Pedestrian protection, speed enforcement and road network structure: the key action for implementing Poland’s Vision Zero

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Abstract

Since 1991 Poland’s road safety has been systematically improving with a 60% reduction in road deaths. Despite the progress Poland continues to be one of the European Union’s worst performing countries. The country’s main road safety problems remain unchanged: dangerous behaviour of road users, underdeveloped system of road safety management and low quality of road infrastructure. This is why subsequent road safety programmes (implemented over the 20 years) were designed to improve pedestrian safety, reduce speeding and treat sources of roadside hazards. The article gives a short diagnosis of Poland’s road safety, evaluates its subsequent road safety programmes called GAMBIT 1996, GAMBIT 2000 and GAMBIT 2005 with its far-reaching Vision Zero just as in a number of countries. The main road safety problems that Poland must solve are identified. A risk-based road safety management method is outlined. An overview is given of a method for estimating fatalities in Poland as a road safety management tool. At its strategic level, the fatality estimation method uses models built on an analysis of 60 countries worldwide and calibrates them to Polish conditions. It puts special emphasis on pedestrian safety, speed management and the design and construction of safety road infrastructure. Finally, selected examples are presented to show the effectiveness of the measures and recommended actions to reduce Poland’s road deaths.

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1. Introduction

Motor transport is clearly a dominant type of transport in a number of countries. In Europe this represents nearly 75% of all transport expressed in ton-kilometres and the consequences account for 95% of all accidents and 90% of all transport-related deaths (Jamroz, 2011).

Road transport accidents are primarily caused by deficient elements of the transport system which come to light when road users make mistakes, vehicles break down, the road infrastructure malfunctions, the weather or nature deteriorate or as a result of vandalism or terror. This calls for new mechanisms and tools to help reduce the social and economic consequences of road transport.

The experience of OECD countries (OECD Scientific Expert Group, 1994) shows that road safety can be significantly improved through comprehensive and coordinated action and building on well-prepared and consistently implemented road safety programmes and road infrastructure projects. Sweden’s Vision Zero road safety programme is a model example (Tingvall, 1998). For a number of years the focus has been on target-oriented programmes with clear goals and objectives that assign numbers to be accomplished, available funds, coordinated partnerships and sources of funding. To ensure that the objectives are well-defined, tools are needed to forecast safety measure effectiveness when strategic action is planned (interventions).

The article provides an analysis of Poland’s road safety, an evaluation of its subsequent road safety programmes over the last decade and proposed efforts to reach Vision Zero and the targets that European Union countries must meet until 2050.

2. Diagnosis of Poland’s road safety

2.1. Poland compared to the European Union

Over the last decade Poland has been one of the EU’s worst performing countries for its total number of road deaths and the RFR demographic rate. Today Poland is one of four countries (with France, Germany and Italy) that generate more than 50% of all fatalities in the EU. Based on the RFR, which is the most frequently used rate for country road safety comparisons, we can see that it is almost double the EU average and triple the rates in the United Kingdom, the Netherlands and Sweden. Some of the reasons include Poland’s socio-economic situation, significantly worse-off than in the countries listed above (GDP per capita is almost twice as low) and the insufficiently strong political will, poor engagement of road safety bodies and a low road safety culture among road users.

2.2. Road safety programmes in Poland

More than twenty years ago efforts were undertaken in Poland to break the harmful trend of increasing road deaths. The guidelines designed to halve the number of road deaths in two decades were formulated in GAMBIT Road Safety Programmes (in national level: first in 1996, second in 2000 and third in 2005) developed by the Gdansk University of Technology, Department of Highway Engineering and other Partners (Jamroz et al., 2006).

When the National RS Programme GAMBIT 2005 (for period 2005–2013) was in operation, there were a number of legislative, educational, preventive and infrastructure measures. Sadly, of the 144 tasks only 84 (58%) were completed. Some of them did not produce the desired results and others were poorly implemented. Some of them, however, have helped improve road safety. These include (Michalski et al., 2013):

- development and implementation of regional and local road safety programmes,
- new driver training and licensing regulations,
- implementation and development of an enforcement system (speed cameras, driver working time checks),
- bicycle traffic regulations,
- intensive construction of express roads and motorways, safe junctions, use of traffic calming measures,
- road safety audits for some of the roads.
It is estimated that within 7 years of the National RS Programme GAMBIT 2005:

- road deaths declined by more than 40%.
- it has saved about 6,000 people from being killed in a road accident, yet an equal number could have been saved if the entire Programme had been implemented. The expected savings from fewer accidents and victims would have been around PLN 34.5 billion.

An analysis of Poland’s forecasted and actual road deaths shows that the strategic goals of the EU’s 3rd Road Safety Action Programme (1 140 fatalities in 2010 in excess of the target) and the National Road Safety Programme GAMBIT 2005 (550 fatalities in 2013 in excess of the target) were too ambitious. As a result, in 2012 the Ministry of Infrastructure introduced a new national road safety programme until 2020. Its strategic objective is to reduce road deaths in Poland to 2 000 (about 50% compared to 2010) and serious injuries to 5 600 (40% less compared to 2010). The new programme builds on the safe system concept, a popular and WHO recommended approach. Two years into the Programme we can see that the actual number of road deaths is fairly close to the forecasted number.

2.3. Problems to be solved

Despite an intensive effort to prove otherwise, road accidents in Poland are anything but an important political priority. The relevant institutions are ineffective because responsibility for road safety is dispersed (collective responsibility). Detailed analyses have identified the main risk factors:

- the state’s organisational and functional system (lack of political will, lack of a lead road safety body),
- dangerous road user behaviour (excessive speed, risk taking, drivers’ disrespect for pedestrian and bicyclist rights),
- too little protection for pedestrians and bicyclists, and no understanding for vulnerable road users
- the system of road safety management (lack of a speed management system, lack of tools for managing road infrastructure safety).
- quantity and quality of road infrastructure (road networks not meeting top road safety standards, few safe junctions, no traffic segregation, difficult roadsides),
- underperforming system of rescue and post-accident care.

In order to illustrate these risk factors, five main problems were indicated in the paper. Five most critical road safety problems that contribute to road deaths: accidents on national roads, involving pedestrians, speeding, high severity of accidents and drink-driving accidents. Figure 1 presents changes in the number of fatalities related to these issues over the last 15 years.

**National roads.** Managed by the General Directorate for National Roads and Motorways (the GDDKiA), national roads carry more than 25% of Poland’s total road traffic. Road accidents on these roads represent 19% of all accidents, 21% of injuries and 34% of road deaths. As the statistics shows, Polish national roads do not have the capacity to carry so much traffic and support high speeds. The main causes of the high risk on Poland’s national roads include: too few of the roads ensure the highest technical standards (motorways and express roads), towns and villages have no ring roads, inadequate road cross-sections, roadsides not meeting technical and safety standards, failure to protect vulnerable road users, roadway improvements not meeting the standards and too few ITS solutions in the area of road traffic management (National Road Safety Council, 2013).

**Pedestrians** are the biggest group of fatalities (35%). Poland is number one among the European Union’s most dangerous countries for risks to pedestrians in road traffic. For many years about 2 000 pedestrians were killed in road traffic. It was not until 2007 that the numbers started going down significantly which continued over the years to reach 1 100 pedestrians killed in 2014 (i.e. a reduction of 40% compared to 2003). Today, vulnerable road users (pedestrians, cyclists, motorcyclists and moped riders) represent 43% of all killed. The factors that contribute to pedestrian accidents include: unregulated pedestrian priority on the road (new legislation under way), lack of
pedestrian safety facilities (pavements, asylum islands) and limited pedestrian visibility at night-time (Jamroz et al., 2014).

**Speed.** Excessive speed, dangerous or not right for the conditions is the cause of 27% of fatal road accidents. A study of Polish national roads in the years 2002–2007 and in 2013 shows that more than 50% of drivers on rural roads and more than 90% of drivers on roads passing through small towns and villages exceed the speed limits (Gaca and Kiec, 2010). The causes of speeding accidents include: a general tolerance for driving significantly above the speed limit, high speed limits (140 km/h on motorways, 50/60 km/h in cities), criticism and poorly regulated speed enforcement system (the main cause of the increase in fatalities in 2011), poor road hierarchy and lack of traffic separation and types of traffic separation.

**Death within 30 days.** Road accident severity in Poland is high (10 fatalities per 100 accidents) and the result of: high speeds in conditions of lack of lane separation and harsh roadsides, deficient rescue system and problems in the health service. As a consequence in 2014 as many as 32% of casualties died within 30 days of the accident. While road deaths in general have declined, severity as a factor of death has increased (28% in 2013). Sadly, none of the relevant GAMBIT 2005–2013 targets have been met. Considering this, three areas should be addressed: reducing accident severity (through improved infrastructure, organisation and management), improving the road rescue system and post-accident care.

Alcohol is no longer Poland’s number one road traffic risk. Today, this problem applies primarily to male drivers and pedal cyclists on weekends. Undertaken years ago, a determined drinking and driving policy has reduced road accident fatalities from 24% in 1996 to 11% in 2014. Over the last ten years the share of drunk fatalities has dropped significantly (from 0.85 thousand in 2003 to 0.35 thousand casualties in 2014, i.e. by 51%). Compared to other European countries it has been one of our biggest successes. Trend analyses, however, suggest that these efforts should be continued both in terms of infrastructure, road safety management and safety culture to be promoted among politicians, decision-makers and road users.

As shown in the analysis and evaluation Poland should target its road safety action on, in line with the three eras concept: improving the infrastructure, which includes building more top standard roads (motorways and express ...
roads), developing its road safety management system (with a special focus on automatic enforcement) implementing a safety culture among politicians, decision-makers and road users.

3. Risk-based method of road safety management

Road safety management using risk-based methods is a formalised and repetitive method which brings together risk assessment and risk response. The objective of the method is to help road authorities to take rational decisions in the area of road safety and road infrastructure safety and eliminate or reduce the consequences occurring in the particular phases of road life cycle. To manage the safety of road users, a risk-based approach was used (Jamroz, 2011; Technical Committee 18, 2004). This method differentiates three levels of risk management:

- **Strategic level** (national) represented by the political authorities of the country, the transport ministry or infrastructure ministry, authorities of the voivodeship (region) or poviat (county); the weight of decisions is the greatest (decisions have the greatest impact). Decisions are taken under conditions of uncertainty or risk arising from limited access to data, strong volatility of the phenomenon and absence of appropriate tools to facilitate decision making.

- **Tactical level** (regional) represented by regional and county governments, road and transport authorities; the decisions weigh less, but the choice of the most effective and efficient actions is very important. There is a need for tools, procedures and methods to facilitate decision making under conditions of risk and uncertainty resulting, inter alia, from limited access to data.

- **Operational level** (local) represented by design offices, road authorities, transport operators, road users, where specific measures are taken; in addition to a good access to data, there is a need for detailed methods of hazard analysis and risk assessment and methods for predicting the impact of a proposed action on risk reduction.

The risk management method is a repetitive way to ensure effective and efficient risk reduction in road traffic, with a particular focus on interventions and actions related to road infrastructure within reasonable limits. In the proposed risk management approach, there are two important phases: risk assessment including risk valuation and analysis and risk response including: risk handling, risk monitoring and risk communication.

At each management level, methods of analysis and risk assessment of various precision should be used. These methods should be used, in particular by:

- central authorities (Parliament and government) to prepare and evaluate the impact of proposed legislation, safety standards, rules and recommendations concerning road users and operators, production and operation of vehicles and the construction and maintenance of roads;
- central offices (transport minister, National Road Safety Council, National Police, General Directorate for National Roads and Motorways) to determine the strategic objectives in national programmes for safety improvement, risk assessment in the road network, assessment of the impact of selected legal regulations and evaluation of the effectiveness and selection of strategic activities;
- regional and local authorities as well as regional and local road safety councils to prepare a safety ranking in selected sub-regions, assessment of risk in the road network managed by the given local authority, to determine strategic objectives in local programmes to improve safety, selection of effective strategic and operational actions;
- road authorities (country, region, city) to assess the risks in the road network managed by the authority, select effective operational activities, perform road safety audits, evaluate the effectiveness and efficiency of the actions.

As regards safety management, the individual risk (refers to the behaviour of a single road user) and societal risk (refers to the behaviour of entire social groups in the selected area or road network) are essential (16) (Jamroz, 2011).

In order to ensure a smooth management process, the right tools should be used to facilitate risk estimation and assessment and decision making. Three tools have been developed, each requiring scientific support. They are: method for estimating measures of societal strategic risk, method for risk classification (for areas and roads of different categories) and methods for evaluating the effectiveness of actions (interventions) (Jamroz, 2013, 2012,
Methods for estimating fatalities $F$ for the whole country at the strategic level are presented further in the paper.

4. Method for estimating fatalities at the strategic level

4.1. Overall concept of the fatality model

This method is designed to estimate the number of fatalities in general or selected road users in a given country. There are a number of road accident fatality ratio or number of road fatalities modelling in the literature (Koornstra, 2007; Kopits and Cropper, 2005; Law et al., 2011; Smeed, 1949). To estimate the number of road accident fatalities in the future as a consequence of projected or assumed social, economic and transport changes, a proprietary prognostic model was used (Jamroz and Smolarek, 2013; Jamroz, 2013, 2012, 2011; Jamroz et al., 2015). To estimate the number of fatalities, factor models were used as shown in the equations below (1), (2):

\[ F = P \cdot RFR_b \cdot MF_c \]  
\[ FX = F \cdot PFX_b \cdot MXF_c \]

where:
- $F$ – number of fatalities on road network in country (fatalities/country/year),
- $P$ – population (M inhabitants/country/year),
- $RFR_b$ – base road fatality rate (fatalities/1M inhabitants/year),
- $MF_c$ – country modification factor,
- $FX$ – number of fatalities of a chosen group of road users (e.g. pedestrians) on road network in country (fatalities/country/year),
- $MXF_c$ – country modification factor for a chosen group of users,
- $PFX_b$ – base percentage rate of the share of selected road users (e.g. pedestrians) in road crashes during the analysed year (%),
- $MXF_c$ – correcting factor for the percentage share of fatalities for selected groups of road users (e.g. pedestrians) in road crashes in the analysed country and during the analysed year.

4.2. Estimating total fatalities

To estimate total fatalities a model was proposed based on the relation described in equation (1). It has three variables: $P$, $RFR_b$, and $MF_c$. The estimation method is presented in the forecast method. The population $P$ in Poland is now 38.5 m and the different scenarios reflect the UN and WHO demographic forecasts for the particular countries (United Nations, 2004). As a result, this is not a research problem, but defining $RFR_b$ and $MF$ forecasting methods is a research problem.

Base Road Fatality Rate $RFR_b$ is a common measure of public health and means the number of deaths in a given area and period. Road safety is frequently measured with the road fatality rate $RFR$ which is defined as the relationship between fatalities $F$ and population $P$ in a unit of time.

Based on the literature (Anbarci et al., 2006; Bishai et al., 2006; Koornstra, 2007; Kopits and Cropper, 2005; Law et al., 2011; Yannis et al., 2011); and the results of research (Jamroz, 2011) it was agreed that $RFR$ jest is a fair measure of a country’s road safety changes. According to this concept a country’s road safety performance changes non-linearly in relation to changes in social and economic development.

There are several cases in the literature of modelling the $RFR$ (road fatality rate) using simple regression models (Clark and Cushing, 2004), exponential models (Koornstra, 2007) or the Kuznetz model (Kopits and Cropper, 2005). The particular approximating analytical function is chosen depending on how well it matches empirical data and meets boundary conditions. A proprietary model was developed of the road fatality rate $RFR$ related to demography.

Using multiple available databases of Eurostat, FAO, IRF, IRTAD, OECD, TI, UN, WB, WHO and many other sources, empirical data were collected on the number of deaths and numerous parameters which describe selected countries in different years, such as demographic, geographic, economic, social, automotive, road and transport variables. The number of countries was narrowed down to those that have reliable fatality statistics, and those
without significant disruptions in the road fatality rate. Selected countries (among others: Australia, France, Japan, the Netherlands and Sweden) have a similar, model function graph of changes in the road fatality rate.

Multiple factor non-linear models have been developed which help identify the effects of a number of important factors including the economy, systems, motorization and infrastructure on road safety measured with the base road fatality rate $RFR_b$. The $RFR_b$ was modelled on the power-exponential function generally described with one of the analysed formulas. One of them is presented by the equation (3). The variables used have a high degree of significance ($p < 0.05$) and meet the Wald test at significance level of 5% which shows that the independent variables are significant in the non-linear models. The $R^2$ coefficient of determination was within 0.51 to 0.88 (Jamroz, 2013):

$$RFR_b = \beta_0 \cdot GDPPC^{\beta_1} \cdot VTKCP^{\beta_2} \cdot \exp(-\beta_3 \cdot GDPPC - \beta_4 \cdot LEI - \beta_5 \cdot CPI + \beta_6 \cdot ACPC + \beta_7 \cdot DPR - \beta_8 \cdot DME - \beta_9)$$

(3)

where:

- $GDPPC$ – gross national product per capita (thousands ID/inhabitant/year), (PPP, constant 2005, international $)
- $VKTPC$ – average vehicle kilometres travelled per year per capita (km/person/year),
- $LEI$ – life expectancy index,
- $CPI$ – corruption perception index,
- $ACPC$ – alcohol consumption per capita (l/inhabitant/year),
- $DPR$ – density of paved roads depending on demography (km/1 M population),
- $DME$ – density of motorways and expressways depending on demography (km/1 M population),
- $\beta_0, \beta_1, \cdots, \beta_9$ – equation coefficients.

A simple model of $RFR_b$ changes was derived on the basic parameters which describe the level of socio-economic development of the country ($GDPPC$), the degree of national organizational system development ($LEI$, $CPI$), population mobility ($VKTPC$), population behaviour ($ACPC$) and structure of the road network ($DPR$, $DME$). The use of the base model developed for Poland demonstrated that the estimated numerical values $RFR_b$ deviate from the actual values, therefore a local coefficient was applied to adapt the $RFR_b$ to local conditions by using country modification factor $MF_c$ as presented in equation (4):

$$MF_c = \gamma_0 \cdot \exp(-\gamma_1 \cdot LEI - \gamma_2 \cdot DME - \gamma_3 \cdot Ln(FV) + \gamma_4)$$

(4)

where:

- $MF_c$ - country modification factor,
- $LEI$ – life expectancy index,
- $DME$ – density of motorways and expressways depending on demography (km/1 M population),
- $FV$ – number of speed cameras in use (cam./year),
- $\gamma_0, \gamma_1, \cdots, \gamma_4$ – equation coefficients.

As can be seen from the relation (4) we find that in Poland $RFR$ measured changes in road safety are significantly affected by: the level of health care ($LEI$), advancement of the motorway and express road network ($DME$) and the advancement of the automatic speed enforcement system ($FV$). With the $MF_c$ applied, the mean squared error of adjustment of the estimated $F$ values to the actual data decreased. As a result, this model could be used as a prediction model to estimate long-term changes in the number of Poland’s fatalities.

4.3. Estimating the number of pedestrian fatalities

This paper addresses the problem of Poland’s most vulnerable road users, that is pedestrians. Using the general model (described with relation 2), a method was developed for estimating pedestrian fatalities $FP$ at the strategic level using the relation (5):

$$FP = F \cdot PFP_b \cdot MPF_c$$

(5)
where:

\[ PFP_b = \beta_0 \cdot \exp(-\beta_1 \cdot GDPPC - \beta_2 \cdot CPI - \beta_3 \cdot VTKPC - \beta_4 \cdot DPR + \beta_5 \cdot DP - \beta_b \cdot PM) \]  \hspace{1cm} (6)

\[ MPF_c = \exp(-\gamma_1 \cdot GDPPC - \gamma_2 \cdot EDI - \gamma_3 \cdot DME + \gamma_4) \]  \hspace{1cm} (7)

where:

- \( FP \) – number of pedestrian fatalities,
- \( F \) – number of total fatalities (victims/year),
- \( PFP_b \) – base percentage rate of the share of pedestrians in fatal road crashes during the analysed year (%),
- \( MPF_c \) – country modification factor for pedestrians fatalities,
- \( GDPPC \) – gross national product per capita (thousands ID/inhabitant/year),
- \( VKTPC \) – average vehicle kilometres travelled per year per capita (km/population/year),
- \( CPI \) – corruption perception index,
- \( DPR \) – density of paved roads depending on demography (km/1 M population),
- \( DP \) – density of population (population/km²),
- \( PM \) – percentage density of motor vehicles (%),
- \( MPF_c \) – correcting factor for the percentage share of pedestrian fatalities in road crashes in the analysed country and during the analysed year,
- \( EDI \) – level of education index,
- \( DME \) – density of motorways and expressways depending on demography (km/1 M population),
- \( \beta_0, \ldots, \beta_n \); \( \gamma_0, \ldots, \gamma_n \) – equation coefficients.

The number of total fatalities \( F \) seen in formula (5) is estimated as specified in 4.2. The other rates are estimated using models developed specifically for the purposes of this work.

The base percentage rate of the share of pedestrians \( PFP_b \) is the percentage share of pedestrian fatalities compared to the overall number of the country’s fatalities. Based on the collected historical data of pedestrian fatalities in selected countries, a model was developed of the function \( PFP_b \) for the independent variables. Initial analyses suggested the use of the exponential function, as the one that best approximates the data being analysed. The resulting model is described with equation (6). A simple model of \( RFR_b \) changes was derived on the basic parameters which describe the level of socio-economic development of the country, the degree of national organizational system development, population mobility, the structure of the road network, population density and the share of motor vehicles in traffic (PiM).

The use of the base model developed for estimating pedestrian fatalities in Poland demonstrated that the estimated numerical values of \( PFP_b \) deviate from the actual values, therefore a local coefficient was applied to adapt the base values to local conditions by using the country modification factor \( MPF_c \) described with formula (7). With the \( MPF_c \) applied, the mean squared error of adjustment of the estimated \( PF \) values to the actual data decreased. As a result, this model could be used as a prediction model to estimate long-term changes in the number of Poland’s pedestrian fatalities.

5. Effectiveness evaluation of selected measures

The model described with equations (1) to (4) was used to develop a forecast of fatalities in Poland until 2050. Several scenarios of the country’s demographic and economic growth were analysed. This paper presents the results of road accident fatality estimation for three scenarios with different: population \( P \) (29.7–36.5 m in 2050), national product \( GDPPC \) (50.5–74.0 thousand ID/mk in 2050) and road safety action.

For these scenarios multi-level models (Jamroz, 2011) were used to develop forecasts of how the independent variables used in formulas (1), (3) and (4) would change. The result is an estimation of fatalities in the years 2015–2050 for the scenarios. Presented in Fig. 2 the results show the projected rate of Poland’s socio-economic growth and changes in the other independent variables (based on road safety trends observed in the world’s best performing countries) and suggest a systematic reduction in road accident fatalities. Yet these changes alone may not be sufficient to achieve the fatality Vision Zero in 2050 (Jamroz, 2013).

The developments will be largely affected by the projected population and rate of socio-economic growth. A small population means fewer fatalities and the other way round. As regards the levels of socio-economic development: a low rate of development (scenario 3) means a higher number of fatalities, a high rate of growth (scenario 1) means a smaller number of fatalities. Estimations of total fatalities show that over the analysed period...
(35 years) about 115 thousand people may die on Polish roads if no road safety improvements are made ("do nothing new" scenario). If, however, scenario 3 is implemented (low level of development and a big population) 51 thousand people may be killed and about 60 thousand may be saved from death. In the case of scenario 1 (high level of socio-economic development and a small population) the result may be about 33 thousand people killed and about 80 thousand saved. It is scenario 2A, however, that is most likely (medium level of socio-economic development and a medium population) about 42 thousand people may be killed and if scenario 1 is implemented about 70 thousand people may be saved from death.

In addition, the results show that the 2020 strategic goal (not more than 2 000 fatalities) can only be achieved, if additional interventions are implemented. The interventions should be designed to: improve the country’s management system and road safety management, improve the rescue, health care and education systems, build new roads (motorways and expressways) and upgrade the current roads to meet road safety standards, develop automatic enforcement to monitor dangerous road user behaviour and develop a system to protect pedestrians and cyclists. If implemented, these additional actions may significantly reduce road deaths until 2020 (by as many as 1 600 people).

Achieving Vision Zero in 2050 will be a more difficult task. Estimations and analyses suggest that interventions may achieve a fatality number above zero (ranging from 30 to 150 fatalities). In this case the RFR will range from 1.0 to 5 fatalities per 1 m population which is several dozens times less than today.

Fig. 2. Forecast of fatalities in Poland until 2050 for different development scenarios (Jamroz, 2013).

6. Conclusion

Despite a number of actions and interventions to improve its road safety, Poland continues to be one of the EU’s worst performing country with a high risk of death or injury in road traffic. Top priority should be given to actions designed to reduce that risk. While the subsequent national, sectoral and local road safety programmes (including GAMBIT programmes) have been able to reduce road deaths in Poland, the results are from the expectations.
The analysis of whether it is possible to achieve the strategic target of the National Road Safety Programme until 2020 and Vision Zero in Poland until 2050 shows that it can be achieved or exceeded significantly if additional strategic actions and interventions are implemented. The most effective and efficient fatality reduction interventions are those that will help change road user behaviour (driving at safe speeds, no drinking and driving), pedestrian and cyclist safety, modern and safe road infrastructure and the state system (less corruption, development of health care, road safety management system). If systematically implemented, the measures will bring us quite close to Vision Zero in 2050.

The methods for estimating fatal road accidents and pedestrian fatalities can be very helpful with future analyses, taking into consideration demographic, economic, social, motorization, transport and infrastructural factors at the country’s strategic level.

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