. Recommendations were listed in the document entitled *Global Plan for the Decade of Action for Road Safety 2011–2020*<sup>6</sup>. The main objective of the plan is the protection of 5 million people from being killed in road accidents in the years 2011–2020. In addition, it was assumed that the UN programme will contribute to the fact that every country will:

- establish its own road safety programme,
- set a target for the reduction of the number of fatalities,
- appoint units responsible for road safety management,
- improve the quality of road safety data collection,
- monitor progress and performance of tasks and their results, increase financial resources assigned for road safety.

The *Global Plan* includes 5 predefined areas of activities, the so-called pillars for national strategies:

- road management system,
- safer road infrastructure and provision of mobility and access to all road users (especially pedestrians, cyclists and motorcyclists),
- safer vehicles,
- shaping safer behaviour of road users,
- system of road rescue and post-crash response.

<sup>6</sup> Global Plan for the Decade of Action for Road Safety 2011–2020; ITS BRD no 1/2011 after [http://www.who.int/roadsafety/decade\\_of\\_action/plan/plan\\_english.pdf](http://www.who.int/roadsafety/decade_of_action/plan/plan_english.pdf)

**The European Union Actions for Road Safety.** As a continuation of the policy from previous years, the European Union obliged its member states to reduce the number of road fatalities on their territories. The latest, 4<sup>th</sup> European Programme for Road Safety<sup>7</sup> has an ambitious goal – the reduction of the number of road fatalities by 50% in 2020, in relation to the year 2010.

*The 4<sup>th</sup> European Programme for Road Safety* is a stage in the performance of a long-term European policy described as *Vision Zero*. No road fatalities – this is one of the most important goals determined in a document issued in 2011: *White Paper – Roadmap to a Single European Transport*

*Area – Towards a competitive and resource efficient transport system.* The fulfillment of all the goals is a condition of the integration of all regions and development of world economy. As the country in which the greatest number of people are killed on the roads every year, Poland is to take intensive measures in order to eliminate this problem.

In the strategic guidelines adopted on 20<sup>th</sup> July 2010, the European Commission listed 7 goals which are to be taken into account by EU members when developing local programmes:

- improvement of safety measures in vehicles,
- construction of a safer road infrastructure, acceleration of new technologies uptake,
- improvement of training and education system for road users, effective enforcement of regulations,
- determination of target reduction of the injured in road accidents, enhanced focus on motorcyclists.

## National conditions

**National Development Strategy 2020<sup>8</sup>.** In this document, it is stated that, due to high risk of road fatalities in Poland, programmes for the improvement of Road Safety are to be developed and implemented. Such programmes are to be in line with works on the improvement of infrastructure and information and education campaigns concerning traffic rules and the promotion of safe behaviour of road users. Most important tasks include:

- construction and development of automatic traffic monitoring systems,
- development of an integrated system of accidents management,
- development of an integrated system of passenger service and goods transport,
- improvement of forms and channels of communication with society in terms of road traffic safety, Intelligent Transportation Systems,
- development of systems for financing investments within the scope of road traffic safety.

<sup>7</sup> 4<sup>th</sup> European Programme for Road Safety: [http://europa.eu/rapid/press-release\\_MEMO-10-343\\_pl.htm](http://europa.eu/rapid/press-release_MEMO-10-343_pl.htm) oraz [http://ec.europa.eu/transport/road\\_safety/pdf/com\\_20072010\\_en.pdf](http://ec.europa.eu/transport/road_safety/pdf/com_20072010_en.pdf)

<sup>8</sup> *National Development Strategy 2020* – proclaimed by the Council of Ministers on 25<sup>th</sup> September 2012.

**Transport Development Strategy until 2020<sup>9</sup>.** Apart from the general goals which take account of the new concepts of EU common transport policy and of the main guidelines of Polish transportation policy developed recently, the document indicates strategic trends in the area of road traffic safety:

- safe behaviour of road users,
- safe road infrastructure, safe vehicles,
- effective system of road rescue and medical assistance.

**Efficient State Strategy 2020<sup>10</sup>.** The document underlines seven detailed objectives. Objective number seven: *Provision of a high standard of safety and public order*, determines the following directions for intervention associated with road traffic safety:

- counteracting road risks,
- road rescue and protection of the population (fire protection; preventive, rescue and firefighting actions),
- implementation and improvement of the rescue alert system,
- improvement of the functioning of the Medical Rescue Alert system

The aforementioned intervention directions include several issues, such as the development of a national Road Safety programme, unification of the law, raising existing infrastructure standards, improvement of the functioning of structures and of the enforcement of procedures.

**National Health Programme for the years 2007–2015<sup>11</sup>.** Road accidents are considered a health-related problem of the society. The third strategic goal of the *National Health Programme* is the reduction of the frequency of injuries resulting from road accidents and the limitation of their consequences. Reaching this goal calls for the reduction of the number of deaths resulting from road accident injuries. The need for preventive measures has also been identified.

**National Programme for Prevention and Solving of Alcohol-Related Problems for the years 2011–2015<sup>12</sup>.** The document determines plans for the following actions directed at limiting the number of vehicle drivers under the influence of alcohol:

- increase the number of sobriety tests carried out during standard road checks,
- development of a strategy concerning the problem of drunk driving, development and implementation of a unified programme for drivers detained for driving under the influence of alcohol,
- public education actions concerning the influence of alcohol on human body and the risk of damages arising as a result of driving vehicles under the influence of alcohol.

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<sup>9</sup>. *Transport Development Strategy* – proclaimed by the Council of Ministers on 22<sup>nd</sup> January 2013.

<sup>10</sup>. *National Health Programme for the years 2007–2015* – proclaimed by the Council of Ministers on 15<sup>th</sup> May 2007.

<sup>11</sup>. *National Health Programme for the years 2007–2015* – proclaimed by the Council of Ministers on 15<sup>th</sup> May 2007.

<sup>12</sup>. *National Programme for Prevention and Solving of Alcohol-related Problems for the years 2011–2015* – proclaimed by the Council of Ministers on 22<sup>nd</sup> March 2011.

# PROGRAMME OBJECTIVES

## Programme principles

Both Polish experience and international achievements in road safety programmes indicate that the Programme should be implemented with account of several significant issues:

1. The principle of systemic approach to safety management.
2. The principle of the improvement of road safety based on the *Safe System* idea.
3. The principle of the improvement of road safety based on the *Vision Zero* idea.
4. The principle of establishing quantitative goals facilitating the monitoring of the strategy implementation and the formulation of unambiguous assessments.
5. The principle of strategic measures formulation based on UN's fundamental pillars of safety (see: Chapter 2).
6. The principle of focusing on main problems of road safety when establishing priorities and directions for actions as per the *4xE* approach: (1) *Engineering*, (2) *Enforcement*, (3) *Education*, (4) *Emergency*. Due to the fact that the emergency response was included as an individual pillar in the *Safety System*, the *Programme* devoted an individual chapter to this issue.

## Systemic management

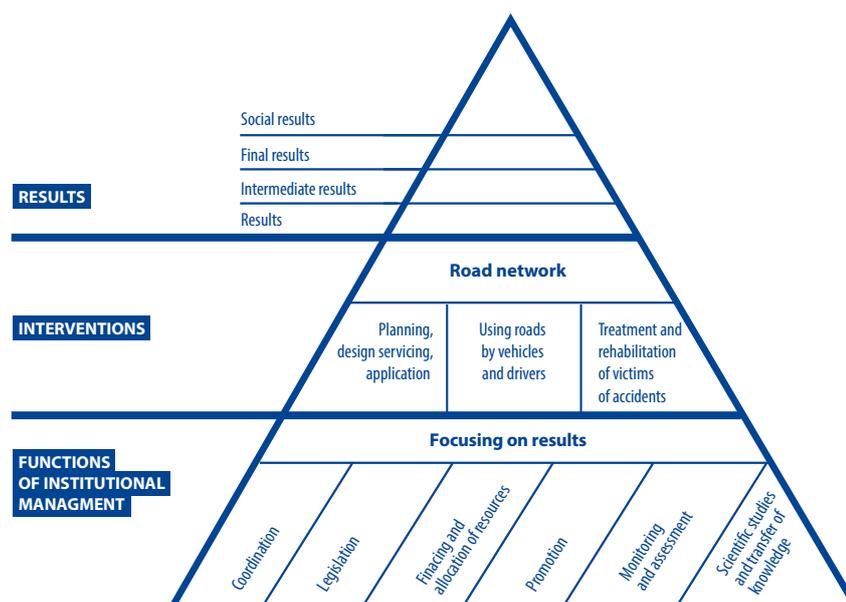
According to the systemic approach to safety management on national and international level, three mutually related elements should be taken into account: (1) functions of institutional management, (2) specific actions (interventions), as well as (3) results.<sup>13</sup>

Effective functioning of the management system for road safety is to be based on specific results and focusing on them sets objectives that have to be attained. At the same time, it presents the current situation and in a way serves as a reminder about these objectives. The principle of focusing on results will require the improvement of planning, coordination, motivation, and activity assessment for the benefit of the improvement of road traffic safety.

<sup>13</sup>. Directions of the World Bank: *Safe System Approach*, based on *TOWARDS ZERO – Ambitious Road Safety Targets and the Safe System Approach*, OECD/ITF 2008

**FIGURE 3.1.**

Systemic management of road traffic safety<sup>14</sup>



However, the largest part of current public debate on road safety focuses on single operations. Actions which are frequently undertaken on a one-off and *ad hoc* basis, do not generate an optimal effect without a management function. All in all, the level of safety should be established with respect to the quality of actions which, on the other hand, depend on the quality of institutional management functions.

The third, final element of the management system for road safety lays in defining required results and objectives. The results show whether the system is effective or not. Determination of the initial status of safety and of whether it is approximating the set objective is obtained by monitoring relevant factors.

### Safe System Approach

The *Safe System* approach is based on the assumption that people will always make errors. Road transport system, properly designed and implemented, should be after all, “lenient” for human errors. Thus, it should minimize results of such errors so as to avoid their most fatal consequences – death or severe injuries. The measures implemented within the approach *Safe System* also enable us to avoid the impact of physical forces which exceed the human body tolerance level in the case of an accident.

The *Safe System* approach also emphasizes the fact that problems of road safety cannot be solved by focusing solely on the improvement of behaviours of road users. Besides, it assumes that people should not be simply because they wish to be mobile. Behaviour of a single road user directly affects safety of others and, what follows, every single person is responsible for road traffic safety.

<sup>14</sup> Bliss, Breen, *Implementing the Recommendations of the World Report on Road Traffic Injury Prevention*, Washington 2009, p.10

## Vision

The programme for the period of 2013–2020 continues the far-reaching **ZERO VISION**, adopted in previous national programmes of road safety<sup>15</sup>. The vision was successfully initialized in Sweden<sup>16</sup>, and then it was developed by other countries. Assuming, among others, that human life and health is more important than the right to be mobile and other objectives of road transport system, the **ZERO Vision** strives to decrease the number of fatalities in road traffic to zero.

### Vision ZERO fatalities on Polish roads

Road transport system is to ensure the exercise of the human right to move, yet it should be safe. **Death or injuries must not be regarded as an inevitable result of mobility.**

Accepting the challenge of the **ZERO Vision** requires skillful, comprehensive use of the effect of influence on road safety of the following factors:

- education and trainings for road users,
- discipline in observing the set principles and inevitable consequences for their violation,
- speed of moving on a road,
- safety standards ensured by vehicles,
- design and modernization of roads along with their surroundings.

The programme assumes that the result to be attained is not only to minimize the number of road accidents, but also to ensure that even if an accident does happen, its consequences are not fatal.

The vision reflects the far-reaching objective of the European Union – the world leader of safety in every type of transport, striving to reduce the number of fatalities in 2050 as close as possible to zero.<sup>17 18</sup>

<sup>15</sup> National Programme for the Improvement of Road Safety in Poland GAMBIT 2000 and National Road Safety Programme 2005 – 2007 – 2013 – GAMBIT 2005

<sup>16</sup> <http://www.visionzeroinitiative.com/en/Concept/>

<sup>17</sup> Tingvall C., Lie A.: *Implementing deep change – Measuring Progress Towards Safe Travel by 2020*. Swedish Transport Administration, EuroRAP General Assembly, Munich 2012.

<sup>18</sup> WHITE PAPER: *Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system*. EU, EC, Brussels 2011.

## Objectives

While the Programme *GAMBIT 2005* (see: Chapter 1) established objectives regarding only the category of fatalities, this edition also emphasizes the problem of seriously injured victims. Experiences of the European countries with the highest level of road safety, such as Great Britain, Sweden or the Netherlands, indicate that there is a great potential for decreasing the number of fatalities. For example, if Poland reached the level of road safety close to the European average – 60 fatalities per 1 mln residents<sup>19</sup>, which is the figure for Austria, Italy, Slovenia, Hungary, or Slovakia – it would mean a decrease of over 44% in the number of fatalities. The number of seriously injured victims holds a similar potential. Both the number of fatalities and the number of seriously injured serve as base information regarding the level of road safety in the European countries.

### Main objectives

Two main objectives to be attained until 2020 were established as a step towards the implementation of the long-term vision:

**Fatalities**  
to limit the annual number of fatalities by at least **50%** until 2020

This objective should be attained in relation to 2010 – which means **a maximum of 2 000 of fatalities in 2020.**

**Seriously Injured**  
to limit the annual number of seriously injured by at least **40%** until 2020

This objective should be attained in relation to 2010 – which is **no more than 6 900 of seriously injured in 2020.**

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<sup>19</sup>. According to data of EU-27 for the year 2011

## Stage objectives

Fatalities:	
year	maximum number of fatalities
2014	3 000
2017	2 400

Seriously injured:	
year	maximum number of seriously injured
2014	9 400
2017	8 000

## Programme structure

As regards *The Decade of Action for Road Safety 2011–2020*, as well as *Transport Development Strategy until 2020* (see: Chapter 2) established by UN, *National Road Safety Programme 2013–2020* and its structure of intervention is based on the following five pillars:

- safe behaviours of road traffic users
- safe road infrastructure
- safe speed
- safe vehicles
- rescue and medical assistance system.

Effective implementation of activities within the above mentioned pillars is conditioned by the improvement of the management system for road safety. Therefore, the Programme indicates also the activities which are essential for planning, implementation, coordination and monitoring activities within its particular pillars.

In every pillar, based on the diagnosis of the existing status of road safety, three priority directions (priorities) reflecting fundamental problems of road safety in Poland were distinguished, as well as conditions for their implementation. However, every priority accumulates activities covering:

- Engineering – understood as technical solutions for:
  - road network, which upgrade road safety and make roads “forgive” human errors,
  - vehicles, which protect drivers, passengers and other road users, as well as diminish possible damages of an accident.
- Supervision – understood as visible supervision and control
- aiming at the verification of existing regulations and prevention of non-compliance.
- Education – understood as enhancing awareness of road safety by identification and understanding the risk. The objective of education is to change attitudes and behaviours at the individual level, as well as at the level of certain communities or at the organizational level.

Pillar	Type of activity		
	Engineering	Enforcement	Education
Safe road user			
Safe road			
Safe speed			
Safe vehicle			
Emergency and post-crash care			

Interventions within trends of priority activities appropriate for every safety pillar

Activities will be conditioned by legal amendments, as well as researches and exchange of experiences.

# SAFE ROAD USER

The most important objective of road safety system is the protection of life and health of road users. People are the main focus of all actions conducted under the *Safe System* approach. Within various areas of the system, these actions will be directly or indirectly targeted at changing dangerous behaviours of road users or their protection against dangerous behaviour. The objective of this chapter is to indicate the actions that are directly connected with road users. As a separate chapter on problems linked with excessive speed in road traffic has been developed (see: Chapter 6), the directions of preventive actions oriented towards education and supervision over human behaviour in terms of speed are not included in the chapter below.

## Facts

**Victims of accidents.** Statistical data (table 4.1) indicate that among pedestrians represent the largest group of fatalities (34%) and then passenger car drivers (28%). Vulnerable road users (pedestrians, cyclists, motorcyclists, motorbike drivers) jointly represent approximately 50% of all fatalities. As for seriously injured in accidents, the highest number corresponds to drivers and passengers of passenger cars (almost 44%) and pedestrians (28%). As mentioned in Chapter 1, cyclists, who account for around 8% of victims of accidents should be given more consideration, seeing as their share in road traffic stands at barely around 1%. The share of motorcyclists and motorbike drivers in the number of victims of road accidents is also on the rise.

Poland leads amongst the most dangerous countries of the European Union as regards the level of risk for pedestrians in road traffic. In 2011 in Poland, the number of pedestrians killed in road accidents per 1 million residents was 37, whereas in the Netherlands this rate is almost ten times lower. There is also a systematic increase in the share of accidents involving pedestrians in limited visibility conditions, and this figure now stands at over 70% of fatalities and almost 50% of seriously injured.

The highest demographic mortality rates (number of fatalities per 1 million people) relate to young road traffic users, aged 15–24 years, and the elderly aged over 65. Extensively high rates regarding seriously injured are recorded for young road traffic users (Figure 4.1.). During the last 10 years, a significant decrease of demographic mortality rate for road accidents was recorded, excluding the group of young drivers (aged 20–24 years old).

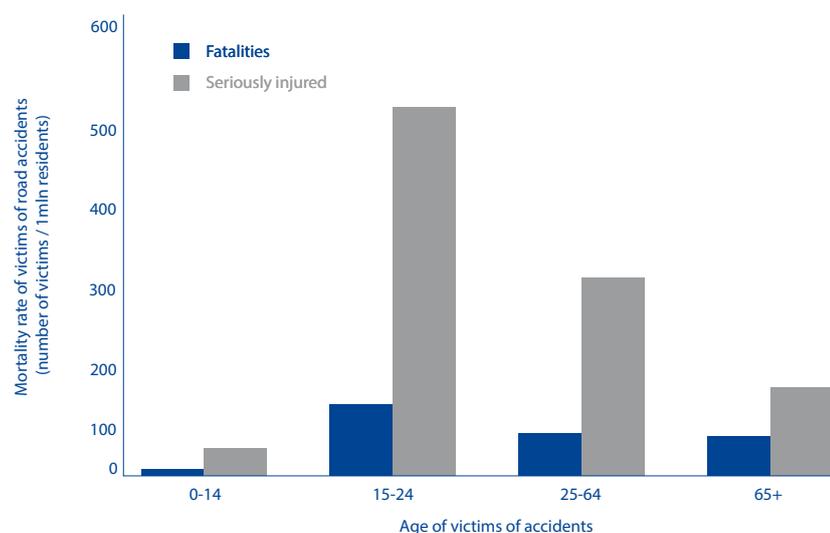
**TABLE 4.1.**

Victims of accidents divided into types of road users in 2011

Type of a road user (victims of accidents)	Fatalities	%	Seriously injured	%
<b>Pedestrians</b>	1 408	33.6	3 510	27.8
in total, including:	1 945	46.4	5 760	45.7
passenger cars	1 555	27.6	2 843	22.5
bicycles	313	7.5	1 156	9.2
<b>Drivers</b>				
motorcycles	271	6.5	890	7.1
motorbikes	82	2.0	532	4.2
trucks and buses	101	2.4	250	2.0
other vehicles	23	0.5	89	0.7
in total, including:	836	20.0	3 343	26.5
<b>Passengers</b>				
passenger cars	742	17.7	2 700	21.4
other vehicles	94	2.2	643	5.1
<b>In total</b>	<b>4 189</b>	<b>100</b>	<b>12 613</b>	<b>100</b>

**FIGURE 4.1.**

Mortality rate for victims of road accidents divided into age groups in 2011



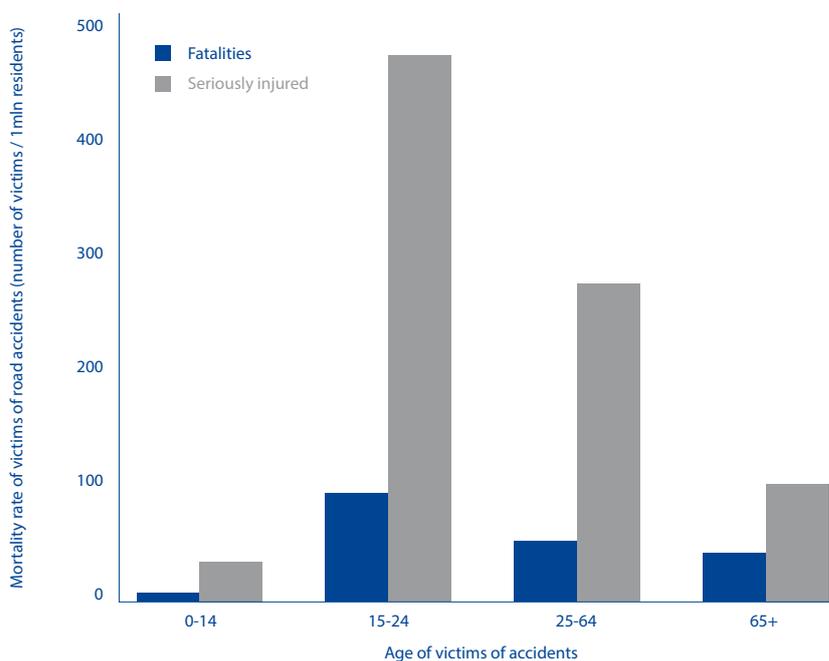
**Perpetrators.** Drivers of passenger cars represent the largest group of perpetrators of accidents (67%) (table 4.2), then drivers of other vehicles (21%), and pedestrians (12%). Out of vehicle drivers, drivers of passenger cars and trucks represent the largest group of accident perpetrators. The largest number of accidents involving pedestrians was caused by passenger car drivers. The most frequent reasons included: failure to give the right of way to a pedestrian on a pedestrian crossing, incorrect manoeuvres and excessive speed of drivers.

Perpetrators of accidents	Accidents	%	Fatalities	%	Seriously injured	%
<b>Pedestrians</b>	4 377	12.0	759	21.1	1 349	11.7
in total, including:	32 138	88.0	2 841	78.9	10 143	88.3
passenger cars	24 573	67.3	2 097	58.3	7 640	66.5
bicycles	1 854	5.1	143	4.0	520	4.5
motorcycles	1 160	3.2	183	5.1	521	4.5
motorbikes	994	2.7	56	1.6	323	2.8
trucks and buses	2 705	7.4	299	8.3	866	7.5
other vehicles	852	2.3	63	1.8	273	2.4

**TABLE 4.2.**

Accidents divided into perpetrators in 2011

In relation to the size of population, young drivers are the most frequent perpetrators of road accidents (Figure 4.2.). Young people represent 14% of the general population, while the accidents caused by young drivers account for 26% of all the road fatalities.



**FIGURE 4.2.**

Mortality rate for victims of road accidents divided into age groups of perpetrators of accidents in 2011

Incorrect behaviours of road traffic users have a critical impact on road accidents. Such behaviours include: hazardous behaviour, driving under the influence of alcohol or drugs, failure to apply protective measures by road traffic users.

Hazardous behaviour mainly includes driving at a speed maladjusted to road traffic conditions, incorrect overtaking, passing a stationary vehicle, and passing from the opposite direction (16%), failure to give the right of way (15%), as well as incorrect behaviour towards pedestrians (10%). Other important elements are: wrong way driving (4%) which often results in head-on collisions, and driver fatigue (4% of all fatalities, and 7% in the case of motorways and expressways).

In 2011, drivers under the influence of alcohol participated in 12.4% of all accidents, in which 559 people were killed (13.3% of all fatalities). The previously undertaken actions resulted in the smallest share of victims caused by drunk driving in all of the EU.

The application of protective measures by drivers and passengers of vehicles is the simplest protection against fatal consequences of an accident. Absence of regular studies precludes the assessment of the actual use of protective devices. The estimated data based on studies conducted since 2008 at the commission of the Secretariat of the National Road Safety Council indicate that: 78% of passenger car drivers, 81% of passengers travelling in the front seat and 51% of passengers travelling in the back seat used seat belts. What is more, 86% of children were protected (child safety seats or seat belts). Nevertheless, there is no information on protections (helmets) used by motorcyclists and cyclists.

## Risk factors

Human errors constitute the largest potential risk factor in road traffic. They are made by road traffic users disrespecting effective regulations and using roads in an irresponsible manner. Therefore, they expose themselves and others to risk. In such cases, dangerous behaviours must be restricted by effective supervision and sanctioning system, unless they can be limited by engineering measures. Errors are also made by road traffic users obeying regulations and using roads responsibly. The *Safe System* policy is to minimize the possibility of making an error by a road user. If an error still occurs, the system is to protect the road user from the negative consequences of his errors.

**Pedestrians.** Driving into a pedestrian represents the most tragic type of accidents on Polish roads. It occurs when:

- a pedestrian is moving along a road and, being vulnerable, often unseen, is run over by a vehicle,
- a pedestrian is crossing a road, on which vehicles run with an extensive speed.

Circumstances triggering a particularly high risk of driving into pedestrians in Poland include:

- low level of education of pedestrians and drivers, non-compliance with traffic regulations by pedestrians and drivers, as well as the lack of partnership on a road manifested in the preponderance of drivers in relation to vulnerable road traffic users (pedestrians, cyclists),
  - incorrect planning and organization of urban and residential areas, disadvantageous location of facilities generating pedestrian traffic,

- excessive speed of vehicles in the places where pedestrians are present, as well as a small number of engineering measures for the protection of pedestrians (sidewalk, refuges, traffic lights),
  - poor visibility of pedestrians, particularly in limited visibility conditions (night, fog, rainfall, snowfall) caused by failure to use reflective elements or insufficient lighting of places with pedestrians (among others, pedestrian crossings).

The most frequent errors made by pedestrians include:

- entering a road directly in front of an approaching vehicle,
- crossing in a prohibited area,
- jaywalking,
- being poorly visible on a road after dusk or in limited visibility conditions.

**Drivers and passengers of vehicles.** Circumstances triggering a particularly high risk of dangerous behaviours of drivers in road traffic in Poland include:

- low level of education of drivers,
- driving under the influence of alcohol and other intoxicating substances,
- fatigue and distraction of poor awareness of risks attention (e.g. by using mobiles while driving),
- poor awareness of risks connected with not using protective measures in a vehicle (seat belts, child safety seat),
- aggressive driving and recklessness.

The most frequent errors made by drivers include:

- failure to give the right of way,
- failure to maintain safe distance,
- approaching pedestrian crossing without adequate caution,
- maladjustment of speed to road traffic conditions (see: Chapter 6),
- running red lights,
- incorrect overtaking (including overtaking of a vehicle which is overtaking another vehicle),
- failure to maintain safe distance between vehicles.

Additional circumstances increasing the risk of accidents and their severity include:

- young age (tendency to reckless behaviours),
- old age (psychophysical insufficiency),
- tendencies to compensation of risk (unlimited faith in technology).

## Priorities and directions of actions

The diagnosis of the current status, as well as experiences of the model countries of the European Union lead us to adopt two priorities within the pillar *Safe Road User*:

- Priority 1 – Shaping safe behaviours of road users,
- Priority 2 – Protection of road users.



**Shaping safe behaviours of road traffic users** is aimed at shaping an aware and polite road traffic user, who respects the rights of others. The objective is to be attained mainly by action directions connected with the education and supervision over road traffic. It is worth mentioning that supervision over behaviours of road traffic users in this priority is of preventive nature, i.e. discouraging dangerous behaviours (e.g. awareness of inevitability of punishment) (table 4.3). Both categories of activities aim at changing behaviours of all road users:

- pedestrians (including children and the elderly),
- vehicle drivers and their passengers,
- cyclists,
- motorcyclists and motorbike drivers.

**Protection of road users** aims at conducting activities of a protective nature. Unlike in the case of actions oriented at changing behaviours of all road users, their safety should be ensured by systems that they do not have control over, of which they may not even be aware. These actions primarily include: engineering activities (building safe roads and their surroundings), uptake of modern technology (security systems in vehicles), supervisory, control and information activities (table 4.3).

**TABLE 4.3.**

Priorities and directions of actions within the *Safe Road User* pillar

Priority	Directions of actions		
	Engineering	Supervision	Education
<b>Shaping safe behaviours of road traffic users</b>		Improvement of the supervision system over behaviours of road traffic users regarding their awareness of being controlled and the inevitability of punishment <sup>i</sup> ;	Shaping attitudes promoting safe behaviours in road traffic within comprehensive education and promotion system <sup>ii</sup> (school education of future drivers and information and promotion activities);
<b>Protection of road users</b>	Promotion and implementation of road protection measures for road traffic users, particularly pedestrians and cyclists (infrastructure for pedestrians and cyclists, organization of road traffic with respect to the needs of cyclists); Implementation of measures moderating road traffic <sup>iii</sup> ;	Development and modernization of a supervision system (including automatic) over behaviours of road users;	

<sup>i</sup>. Within the element of supervision particular attention should be paid to: driving under the influence of alcohol, fastening seat belts, using child safety seats.

<sup>ii</sup>. *Education and Promotion System* taken holistically within the *Road Traffic Safety Management System* (table 9.1)

<sup>iii</sup>. Direction included also in *Safe Roads* and *Safe Speed* pillars.

## Conditions for the performance of these actions

Fundamental conditions for successful implementation of actions regarding safety of road traffic users include legislative measures and support resulting from research and exchange of experiences.

### Legislative measures

- Amendment of legal acts regarding the shaping of safe behaviours in road users, including:
  - ensuring safety for vulnerable road users (among others, through the implementation of universal education system at schools<sup>20</sup> regarding transportation),
  - decreasing the risk of accidents involving young drivers by establishing new regulations<sup>21</sup>,
  - decreasing the risk of accidents involving the elderly by establishing new regulations,
  - decreasing the risk of accidents caused by chronically ill people by establishing new regulations (e.g. periodic medical examinations),
  - regulation of the competences of institutions handling supervision over behaviours of road traffic users.
- Amendment of legal acts regarding the protection of road traffic users, including:
  - strengthening the safety of vulnerable road users (among others, revision of the right of way regulations regarding pedestrian crossings),
  - reduction of drunk driving,
  - implementation into spatial planning of the so-called “good practices” for road traffic safety.

### Research and exchange of experiences

- Control over trends of changes in behaviours of pedestrians, cyclists, motorcyclist and drivers, as well as over the influence on safety of these groups of road users (speed, seat belts, helmets, running red lights).
- Assessment of the effectiveness of actions and implemented measures for attaining the objectives connected with the protection of particular groups of road traffic users.
- Development of a system for collecting data regarding behaviours in road traffic.

<sup>20</sup> Education System included entirely within the *Road Traffic Safety Management System* (table 9.1)

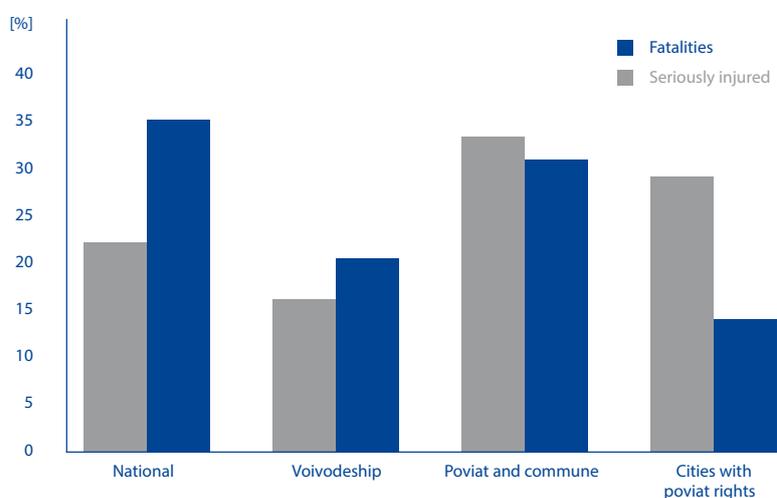
<sup>21</sup> For example, by implementation of the so-called probationary period, higher fines for offences in road traffic, different system of charging penalty points.

# SAFE ROADS

One of the main causes of road accidents and their severity (the number of injured people and fatalities) are the errors in road infrastructure. The condition of the road infrastructure is rarely presented as the immediate cause of accidents in reports, but the road irregularities certainly favour the making of mistakes by road users (these irregularities are, inter alia, connected with the shaping and management of the road infrastructure). As such, they are an important indirect cause of the accidents. Another risk factor are obstacles in the immediate road surroundings, which amplify the effects of the accidents.

## Facts

The public road network in Poland has a total of approximately 383 300 kilometers, while the country road network (managed by the GDDKiA) accounts for around 18 500 kilometers, which constitute around 5% of the public roads. It is worth remembering that this network handles around 30% of the total road traffic in Poland. In 2011 the following data were recorded: 1 458 fatalities and 2 750 seriously injured (22% of the total number of fatalities and 35% of the total number of seriously injured respectively) on national roads, 852 fatalities and 2 006 seriously injured (20% and 16% respectively) on voivodeship roads, 591 fatalities and 3 651 seriously injured (14% and 29% respectively) on the roads of cities with poviats rights, and 1 288 fatalities and 4 183 seriously injured (31% and 33% respectively) on the poviats and commune roads altogether (Figure 5.1).

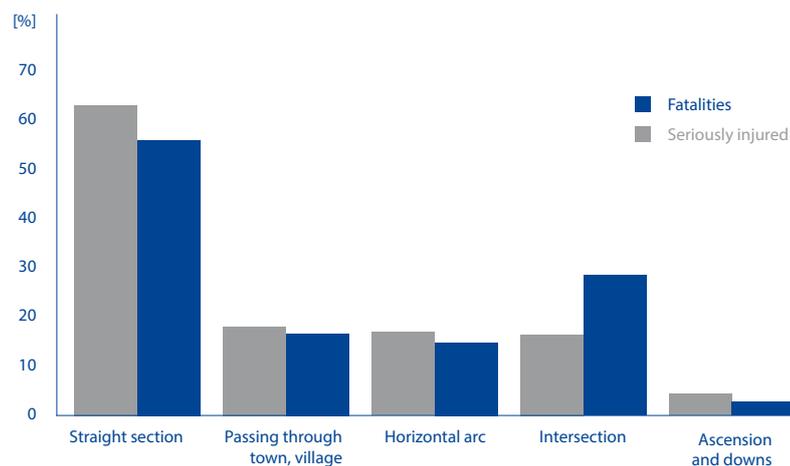


**FIGURE 5.1.**

Location of accidents according to road categories

An analysis of the occurrence of accidents on the entire road network in Poland divided into sections indicated that: 17% of the total number of fatalities and 16% of the total number of seriously injured were recorded on the sections of transit roads passing through localities, 15% of fatalities and 27% of the seriously injured were recorded on intersections, and 16% of the fatalities and 14% of the seriously injured were recorded on horizontal curves (Figure 5.2).

**FIGURE 5.2.**  
Location accidents by place of occurrence on national roads in 2011



Of all the types of road accidents, side collisions were most frequent – they constituted 28% of the total number of accidents, but the largest number of fatalities was caused by running over a pedestrian – this cause accounts for 33% of the total number. Another serious problem is the huge number of head-on collisions with fatal consequences – 18% of fatalities, and driving into a hard obstacle in the road surroundings – a tree/a post/a sign – which constitutes 17% of fatalities. According to the foregoing, the surroundings and equipment of roads are still inappropriate. The obstacles dangerous for the road safety are not eliminated to a sufficient degree, roads are not sufficiently equipped with security devices for vulnerable road users, and the actions leading to limit the number of head-on collisions with the most fatal consequences are not undertaken to an adequate degree (data for the year 2011).

Considering the additional circumstances and causes of road accidents on Polish roads in 2011, the following problems have been distinguished:

- Accidents in conditions of limited visibility – 51% of fatalities. The risk of an accident at nighttime is over 60% higher than during daytime, and in case of pedestrians on country roads, it is 8 times higher than during the day. At night, the risk of accidents connected with driving into an obstacles is also significantly higher.
- Accidents with the participation of drunk road users – 13% of fatalities.

The sections with high and very high risk account for over 73% of the total length of the national road network (in terms of the number of fatalities to transport performance), which confirms the very poor level of safety. It should be pointed out that this concerns national roads, where the largest number of actions to improve safety is implemented, but their scope remains insufficient.

## Risk factors

The influence of a road on traffic safety is contingent upon the characteristics of the road network, considered from the perspective of the whole country, as well as from the perspective of single voivodeships and cities. Planning and design have an essential impact on road safety when a transport system is being developed. Lack of consideration for the factor of road safety at the planning stage is a primary cause giving rise to circumstances which have a negative influence on that safety. Such circumstances include:

- Lack of, or poorly integrated, public transport service, which causes rapid decrease in the share of public transport trips,
- Multifunctional character of the majority of main roads and streets, mixed structure of vehicle streams on roads (fast passenger cars and trucks, tractors, bicycles and pedestrians), Location of schools, playgrounds and service facilities next to the roads with high traffic flow
- constituting a barrier for large streams of pedestrians making their way towards such areas, Lack of well-organized parking areas for cars and bicycles next to public transport stops, which would encourage commuters to use the *Park and Ride* system (driving to a public transport system stop and switching to public transportation to arrive at the final destination),
- Terminals, depots and other facilities bringing about lorry traffic located in residential areas, Lack (apart from short sections) of cycling infrastructure connecting residential areas with railway stations and bus stops, commercial and recreational areas,
- Practice of designing roads, streets and intersections without proper consideration for their real functions (a negative example may be the use of solutions intended for country roads which favour large turning radii, excessive road widths, etc. in cities),
- Location of large-area shopping centres in places disadvantageous for road traffic safety, and incorrect integration of such centres with the transport system,
- Attempts of redressing incorrect planning or geometric solutions with complicated traffic arrangements which cause the so-called *superfluous signage*.

Some of the above phenomena result from unclear or obsolete guidelines for road and street design. There are also no supportive materials promoting solutions considered good planning and design practice. It is, nonetheless, necessary to transform the existing road network in order to mitigate the negative consequences of planning and design errors (especially connected with the safety of road users). The biggest hazards to road users originate from such shortcomings of the existing road network as, among others:

- Small share of roads with the highest technical standard (motorways and expressways), Lack of ring roads around many cities and villages,
- Deficiencies in facilities for vulnerable road users (sidewalks, bicycle paths),
- Incorrectly selected road cross-sections (four-lane single and two-lane single roads with wide hard shoulders) and insufficient share of road sections enabling safe overtaking, Insufficient share of safe intersections (e.g. small roundabouts or intersections with traffic lights),
- Lack of physical traffic-calming measures (e.g. speed bumps, pedestrian refuges, changes of the longitudinal road profile),

- Road surroundings which do not fulfill technical and safety standards (e.g. trees, posts), Non-adherence to the road safety standards while performing renovations of road surfaces,
- Insufficient degree of implementation of intelligent transport systems (ITS) under the management of road traffic (e.g. signs with variable content, traffic control systems, systems providing information of road conditions and their congestion ).

### Priorities and directions of actions:

In order to improve the road traffic infrastructure safety, the undertaken actions must be oriented at two main priorities of the *Safe Roads* pillar:

- Priority 1 – the implementation of the road safety standards eliminating the most serious hazards in road traffic,
- Priority 2 – the development of a road infrastructure safety management system.

The implementation of the road safety standards eliminating the most serious hazards in road traffic aims at decreasing the number and effects of accidents caused by the shortcomings of the road infrastructure, including especially:

- accidents with the participation of pedestrians and cyclists, head-on collisions,
- falling out of road,
- side and rear-end collisions, accidents at nighttime.

These standards should be implemented at the stage of planning and designing roads and their surroundings, as well as during their use and monitoring.

The development of the road infrastructure safety management system aims at eliminating the hazards for the road safety during the use of road infrastructure. This objective is going to be reached by developing proper tools and drafting the procedures enabling the implementation of the particular elements of the road infrastructure safety management system<sup>22</sup>:

- assessment of the road impact on traffic safety,
- audit of road safety design documentation, classification of dangerous sections,
- control of road infrastructure in terms of road traffic safety.

Moreover, the implementation of the modern measurements of road safety management on the road network, with the use of intelligent transport systems, will be important (table 5.1.).

**TABLE 5.1.**

The priorities and directions of the actions within the *Safe Roads* pillar

<sup>22</sup> Pursuant to the Directive 2008/96/EC of the European Parliament and Council of 19 November 2008 on road infrastructure safety management.

Priority	The direction of actions		
	Engineering	Supervision	Education
<b>The implementation of the road safety standards eliminating the most serious hazards in road traffic</b>	<p>Transformation of the road and street network in order to obtain their hierarchical structure;</p> <p>Modernisation of roads to satisfy the needs of road traffic safety<sup>i</sup></p> <p>Implementation of the infrastructural measures<sup>ii</sup> of:</p> <ul style="list-style-type: none"> <li>a) calming the traffic (supporting the speed management);</li> <li>b) reducing the accidents caused by head-on collisions;</li> <li>c) reducing the number of accidents with the participation of pedestrians and cyclists<sup>iii</sup>;</li> </ul> <p>Implementation of safer infrastructural solutions and traffic organization in terms of intersections and road cross-sections;</p> <p>Construction of expressways and motorways.</p>	<p>Implementation of ITS measures in the supervision of the road infrastructure safety;</p>	<p>Training, within the educational system<sup>iv</sup>, of staff dealing with road safety (including road administrators and police officers), and dissemination of knowledge and so-called good practice</p>
<b>Development of the road infrastructure safety management system</b>	<p>Implementation of the ITS measures in the traffic management system<sup>v</sup>, and of road infrastructure safety;</p>	<p>Commonplace implementation of independent road safety audit and their safety on the entire road network in Poland (implementation in stages), also in terms of verification of signage and traffic organization.</p>	<p>Analysis and implementation of the uniform training system for professionals classifying the road sections, and for those conducting periodic controls of the road condition and road engineering facilities<sup>vi</sup>;</p>

i. Including, inter alia, elimination of the road infrastructure errors leading to the creation of sections with the highest risk of fatalities, and also the development of the idea and practical implementation of so-called „forgiving roads”, equipped with passive safety measures and free of dangerous side obstacles.

ii. Including, inter alia, the development of the idea and practical implementation of so-called „self-explaining roads” which are characterized with: easily understandable function and method of using, segregation of traffic in terms of users and speed. This direction is also included in the *Safe Road User* and *Safe Speed* pillars (table 4.1 and 6.1).

iii. Including, inter alia, construction/reconstruction of sidewalks, bicycle paths along with additional protection measures, and also the implementation of infrastructural measures increasing the safety of road users in conditions of limited visibility.

iv. *Educational system* included entirely within the *System of Road Traffic Safety Management* (table 9.1)

v. *Traffic Management System* included entirely within the *System of Road Safety Management* (table 9.1)

vi. *The System of Staff Education Working on Road Safety* included entirely within the *System of Road Safety Management* (table 9.1)

## Conditions for the performance of these actions

Fundamental conditions for successful implementation of actions regarding safety of road infrastructure include legislative measures and support resulting from research and exchange of experiences.

### Legislative measures

- The assessment and amendment of law related to road infrastructure planning and drafting of land use plans in order to eliminate the imperfections of previous regulations and to introduce contemporary criteria and requirements for road traffic safety.
- The assessment and amendment of law related to construction and re-construction of roads and traffic management, in order to eliminate the imperfections of previous regulations, including their structure and introducing contemporary criteria and requirements of road traffic safety.
- The drafting and implementation of road safety standards which must be satisfied by appropriate road classes, including roads subject to surface renovation and other modernization works.

### Research and exchange of experiences

- On-going assessments of the effectiveness of typical and untypical infrastructural measures for road safety improvement, along with a formulation of recommendations for planning and design.
- Research on the impact of various road infrastructure elements on road traffic safety, along with the development of models for forecasting this safety,
- Detailed diagnoses of hazards for different types of accidents (with pedestrians, head-on collisions, vehicles falling out of the roads, side and rear-end collisions), along with the assessment of the effectiveness of various safety-improving measures.
- Research on the impact of using intelligent transport systems on nationwide road traffic safety, along with practical recommendations and the assessment of effectiveness of implemented measures, and integration of the use of such solutions with planning and design practice.
- Development of an integrated database on accidents, roads, traffic, and collecting supplementary data for on-going monitoring of the road safety and scientific research<sup>23</sup>.

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<sup>23</sup>. *Monitoring System* included entirely within the *System of Road Safety Management* (table 9.1)

# SAFE SPEED

Speed is a key factor influencing the risk of road traffic accidents and the scale of their consequences. Nearly half of all the drivers in Poland exceed the allowed speed limits and the excessive speed, or speed maladjusted to the road conditions, is the cause of nearly one-third of fatal accidents.

## Facts

Research conducted on the Polish national roads regarding the observance of speed limits throughout the country shows a horrifying picture. It indicates that local speed limits are observed to a very limited degree. Over 50% of drivers exceed the allowed speed limits, and the worst situation is on sections passing through small and medium-sized localities, where over 85% of drivers exceed these limits<sup>24</sup>. In 2011, excessive speed or speed maladjusted to the road conditions was the direct or indirect cause of accidents which resulted in the death of 1 232 persons (i.e. nearly 30% of all killed), while 3 451 people were seriously injured (27.5% of the total of seriously injured).

Accidents linked to excessive speed tend to be much more severe – the average number of fatalities per one accident in this group is over 25% higher than the number of fatalities per one accident generally.

Most fatalities in accidents caused by excessive speed (40%) take place on poviats and commune roads, 25% on national roads, 20% on voivodeship roads and 10% on roads in cities with poviats rights. However, once the distance and the traffic load are factored in, the highest risk of being killed as a result of a speed-related accident occurs on national and voivodeship roads.

The structure of fatalities in the accidents whose cause was excessive speed indicates that this type of accidents occur mainly (Figure 6.1.):

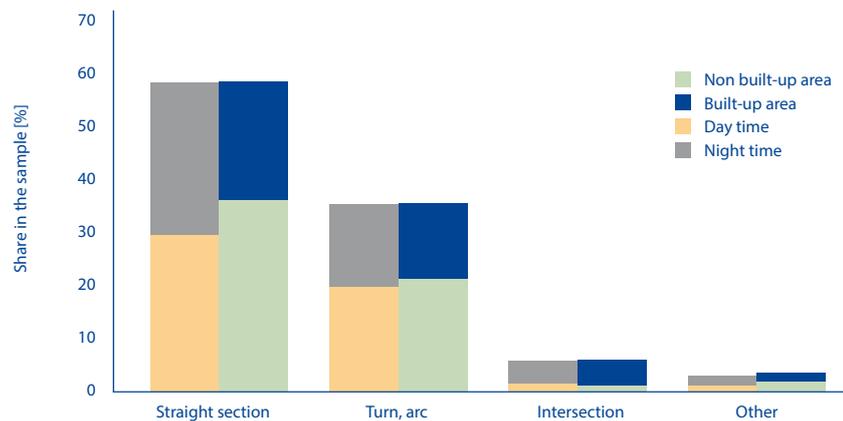
- on straight sections (58% of fatalities) and on horizontal curves or arcs (33% of fatalities) – horizontal curves must then be identified as the most dangerous elements of roads, as the share of total curved distances in the entire road network is much lower than of straight sections;

<sup>24</sup>. Gaca S., Jamroz K., Ząbczyk K. et al.: *Nationwide study on measurement of vehicle speed and the use of safety belts*. Within SPOT. Periodic report no. 2. Consortium: SIGNALCO Krakow – TR FIK Gdańsk – BIT Poznań. Krakow-Gdańsk-Poznań 2006.

- during daytime, 55% of fatalities are recorded and 45% at nighttime – however, considering that nighttime traffic accounts for about 25% of the 24-hour traffic, at nighttime the risk of losing one’s life in a road accident raises.
- 61% of fatalities in speed-related accidents occur in non built-up areas. This is caused by the fact that drivers develop much higher speeds in these areas.

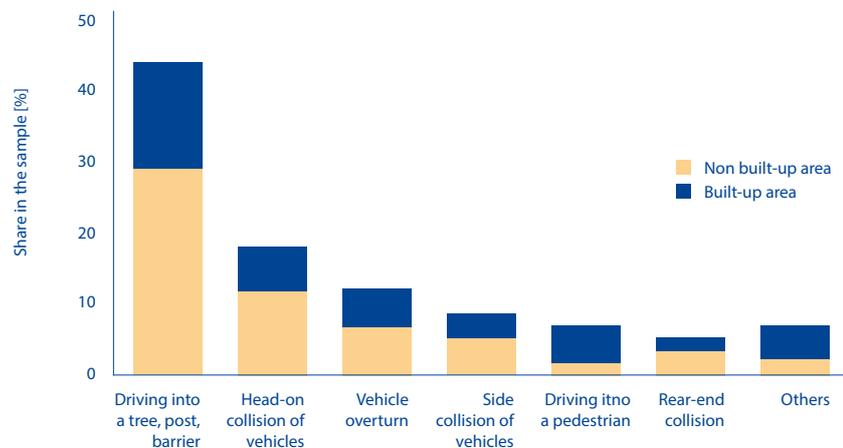
**FIGURE 6.1.**

Distribution of the share of fatalities in speed-related accidents, divided into road elements, time (day/night) and type of area



**FIGURE 6.2.**

Distribution of the share of fatalities in speed-related accidents, divided into type of accident



The most frequent types of speed-related fatal accidents (Figure 6.2.) are: driving into a tree or a post (43% of fatalities), head-on collisions (18% of fatalities), vehicle overturn (11% of fatalities).

## Risk factors

Higher speed of driving causes: the narrowing down and elongation of the field of vision, shortening of the time available to the driver for processing information and making a correct decision. Also the braking distance is longer, which makes it more difficult to avoid a collision. As a result, high speed brings about a higher probability of an accident and its more grave consequences. This is caused by the release of more destructive energy at the moment of a collision with an immobile obstacle or another vehicle.

The relation between the change of the average speed and the number of accidents it may cause is well-described by the popular “power model” developed in 2004 by G. Nilsson. It shows that as little as a 5% speed increase correlates to an estimated 10% increase in the number of all accidents and to a 20% increase of fatal accidents<sup>25</sup>.

Numerous experiences indicate that, in the following events, there is a 90% likelihood of being killed as a result of a traffic accident:

- driving into a pedestrian at a speed >50 km/h, side collision of vehicles at a speed >70 km/h,
- head-on collision of vehicles or driving into a tree at a speed >90 km/h.

In Poland, despite many undertaken actions, the risk of severe accidents remain high. The insufficiency of the activities taken up in this respect is, above all, relate to:

- the drivers’ desire to move quickly on the roads,
- the drivers’ inclination to take up risks and the resulting social acceptance for speeding, low likelihood of being caught in the act of speeding,
- not enough effective traffic-calming measures (small roundabouts, speed bumps, narrowed roads, etc.),
- incorrect solutions, consisting in conducting transit roads through small localities,
- insufficient hierarchization of roads in unfavourable type-related structure of vehicle streams (passenger cars, trucks, tractors, etc.), which gives rise to a lot of overtaking – a maneuver which often ends with an accident.

## Priorities and directions of actions

A diagnosis of the current state and the experiences of model countries of the European Union (in terms of traffic safety consideration), lead us to adopt two priorities under the *Safe Speed* pillar:

- Priority 1 – Shaping driver behaviours in relation to driving at a safe speed,
- Priority 2 – Making the speed management system more efficient.

**Shaping drivers’ behaviours in relation to driving at a safe speed** aims to educate aware and considerate road users, who respect the rights of other road users. This aim will be reached by, among others, actions directed at education and road traffic monitoring (table 6.1).

**Making the speed management system more efficient** aims to keep the driving speed within the maximum allowable limit as defined by the regulations and road signs on roads of various categories.

Reasonable speed management consists of:

- setting general and local speed limits taking account of various factors (shape of the road, design speed, road users, immediate surroundings of the road),
- enforcement of the observance of speed limits by drivers through:

<sup>25</sup> G. Nilsson, *Traffic Safety Dimensions and the Power Model to Describe the Effect of Speed on Safety*, Lund Institute of Technology, 2004.

- supervision and restriction measures (automation of traffic monitoring),
- planning and road measures (traffic calming, hierarchization of roads, separation of different types of traffic).

This objective will be reached mostly by actions linked to engineering, supervision and education (table 6.1).

### **Conditions for the performance of these actions**

The basic conditions for the successful performance of the speed-related actions are legislative measures and support resulting from research and exchange of experiences.

#### **Legislative measures**

- Amendment of legislative acts relating to vehicle speed, including the modification of the mode for penalizing speed-related breaches of traffic regulations.

#### **Research and exchange of experiences**

- Monitoring the trends and changes in the behaviours of vehicle drivers in relation to different speed-related measures.
- Assessment of the efficiency of actions and measures employed in terms of reaching the set speed-related goals.

**TABLE 6.1.**

Priorities and actions within the *Safe Speed* pillar

Priority	Direction of actions		
	Engineering	Supervision	Education
<b>Shaping drivers' behaviours in relation to driving at a safe speed</b>	<p>Implementation of traffic-calming measures; Speed zoning in built-up areas;</p> <p>Transformation of the road and street network in order to hierarchize their structures<sup>ii</sup>;</p>	<p>Modification of the drivers' penalty system;</p> <p>Making the driver supervision system more efficient by instilling a sensation of commonplace control and inevitability<sup>iii</sup> of penalty;</p>	<p>School education within a complex educational system to shape attitudes against speeding; Introduction, into the driver's education<sup>iv</sup>, of methods shaping the habit of driving at a safe speed;</p> <p>Running campaigns<sup>v</sup>:</p> <p>a) informational – on speed supervision</p> <p>b) encouraging to drive at a safe speed,</p>
<b>Making the speed management system more efficient<sup>vi</sup></b>	<p>Unification of the methods of employment of speed limits;</p> <p>Use of ITS measures in speed management;</p>	<p>Expansion and modernization of the system (incl. automatic) of speed supervision;</p> <p>Revising the competences of speed</p>	<p>Creation and popularization of guidelines, rules and good practices of designing roads in terms of speed;</p>

I. <sup>This direction is also included in the *Safe Roads* pillar (tab. 5.1)</sup>

II. <sup>This direction is also included in the *Safe Roads* pillar (tab. 5.1)</sup>

III. <sup>Within supervision, particular consideration to be given to exceeding speed limits. This direction is also included in the *Safe Road User* pillar (tab. 4.1)</sup>

IV. <sup>*System of education* included in whole within the *System of road safety management* (tab. 9.1)</sup>

V. <sup>*System of promotion* included in whole within the *System of road safety management* (tab. 9.1)</sup>

VI. <sup>This priority included also within *System of road safety management* (tab. 9.1)</sup>

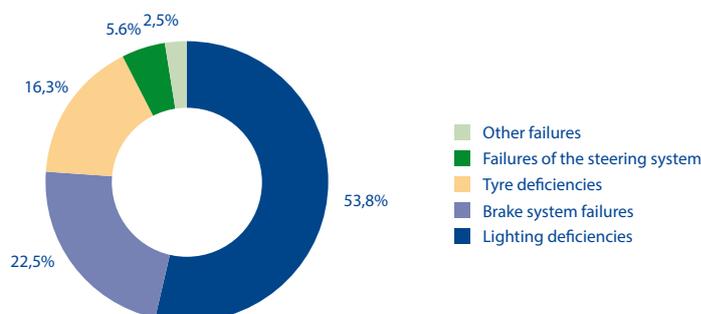
# SAFE VEHICLES

According to the statistical data, vehicles are quite rarely the main cause of a road accident, but their technical condition significantly influences the severity of accidents.

## Facts

**FIGURE 7.1.**

Accidents attributable to technical failures in vehicles 2011



According to official statistical data regarding vehicles registered as of 2011, in Poland there were about 24 million<sup>26</sup> motor vehicles and motorcycles, including about 18 million passenger cars and over 3 million trucks<sup>27</sup>. Estimates of the Motor Transport Institute<sup>28</sup> indicate that in 2009, the average age of the vehicles in use in Poland was around 12–13 years.

For comparison: the average age of vehicles in Sweden is just under 10 years, in Finland – over 11 and in the USA – 11 years<sup>29</sup>. Research shows that the average number of failures significant in terms of the safety of road traffic increases with the age of the vehicle. At the same time, it is noticeable that the older the car, the more failures posing a risk to road safety.

<sup>26</sup> Pursuant to the Traffic Law Act – a motor vehicle is an engine vehicle whose constructions allows driving at a speed over 25 km/h, which also includes motorcycles.

<sup>27</sup> Polish Central Statistical Office, *Transport – results of operations 2011*; pp.137,138.

<sup>28</sup> Balke I., Balke M. Research on the quantitative structure of vehicle fleet in Poland with account of brands and age of chosen types of vehicles as at the end of 2009; ITS no. 6002/ZBE; Warsaw, September 2011.

<sup>29</sup> Franke A. *Forced to accept the new*; SDCM Association of Automotive Parts Distributors and Producers; www.sdcm.pl

## Risk factors

Vehicle safety indirectly influences the number of fatalities and the scale of consequences of accidents. For this reason, solutions in this area should be constantly sought and implemented, especially through equipping cars with elements supporting the driver (active safety) and elements protecting the persons participating in road occurrences (passive safety).

**Technical condition of the vehicle.** Pursuant to the law in force, the technical condition of vehicles is periodically revised by motor vehicle inspection stations (MVIS). However, an inspection carried out by the Supreme Chamber of Control<sup>30</sup> revealed that supervision over these inspection stations is insufficient. Nearly two thirds of obligatory devices of the MVIS is not certified.

In Poland, the low technical culture is also a problem. It translates into neglect of the technical condition of vehicles, especially in what regards elements influencing the safety, such as brakes, lighting, shock-absorbers, steering system, tyre pressure.

**Lighting.** Lighting deficiencies are among the most frequently listed failures (54%). This allows us to define the lighting issues as one of priorities in those actions for improvement of road safety which are linked with the technical condition of vehicles. Regulations regarding lighting-related technical requirements for vehicles are not in step with the technological progress and the low awareness of drivers is an additional factor, as they usually do not know that even formally proper lighting may not light the way sufficiently.

**Spare parts.** Another problem is related to the spare parts used in vehicles. Technical requirements which should be met by parts and subassemblies used as replacement of original parts are not regulated by any national or European laws. It has been estimated, based on examination of spare parts<sup>31</sup>, that the quality of over 50%<sup>32</sup> of parts currently on the market, as well as of various operating fluids (including brake fluid) poses a direct hazard to the safety of vehicle use.

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<sup>30</sup>. *Information on the results of road safety inspection in Poland*, NIK, Warsaw, March 2011, rec. no. 5/2011/P/10/061/KKT

<sup>31</sup>. Research on spare parts purchased at random at stores and wholesale stores of national distributors of automotive parts.

<sup>32</sup>. ITS research within the development project No. N R10 0017 06/2009, entitled: *System for examination and evaluation of spare parts, subassemblies and operating fluids used in vehicles for the upkeep of their safety*, financed by the National Centre of Research and Development.

**Equipment – modern safety devices.** Currently, all the newly manufactured vehicles in the European Union are equipped with basic safety systems, such as seat belts, ABS system or air bags for the driver. Additionally, thanks to advanced technologies, it is possible to equip cars with more systems supporting the driver in a risky situation on the road. This allows drivers to avoid collisions or to mitigate their consequences, both for the driver and for the passengers, as well as for other road users. Examples of such systems are: electronic traction control (which assists the driver in recovering from skids), camera systems limiting the so-called blind spot or eCall (a system installed in the car, which automatically notifies rescue services about an accident). These solutions form part of the “eSafety System”. Vehicle producers subject their technical solutions to safety tests and strive to rank as high as possible in consumer rankings, such as Euro NCAP, which helps to popularize these solution and make them more readily available in new cars. Also cars driven in Poland, both imported as used vehicles (mostly from other EU states), are largely equipped with systems enhancing road traffic safety<sup>33</sup> thanks to which a vehicle may limit the consequences of human-made errors and its technical shortcomings are rarely the cause of accidents.

## Priorities and directions of actions

The diagnosis of the current state, as well as the experiences of model states of the European Union (in terms of road safety considerations), lead us to adopt two priorities under the *Safe Vehicle* pillar:

- Priority 1 – Enhancement of actions regarding vehicle technical condition inspections,
- Priority 2 – Improvement of safety systems in vehicles.

**Enhancement of actions regarding vehicle technical condition inspections** aims to, above all, reduce the risk of accidents caused by poor technical condition of vehicles and to limit their severity.

**Improvement of safety systems in vehicles** aims to implement such construction solutions so as to render the vehicle capable of protecting its driver and passenger, as well as other road users, to prevent human errors and to minimize the dangers when these errors are made.

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<sup>33</sup> Damm A. +Team. *Method for the evaluation of impact of used vehicles imported to Poland on the road safety and gas emissions*; Research project of the Ministry of Science and Higher Education no. N509508238, ITS paper no. 9082/ZDO; Warsaw, April 2012

**TABLE 7.1**

Priorities and directions of actions within the *Safe Vehicle* pillar

Priority	Direction of actions		
	Engineering	Supervision	Education
<b>Enhancement of actions regarding vehicle technical condition inspections</b>	Implementation of modern technologies and techniques at motor vehicle inspection stations;	Modernization of the system of supervision of motor vehicle inspection stations and monitoring their work;	Education within a complex education system <sup>i</sup> regarding maintenance of the proper technical condition of vehicle and how it affects the safety of all road users;
	Improvement of technical homologation and use requirements regarding vehicle equipment;	Modernization of the system for verification of equipment and parts in cars which affect their safety in road traffic; Certification of the obligatory equipment of motor vehicle inspection stations;	Running, within the system of promoting road traffic safety <sup>ii</sup> , information campaigns and campaigns to promote maintenance of the proper technical state of vehicles <sup>iii</sup> ; Periodic trainings for diagnosticians and supervisors of motor vehicle inspection stations <sup>iv</sup> ;
<b>Improvement of safety systems in vehicles</b>	Equipping the vehicles with modern safety devices <sup>v</sup> ; The implementation of obligation of using devices blocking the vehicle start-up for professional drivers in cases when alcohol content in exhaled air exceeds	The implementation of supervision on proper use of obligatory safety devices installed in vehicle (e.g. child safety seats);	Popularization among the car owners of modern vehicle safety systems;

- I. *System of education* included in whole within the *System of road safety management* (tab. 9.1)
- II. *System of promotion* included in whole within the *System of road safety management* (tab. 9.1)
- III. Including the popularization of the significance of lighting on the road safety and promotion of better quality lighting.
- IV. *System of education* for road safety staff, included in whole within the *System of road safety management* (tab. 9.1)
- V. Including systems to raise the safety of vulnerable road users, such as automated braking systems, external air bad.

## Conditions for the performance of these actions

Basic conditions for the successful performance of the actions related to vehicle safety are legislative measures and support resulting from research and exchange of experiences.

### Legislative measures

- Development of a concept for a modernized national system for the inspection of the technical condition of all vehicles.
- Development of provisions regarding the professional supervision over the equipment of motor vehicle inspection stations and monitoring their work.
- Development of technical requirements unequivocally and objectively guaranteed by technical tests of vehicles.
- Development of legal bases for the implementation of a system (certification, homologation) to supervise the introduction into trade and use in cars of parts and operating fluids.

### Research and exchange of experiences

- Introduction of the common practice of using the technologies of objective exploitation tests with the use of devices allowing for precise and quick exploitation measurements. Conducting in-depth research on road traffic accidents<sup>34</sup>, including the analyses of the influence of the technical condition of vehicles for the occurrence of accidents. Conducting development works related to defined groups of advanced technology products. Research, development and pilot implementation of intelligent transport systems related to the cooperation of devices with which roads and vehicles are equipped.
- International cooperation regarding the improvement of legal regulations related to the systems of testing and assessment of spare parts, operating fluids and participation in international research regarding pilot implementation of modern solutions within the scope of active and passive safety.

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<sup>34</sup>. This should be done in accordance with the DaCoTa project methodology – improvement of the European system of gathering, processing and making available data on road safety (the integration of all road safety research). More at <http://dacota-project.eu/>

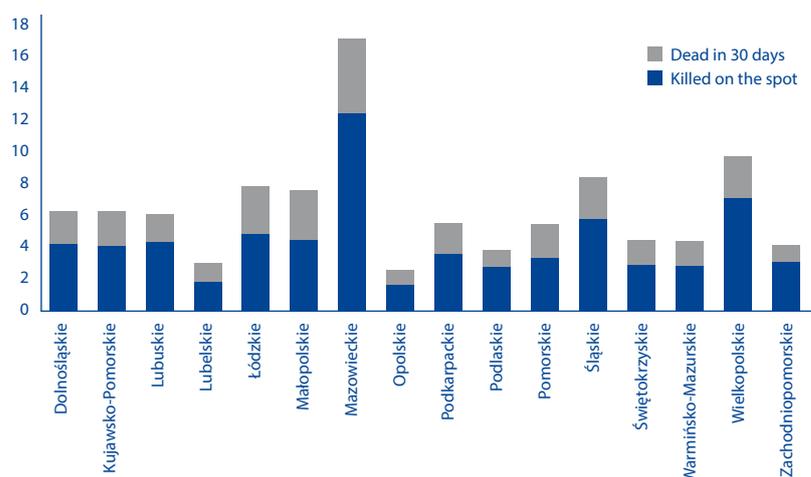
# RESCUE SERVICE AND POST-CRASH RESPONSE

Rescue service are the activities taken up under conditions of sudden or extraordinary danger to life and health, and also to property and environment, performed immediately. The main characteristics of rescue service are the suddenness of the incident preceding the action, for example, of the forces of nature or human, and the urgent course of reaction.

Among numerous rescue fields, medical rescue service and post-crash care process are essential for the road safety, because they concern the health and lives of the injured, and, what is more, they require the involvement of many parties.

## Facts

In 2011, 4 189 people died in road accidents in Poland. According to statistics, 71.3% of victims were killed on the spot, while the remaining 28.7% died within the next 30 days.



**FIGURE 8.1.**

Accidents with fatalities divided into voivodeships



According to research, the injured in road accidents who were taken to the hospital within one hour following the accident (after the preliminary wound dressing) survived more often than those who were taken to the hospital later. This is the so-called *golden hour*, in which the sequence of the actions directed at keeping the injured person alive and transferring them to the hospital should be taken. The *platinum 10 minutes* are also essential – this is the time that passes between the accident and the undertaking of rescue action by people qualified to provide it. Unfortunately, the Polish system of post-crash response does not always enable the fulfillment of these principles.

The rescue system in Poland consists of two sub-systems which are independent from each other and only integrated to a limited degree:

- Emergency Medical Services (which lays within the competences of the Minister of Health),
- National Fire-fighting and Rescue System (which lays within the competences of the Minister of Internal Affairs), operating at three administrative levels corresponding to the administrative structure of the country.

State Fire Service, together with other units of fire protection, participates in over 450 000 interventions per year, among which the sudden hazards in road transport are the most numerous group out of all types of incidents. They account for over 20% of hazards nationwide, which represents a 22% share in all road incidents. In terms of the types of means of transport and incidents in which the rescue resources of the National Fire-fighting and Rescue System intervene, passenger cars represent the largest share in road accidents, followed by trucks.

An efficient rescue system may help to decrease the number of fatalities and speed up the recovery of the injured. Nevertheless, the experience of going through an accident very often influences the subsequent functioning of the victims in the society.

According to research, the victims of road accidents in Poland very often do not know where they can obtain help or information about their rights. Victims often lack knowledge regarding the government, local-government or non-governmental institutions which may offer help. Very often, such a person is left on their own and the help they receive is contingent only on their own initiative, or the initiative of their relatives. Regrettably, the institutions which have direct contact with victims or their relatives are incapable of directing them to the appropriate organizations offering professional legal, psychological or material help<sup>35</sup>.

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<sup>35</sup>. Research carried out within the Project of Integrated Transport Safety System, conducted during the period of 2008–2010.

## Risk Factors

1. Currently, the two simultaneously functioning systems, Emergency Medical Service and National Fire-fighting and Rescue System are not sufficiently coordinated. Separate organizational systems, separate communication systems, different equipment and actions standards cause not only economic losses, but also, above all, affect the speed and quality of rescue actions.
2. In theory, Emergency Medical Service and National Firefighting and Rescue System are in close cooperation, but in practice the coordination of actions takes place over the telephone, handled by dispatchers of each service at various levels of management (poviat or voivodeship).
3. Lack of a universal emergency telephone number 112. This causes delays in undertaking rescue actions.
4. Lack of a universal educational system in terms of giving firstaid.
5. Lack of standardization of medical equipment of all services.
6. Lack of proper specialized equipment for the Volunteer Fire Department, which would enable faster arrival at the accident site.
7. Insufficient number conveniently located Hospital Emergency Departments. Such situation leads to delays in giving specialist treatment.
8. Deficient information system for victims and their relatives about the possibilities of receiving help (legal, material, psychological or specialist medical).
9. Despite many non-governmental organizations involved in helping road accident victims there is no efficient and consistent system of providing assistance to road accident victims.

## Priorities and directions of actions

The presented diagnosis leads us to the adoption of two priorities within the *Rescue service and postcrash care* pillar:

- Priority 1 – Integration and development of a National Rescue System,
- Priority 2 – Reorganization of the system of help for the victims of road accidents.

**Integration and development of a National Rescue System** aims at the development of a single rescue system on roads, which should function in cooperation with the rescue systems of neighbouring countries of Poland and with the rescue systems of other branches of transport (railway, air, water and maritime transport), with the objective of providing faster and more efficient assistance to road accident victims.

**Reorganization of the system of help for the victims of road accidents** aims at facilitating the victims' access to information about the available forms of assistance. This objective is going to be attained mainly by the directions of actions connected with engineering and education.

**TABLE 8.1.**

Priorities and directions of actions within the *Rescue Service and Post-crash Care* pillar

Priority	Direction of actions		
	Engineering	Supervision	Education
<b>Integration and Development of National Rescue System</b>	<p>Reorganization of the uniform Rescue Alert System and coordination of the current professional work of rescue system;</p> <p>Development of contemporary communication and localization systems which improve the rescue system<sup>i</sup>;</p> <p>Development of health care units to treat severe injuries and medical post-crash rehabilitation;</p> <p>Equipping rescue services with rescue equipment; implementation of ITS measures in the <i>System of Road Traffic Management</i><sup>ii</sup>. the systems of traffic supervision in danger zones, detecting road incidents.</p>	<p>Supervision over:</p> <ul style="list-style-type: none"> <li>- optimal organisation of services and resources,</li> <li>- correctness of the procedures of rescue services and entities,</li> <li>- cooperation between authorities, local governments, inspections and other entities,</li> <li>- removing road barriers for rescue services and entities,</li> <li>- actions connected with organizing the post-crash help;</li> </ul> <p>Standardization (uniformity) of principles and medical procedures for all rescue services;</p>	<p>Development of a more effective system of general education<sup>iii</sup> of society in the area of providing first aid.</p> <p>Developing a more effective system of training in the area of first aid: members of services (police officers, fire-fighters, frontier guards, inspectors of road transport), children and adolescents, participants of driver's education courses, in all medical professions;</p> <p>Standardization (uniformity) of exams and certification of rescue abilities;</p>
<b>Reformation of help for victims of road accidents system</b>	<p>Creating the system of helping road accident victims;</p> <p>Creating the database concerning the entities which work on help for road accident victims.</p>	<p>Supervision and cooperation with insurance companies.</p>	<p>Social campaigns<sup>iv</sup> informing about the rights of road accident victims and possibilities for receiving help;</p> <p>Training for services in the area of passing on information about death;</p>

I. For example, uniform and effective standard for all services, development of e-call system, etc.

II. *System of Road Traffic Management* was entirely included within the *System of Road Traffic Safety Management* (table 9.1)

III. *System of Education* was entirely included within the *System of Road Safety Management* (table 9.1)

IV. *System of Promoting* was entirely included within the *System of Road Safety Management* (table 9.1)

## Conditions for the performance of these actions

The basic determinants for achieving a success in performing the actions connected with rescue service and help for victims of road accidents are the legislative measures.

### Legislative measures

- Development of the basis for creating the uniform rescue system on roads<sup>36</sup>.

### Research and exchange of experiences

- Follow-up on the fate of road accident victims.
- Improvement of cooperation between rescue services and entities in the processes of:
  - Preparing the entire infrastructure for rescue actions on roads,
  - Organizing common training for rescue services and entities,
  - Informing and cooperation on accident sites (single, numerous and on a mass scale).
- Development of a system for collecting precise statistics regarding the entire rescue process and post-crash care.
- Research on the types of hazards and their localizations, and design of a method of choosing of the proper rescue services to handle these hazards.

### Other conditions

- Exchange of experiences between national rescue systems and other countries.

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<sup>36</sup>. Development of the basis for creating the uniform rescue system on roads is entirely included within the *System of road safety management* (table 9.1).

# ROAD SAFETY MANAGEMENT SYSTEM

The process of improving road safety requires compliance with the following three interconnected elements: the function of institutional management, specific actions (interventions) and results. The fundamental functions of institutional management include:

- coordination,
- legislation,
- financing and provision of resources, promotion and communication,
- monitoring and evaluation,
- research, development and the transfer of knowledge.

As indicated by the diagnostic evaluation of the existing road safety management system (see: Chapter 1), each of these aforementioned functions requires improvement in view of the performance of actions defined in chapters 4, 5, 6, 7, 8. These functions are fulfilled in various proportions, depending on the institution and the level of public administration.

## The improvement of organizational structures of road safety and coordination

**The leading institution.** The role of the leading institution should be performed by the National Road Safety Council. In order to play this role properly, the Council must, above all:

- effectively fulfill its coordination duties:
  - horizontal – between the National Road Safety Council and particular departments and units supervised by departments, e.g. during works on Performance Programmes (see: Chapter 10), or works on specific interventions included in these programmes,
  - vertical – between the National Road Safety Council and institutions administering road safety on the voivodeship, poviata and commune level and local communities, enterprises and non-governmental organizations,
- set the directions in the area of road safety,
- develop boards of specialists,
- play the leading role in the promotion of the Programme dissemination and actions concerning education and social campaigns,
- ensure adequate and stable financing for the road safety system in Poland.

Besides horizontal coordination, it is also necessary to focus on the establishing of cooperation between the National Road Safety Council and Voivodeship Road Safety Councils, which are (according to the legislator's intention<sup>37</sup>) leading institutions on the voivodeships level. Another area for the vertical cooperation is the necessity for central-level legislation to take account of the specificity of lower administration levels, to be done especially through the mechanism of effective consultations. These consultations are to relate to all areas of road safety system and be conducted in the form of seminars, workshops or conferences.

**Voivodeship Road Safety Councils** should become a real leader in the area of road safety on the regional level and fulfill the following management functions:

- coordination
  - horizontal – between voivodeship structures of the Police, Road Inspectorate, State Fire Service, General Directorate of National Roads and Motorways, voivodeship roads administration, poviats roads administration, the superintendent of education, local non-governmental organizations and local communities,
  - vertical – with the National Road Safety Council and poviats road safety councils,
- legislation,
- financing and allocation of resources,
- promotion and communication,
- monitoring and evaluation,
- transfer of knowledge.

The Voivodeship Road Safety Council should be supported by a relevant research unit (e.g. local scientific centre).

**Poviat Road Safety Councils** should fulfill management functions, analogous to these aforementioned, especially in the area of coordination:

- horizontal – between poviats headquarters of the Police, State Fire Service, education units, the administration of poviats and communal roads, local non-governmental organizations and communities.
- vertical – with Voivodeship Road Safety Councils and both communal and municipal leaders of road safety.

**Communal and Municipal Centres of Road Safety**, as a local leader (acquainted with dangers and the needs of inhabitants), should perform the function of a cooperation platform for local communities with the institutions administrating road safety system on a given area, and also promote knowledge of safe road using.

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<sup>37</sup>. *Traffic Law Act* of 20<sup>th</sup> June 1997 – (Journal of Laws, 2012, item 1137, as amended)

## **The introduction of a coherent system of legal regulations on road safety**

Polish legislation does not approach road safety adequately to the scale of the problem. The fundamental document in the area of road safety is Traffic Law Act. There are many other regulations relating directly or indirectly to the system. Regrettably, the existing regulations are dispersed, not precise enough or not adapted to the changing external determinants.

It is necessary to strive for the legal identification of road safety as an important social problem and to introduce one act to encompass the issue in its entirety.

Above all, it is necessary to regulate the issues related to the implementation of a stable system financing of road safety and to the introduction of an integrated rescue system.

Such a law will facilitate the effective functioning of road safety system in Poland. Works should commence with analyses to determine the necessary legal amendments, to guarantee their

coherence, the possibility of implementation of new safety-improving measures concerning road safety and effective functioning of the developed management system. Subsequently, on this basis, proposals and drafts of amendments to selected legal acts will need to be prepared.

## **The introduction of a stable system of financing road safety**

The current weak spot of road safety system in Poland is the insufficient and unstable financing. It is important to conduct an relevant analysis in this respect and to initiate a social dialogue concerning the form of the financing system in this field. Subsequently, it is necessary to determine the share of revenue received from the speed supervision system which could be reinvested in road safety (spent on road safety education, programmes for helping the victims of accidents, removal of dangerous spots on public roads) and to determine the method of relating the amount of obligatory premiums paid by vehicle users to the financing of road safety.

It is essential to spread awareness at all administration levels, among entities and institutions engaged in road safety (including public opinion) on the global social costs of road accidents and of the impact they have on public health (see: Chapter 1). At the same time, the expenditures on reparatory and preventive actions in the field of road safety should be treated as investments which will return measurable profits.



If the current situation of the reduced financing of road safety continues, it will be necessary to focus on the reinforcement of the already described management functions, which should bring measurable profits. The consistent adherence to the principle of focusing on the results and of making use of facts during the first years of the programme will allow for the evaluation of the effectiveness of actions in the current model and structure of financing. As a consequence, the future considerations will be reinforced with measurable arguments, which will facilitate the decision-making on the prospective relocation of resources or allocation of additional ones.

Over the duration of this Programme, another EU financial prospect for the years 2014–2020, providing for new sectoral operational programmes, may become a significant source of financing. An important role is to be played by contents aimed to secure the co-financing from higher levels of administration, organized at the level of communes and poviats.

### **The introduction of a uniform system of monitoring and communication**

The progress on the way to the performance of objectives listed in this programme will be contingent upon numerous factors. Unfortunately, many factors will lay beyond the direct control of the state administration – for instance, the international economic environment may have some influence. On the other hand, one characteristic feature of the Programme is the public commitment of its accomplishment.

The focused concentration on the results raises the necessity of an efficient, ongoing and complex monitoring and evaluation of whether the measures already taken are heading in the right direction.

It is essential to improve the data collection system and strive for the creation of a complete database which would encompass the entire road safety system. It would allow for the collection and analysis of data from currently dispersed sources and for their integration. Then, it would be possible to find answers to specific problematic issues.

For this purpose, it is necessary to create a uniform system of information about road safety through the development of a network of observatories. The network should consist of the Polish Road Safety Observatory, which is currently being developed by the Motor Transport Institute, as well as of regional observatories.

The main task of the Polish Road Safety Observatory is the development of a system of collection and processing of data on traffic safety. The data analyses and the conclusions arising should be disseminated to the authorities on various levels, specialists in charge of road safety and the general society.

## The implementation of a road safety research system and the transfer of knowledge

Considering that only objective knowledge on hazards to road safety and the means of their elimination will allow for rational decisions, not influenced by subjective opinions, it is necessary to undertake scientific research related to this area. The fundamental objective of the research is the improvement of analytical tools and planning of actions for the improvement of road safety, but also their evaluation and modification in order to adapt them to changing external determinants.

The research should be conducted in two major fields:

1. Long-term research directed at the understanding of basic mechanisms and relations influencing the condition of road safety;
2. Research directed towards the solution of current fundamental problems concerning road safety in Poland and the determination of the effectiveness of the measures adopted for the improvement. The research was suggested in the relevant parts of the programme.

It is also necessary to introduce the system of research on road safety in the form of a long-term research plan. It is essential to develop a mechanism for the participation of Poland in the European research platform for road safety, in order to make it possible to take advantage of the experience of other members of the European Union.

## Systemic actions

The analysis of the needed systemic actions concerning road safety the management of, leads us to adopt three fundamental areas of intervention:

- Area 1 – Systemic actions resulting directly from the institutional management function,
- Area 2 – Systemic actions within other fields of road safety,
- Area 3 – Systemic actions beyond the direct field of road safety.

**TABLE 9.1.**

The areas of intervention and the direction of systemic actions in the field of road safety management system

The areas of intervention	The directions of systemic actions
<b>Systemic actions resulting directly from the institutional management function</b>	<p>Improvement of organizational structures and modern methods of road safety system management on all organizational levels (both on the national and regional level);</p> <p>Introduction of a uniform legal system in the area of road safety;</p> <p>Elaboration, development and implementation of the <u>system for financing</u> road safety actions;</p> <p>Elaboration of a new <u>education system</u> for road users;<sup>i</sup></p> <p>Elaboration of <u>education system</u> for professionals dealing with road safety;<sup>ii</sup></p> <p>Elaboration of a uniform and coordinated <u>system of informing and programming road safety</u>;<sup>iii</sup></p> <p>Development and implementation of a uniform <u>monitoring system</u> (e.g. through the improvement of the data collection system and broadening of the scope and integration of databases);</p> <p>Elaboration and implementation of the <u>programme of scientific research on road safety and the transfer of knowledge</u> in this field, as a foundation for the rational and effective implementation of actions for the improvement of safety and of the road safety system management;<sup>iv</sup></p>
<b>Systemic actions within other fields of road safety</b>	<p>Development of <u>systems of traffic management</u> with the help of Motor Transport Institute;<sup>v</sup></p> <p>Development and promotion of a systemic approach towards the <u>speed management</u>;</p> <p>Enforcement of awareness of the role of road safety on the local level;</p> <p>Creation of foundations for the development of an integrated <u>rescue system</u>;</p> <p>Enhancement of the role of NGOs and media in the shaping of safe behaviour and in conducting trainings;</p> <p>Active international cooperation on the governmental level in the field of road safety;</p>
<b>Systemic actions beyond the direct field of road safety</b>	<p>Improvement, development and promotion of other branches of road transport in the area of product transport (rail transport, inland navigation);</p> <p>Improvement, development and promotion of public transport systems on the national and local level;</p>

i. The system of school education, the system of the education of drivers and future drivers.  
 ii. Including, e.g. training of road administration representatives, policemen, auditors, professionals responsible for the control of road traffic safety condition, and diagnosticians.  
 iii. Including, e.g. information and promotion campaigns and the evaluation of their influence on road traffic safety  
 iv. Including, e.g. databases devoted to national researches, the exchange and taking advantage of best experiences, report conclusions, essays and international and foreign conferences.  
 v. Including, e.g. information about the condition of traffic and warning, the enhancement of the usage of signs with variable content, systems of supervision over traffic in dangerous zones, new systems of traffic control on intersections, speed supervision, the detection of road accidents.

# PRINCIPLES OF PROGRAMME IMPLEMENTATION

## Connections, synergy and cooperation

In the perspective up to the year 2020, the programme will not function without certain links to other, related areas of life. Road safety closely interrelated with: transport, infrastructure, public finances, health, education, rescue system, power sector, environmental protection, scientific research, jurisdiction, trade exchange and spatial planning.

The connection between road safety and the sphere of transport policy, its objectives and specific endeavors, is quite obvious. However, the influence of the transport system on the field of public health should receive more attention. According to the simplest interpretation, this influence is the number of fatalities and injured people in road accidents.

Transport system influences also the environment: energy savings, the level of greenhouse gases emission, noise, etc. The increase in significance of public transport in urban agglomerations is a good example of a connection between road safety and other areas. Buses, trams and subway are safer means of transport than passenger cars or motors. The fewer people use the latter means of transport, the fewer fatalities and injured people are there. Also, road networks are less overcrowded thanks to it. The increased use of public transportation, as well as spatial planning limiting the need to commute will influence not only road safety, but also public health and environment, and it will reduce capital expenditures for urbanization. These problems were noticed in the strategic documents such as the *Transport Development Strategy by the year 2020 (with the perspective until year 2030)*, and the *National Health Programme for the years 2007–2015*, which has been in force since 2007 (see: Chapter 2).

The coordination between public administration, local government, business, nongovernmental organizations or local communities has a key meaning for the success of each programme of road safety.

## Implementation tools

The basic tools for implementing the programme will be, similarly to the solutions described in GAMBIT 2005 programme, the performance programmes at sectoral, voivodeship and poviát levels. All the programmes should be developed with consideration of the superior objective, which is the implementation of the objectives of this national Programme.

**Performance programmes** – these are the programmes prepared for the period of one or two years, which will include:

- a) Detailed plans of actions for the upcoming year in case of one-year programmes,
- b) Detailed plans of actions for the first year and the outline of actions for the second year in case of two-year programmes.

Each performance programme will contain a set of actions to implement the priorities and directions specified under the National Road Safety Programme, and it will specify the time frames for implementing single tasks, leaders responsible for their implementation, and a set of indicators to

measure degree of implementation of action and its impact on road safety. The first programme will cover the year 2013, and next programmes will cover the periods of 2014–2015, 2015–2016, etc.

**Sector programmes** – internal programmes of individual departments and institutions of government administration (Directorate General of National Roads and Motorways, Polish Police Headquarters, National Headquarters of the State Fire Service of Poland, Central Inspectorate of Road Transport, etc.).

**Voivodeship programmes** – apart from the national programme, the basis for creating voivodeship programmes should be voivodeship-level documents-development strategy and plan of spatial development. Similarly to the national programme, the voivodeship programmes should be based on a diagnosis guaranteeing an impartial view on the actual state of road safety and a strategy setting a clear objective and main directions of actions. They should be supplemented with operating programmes defining the tasks to be completed by the institutions and organizations at the voivodeship level.

**Local programmes** – these are the programmes implemented by local governments. These programmes, developed very carefully, should indicate the concrete solutions in infrastructure, supervision, education and rescue service (e.g. improving a specific intersection, equipping a specific unit with the equipment, indicating a specific spot for automatic supervision, etc.).

## Monitoring and Assessment

The intensive focus on results raises the need to proceed with an efficient, ongoing and complex monitoring and assessment of whether the undertaken actions are headed in the specified direction. As mentioned in the previous chapter, the progress in achieving specified objectives will depend on many factors, also on those laying beyond the direct control of the national administration. However, the public commitment to the implementation of the Programme is significant.

The Programme tools of monitoring will be:

- 1.** Annual reports on road safety in Poland, which will contain mainly:
  - a)** facts concerning the accidents from the previous year,
  - b)** specific indicators of the implementation of actions included in the performance programmes for the previous year.
- 2.** Periodic reports on the implementation of this programme containing the assessment of effectiveness of the used solutions, correlated with the stage objectives (see: Chapter 3):
  - a)** the first periodic report in the year 2015 should cover the period of 2012–2014,
  - b)** the second periodic report in the year 2018 should cover the period of 2012–2017.

The National Road Safety Council will be responsible for both types of reports (published officially). Subsequent performance programmes will be formulated on the basis of annual reports. Periodic adjustment of the Programme will be performed on the basis of reports. Application of both mechanisms is expected to enhance effectiveness of the undertaken road safety measures, and, consequently, to help us attain the objectives formulated in this Programme.

Analogical monitoring mechanisms – annual and periodic reports should be introduced at the level of implementation of voivodeship and local programmes.

## Road safety indicators

The main measure of implementation of this Programme, as well as road safety in general, will be the real decrease in number of fatalities and seriously injured. These indicators will be used for the ongoing assessment of the progress in reaching the main objectives in 2020, also in relation to stage objectives for the years 2014 and 2017. The general assessment of Programme progress will be also facilitated by the other indicators presented in table 10.1.

**TABLE 10.1.**

Specification of basic monitoring indicators of National Road Safety Programme

Pillars of the Programme	Year	Fatalities			
		2010	2014	2017	2020
		2010	2014	2017	2020
<b>Final indicators for the complete Programme</b>					
The number of victims (victims/year)	3,907				11,491
The demographic victim indicator (victims/1 million inhabitants/year)	102.3				302.9
The automotive victim indicator (victims/1 million vehicles/year)	169.6				498.8
The victim concentration rate (victims/1 billion pass-km/year)	No data available				No data available
<b>Final rates for individual pillars</b>					
The number of pedestrians as victims of road accidents (victims/year)	1,235				3,287
The number of cyclists as victims of road accidents (victims/year)	280				890
The number of motorcyclists and motor drivers as victims of road accidents (victims/year)	320				1,139
The number of victims in the accidents caused by drunk drivers (victims/year)	352				1,284

Pillars of the Programme	Year	Fatalities				Seriously injured			
		2010	2014	2017	2020	2010	2014	2017	2020
<b>Safe Roads</b>	The number of victims in head-on collisions (victims/year)	776				2,052			
	The number of victims in side and rear-end collisions (victims/year)	917				3,409			
	The number of victims in accidents resulting with the vehicle falling out the road (victims/year)	693				1,607			
	The number of victims on sections of transit roads in built-up areas (victims/year)	518				3,151			
	The number of victims on the intersections and junctions (victims/year)	585				2,754			
<b>Safe Speed</b>	The number of victims on the horizontal curves (victims/year)	566				1,695			
	Number of victims at night time (victims/year)	1,529	3,092			3,092			
<b>Safe Vehicle</b>	Number of victims of road accidents caused by excessive speed (victims/year)	1,117				3,213			
	Number of victims of road accidents with defective vehicles (victims/year)	19	70			70			
<b>Rescue system and post-crash response</b>	Number of victims who died within 30 days after the accident (victims/year)	1,217							
	Number of victims with permanent disability (victims/year)								No data
<b>Indirect rates relating to individual pillars</b>									
<b>Safe Traffic User</b>	Share of people with fastened seatbelts in the vehicle (%)					78.3% – driver 81.9% – a passenger in front 51.2% – a passenger in back seat <sup>1</sup>			
	Share of children transported and properly protected in the vehicle					No data available			
	Share of motorcyclists, motorbikers and cyclists using helmets (%)					No data available			
	Share of drunk drivers or drivers under influence of other substances detected in control (%)					No data available			

Indirect rates relating to individual pillars		2010	2014	2017	2020
<b>Safe Road</b>	Share of the calmed traffic roads in road network in built-up areas [%]	No data available			
	Share of roads equipped with the infrastructure for pedestrians and cyclists in country and voivodeship road network [%]	No data available			
	Average speed of vehicles on motorways and expressways (kilometres per hour)	No data available			
	Average speed of vehicles on country roads (kilometres per hour)	No data available			
	Average speed of vehicles on city roads	No data available			
	Share of drivers exceeding speed on motorways and expressways (%)	No data available			
<b>Safe Speed</b>	Share of drivers exceeding speed on country roads (%)	66.5% <sup>II</sup>			
	Share of drivers exceeding speed on city roads (%)	79.4% <sup>II</sup>			
	Share of drivers exceeding speed, detected in control (%)	No data available			
<b>Safe Vehicle</b>	Average vehicle age (years)	15.5 – passenger cars 14.7 – trucks 18 – buses <sup>I</sup>			
	Share of vehicles with defects (%)	No data available			
<b>Rescue and post-crash response</b>	The average arrival time of rescue services on site of accident (minutes)	No data available			

I. Data from 2008 gathered within SPOT, National study of the speed measurement and use of seat belts.

II. Source: [http://www.samar.pl/wiadomosci/park-samochoadowy-2010-w-polsce?locale=pl\\_PL](http://www.samar.pl/wiadomosci/park-samochoadowy-2010-w-polsce?locale=pl_PL)



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