

THE RESEARCH ON THE FACTORS THAT PREDETERMINE THE ACCIDENT RATE IN HEAVY TRANSPORT SECTOR: IN CASE OF LITHUANIA

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Summary

When Lithuania joined the European Union, ensuring the road traffic safety became one of the most important problems. In Lithuania, official data collection is arranged if a traffic event caused an injury or a death of a traffic participant. In addition, the total number of traffic events is calculated. However, no data on tangible damage caused by a traffic event are fixed, if the event caused such damage only. In addition, there are no official data on traffic events where nobody suffers and the traffic participants agree on the circumstances of the event. For systematization of collected data, certain data accounting measures are applied and the results are provided to the final data managers. This article consist of theoretical and practical research on the factors that predetermine the accident rate in Lithuania heavy transport sector.

Keywords: heavy transport, traffic, accident, trucks

1. Introduction

Traffic events cause world widely 1.3 million deaths and over 50 million injuries annually; in addition, the vehicles and road infrastructure are destroyed and a negative environmental impact takes place. The profession of drivers, in particular those engaged in truck driving, is not the safest profession in the world; however, driving a huge vehicle is much safer, as compared to driving a car.

When Lithuania joined the European Union, ensuring the road traffic safety became one of the most important problems. The continuous extension of the transport system is accompanied by growing traffic safety problems with their consequences – the increasing accident rate and number of traffic fatalities. In Lithuania, the traffic safety problem is

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important, because the national transport system varies; the number of vehicles and the volumes of transported cargoes increasingly grow. The said factors cause changes of the traffic intensity. Lithuania successfully integrated into EU market of services; however, the same cannot be stated about its integration into European traffic safety systems. Tackling this problem is of great importance, because traffic safety is a priority area in EU [1].

The traffic safety situation in Lithuania, as compared to other EU Member States, is one of the poorest, because the principal statistical indicators in this sector reflect a negative image up to present time. The losses caused by traffic events in our country annually amount to 0.5 – 0.7 billion Euro. The increasingly growing accident rate and the number of fatalities achieved such a level that cannot be tolerated anymore.

The problem of traffic safety may be tackled only on the national level upon applying every legal, administrative, engineering and educational measure.

The relevance of the research: for the today level of development of transport facilities, shortening of transportation duration from day to day, when the distances remain the same, is typical; so, a risk of involvement in a traffic event in streets and roads of Lithuania is 3 or 4 times higher [2], as compared to other countries. In addition, the increasingly growing number of vehicles causes an increased probability of the accident rate growing in roads, so the problem of accident incidence rate becomes still more topical in Lithuania. Upon taking into account the topicality of the subject of the research, it had been formulated as follows: The research on the factors that predetermine the accident rate of heavy transport sector [3].

The aim of the research: to analyze the causes of traffic events in heavy transport sector on the base of statistical data and scientific papers and their importance for choosing traffic safety measures.

The tasks of the research:

- To analyze the traffic events discussed upon in literature and to establish their causes.
- To analyze the relevant studies carried out by Lithuanian and foreign researchers and to single out the scientific problems related to the accident rates in the heavy transport sector.
- To carry out a research on the base of the formulated scientific problems striving to identify a set of traffic safety problems and to compare the accident rates in Lithuania and other countries.
- To analyze the potential opportunities of reducing the accident rate in heavy transport sector on the base of the results of the research.

2. The peculiarities of traffic events in Lithuania

The very rapid growth of the number of vehicles causes more and more problems related to the accident rate. Lithuania is one of European leaders in traffic accidents. Although the economic situation in Lithuania remains hard, the number of vehicles increasingly grows

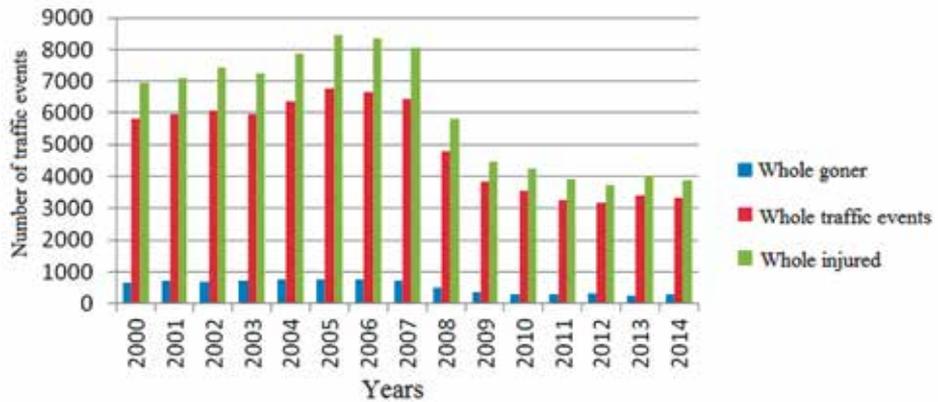


Fig. 1. The changes in the number of traffic events within the period from 2000 to 2014 (according to the data provided by Lithuanian Road Police)

[4]. The data provided by Lithuanian Road Police Service show the changes of the number of traffic events as well as the numbers of traffic fatalities and injuries [13].

It may be seen from the diagram that the number of traffic events was 5'807 in 2000; then the accident rate was increasingly growing up to the year 2005. The growth in the number of vehicles and the traffic flows was accompanied by increase of the accident rate. In 2005, the accident rate in Lithuania has achieved its top level: 6771 traffic events with 773 fatalities and 8'466 injuries. Since the year 2005, more attention was paid and more funds were allocated for the struggle against traffic events, so a considerable decrease of the accident rates took place up to the year 2010. Traffic participants appeared to be able to adapt themselves to the new traffic conditions; in addition, the investments also contributed to cutting the number of traffic fatalities [8]. In the period from 2010 to 2012, the accident rate was decreasing; however, it increased in 2013 by 6.9%. In 2014, the number of traffic events achieved the level of the year 2011. In the year 2014, the number of traffic events decreased by 42.7%, as compared to 2000.

While analyzing the data for the year 2013, we can notice that the highest accident rate was typical for Fridays. The maximum number of traffic events took place on Fridays; however, the maximum number of traffic deaths was typical for Saturdays. Talking of the influence of the time of a day on the accident rate, it should be emphasized that a probability of occurrence of a traffic event in dark is considerably higher, as compared to daylight hours. In course of analyzing the data for the year 2013, the top accident rates were found to be typical for the time about 7.00 o'clock am and for the range between 04.00 o'clock pm and 06.00 o'clock pm. It is logical that a majority of traffic events occur in hours of maximum traffic intensity. It was found that about 74% of all traffic events occur in dark, whereas only 26% of them occur in daylight. While talking about the season, the atmospheric conditions are important as well. The accident rates are highly impacted by atmospheric precipitation, snowstorms, mists and so on. In such cases, the atmospheric

conditions are more complicated than usual. The statistics show a growth of the number of traffic events upon bad meteorological conditions. In autumn or winter, because of slip roads or poor observability, the accident rates are considerably higher, as compared to the warm season. In 2013, October and November were the most dangerous months for driving, whereas February and March were the safest ones. Such a situation takes place because the atmospheric conditions suddenly become worse and the drivers are not ready for such changes [14].

Taking into account that according to the statistical data and those from foreign authors, load-carrying vehicles cause from 4% to 7% of the total number of traffic events. We know exactly that the total number of accidents caused by load-carrying vehicles in 2013 amounted to 187. However, there are no available data for earlier years.

While comparing the number of traffic accidents per million population in Lithuania and other European states, it may be seen that our indicators are among the worst ones, so it may be stated that the situation in Lithuania remained unsatisfactory and it is necessary to increase the efficiency of police control on roads and to coordinate the activities of institutions responsible for traffic safety. In addition, it is necessary to search for new solutions related to further reducing the accident rates in the country [12].

3. The accident rates in regions of Lithuania

The high accident rate has not prevented Lithuania from joining the EU; however, Lithuania cannot avoid the relevant actions from its side, because total about 62 thousand traffic events that caused about 75 thousand injuries and about 7 thousand deaths were registered on roads of Lithuania within 10 last years. According to the paper [11], two problematic regions where the maximum accident rate is fixed may be singled out:

- The region in the north-western part of the state that includes the territories controlled by Klaipėda, Kretinga, Šilutė, Neringa and Pagėgiai self-governments;
- The region of high accident rates that includes the territories controlled by Vilkaviškis, Šakiai, Birštonas, Marijampolė, Alytus and Kaunas self-governments.

In the above-mentioned regions of Lithuania, the maximum accident rates are fixed. In the opinion of the authors, such high level of accident rates was predetermined by the dense network of highways and country roads. In addition, high accident rate in West Lithuania is caused by the increased number of holidaymakers in summer. The high levels of accident rate in Southeastern and Middle Lithuania are predetermined by the geographical position of the regions where the main highways and country roads cross. It is evident that roads with highly intensive traffic flows are abundant in the territories controlled by Kaunas, Marijampolė and Alytus self-governments.

In course of analysis of the "black spots" in Lithuanian roads, it becomes clear that most of them are formed at approaches of large cities of Lithuania and on highways, for example, the road section Kaunas–Zarasai–Daugavpils of „Via Baltica" highway at Marijampolė. They also are typical for the road section between Šiauliai City and Radviliškis District of

the highway Vilnius-Panevėžys-Šiauliai-Palanga-Klaipėda as well as at Plungė Town of the same highway; for sections of the country road Alytus-Seirijai-Lazdijai at territories controlled by Alytus Municipality. It is notable that traffic intensity and traffic flows form only a part of the factors that predetermine high accident rates, because they are highly affected by the road environment (a narrow single-lane road, forested roadsides and so on.) [5].

4. The analysis of the accidents rates of trucks possessed by enterprises

On starting the transport business in Lithuania, microenterprises are usually founded [7], [9]. They are attractive for considerably lower taxes; however, such enterprises are not abundant, so microenterprises, small, medium and large enterprises are discussed upon herein. In course of the research, the following details of them were identified:

- At microenterprises, usually from 8 to 9 employees on the average are employed. Typically one enterprise possesses 6 trucks. The most popular marks of trucks at such enterprises include „Mercedes-Benz“, „VOLVO“ and „MAN“.
- At small enterprises, the number of employees varies between 28 and 48, whereas the number of trucks - between 15 and 30. The most popular marks of trucks at such enterprises include „Mercedes-Benz“, „VOLVO“, „SCANIA“, and „IVECO“.
* At medium enterprises, the number of employees varies between 54 and 175; because we have chosen various enterprises that, in addition to transportation services, provide also other services, such as vehicle maintenance or customs services, such a broad range of the number of staff is natural. The number of trucks varies between 29 and 72. The most popular marks of trucks at such enterprises include „Mercedes-Benz“ and „VOLVO“.
- At large enterprises, the number of employees varies about 300. The number of trucks varies between 58 and 93. The most popular mark of truck is „DAF“.

5. The distribution of accident factors between enterprises

The analysis of activities of microenterprises shows that a majority of traffic events occur on turning/parking/back running of the truck. In such situations, the driver through inattention or hurry overlooks another vehicle and is involved in a traffic event. In addition, many traffic events occur on changing lanes or overtaking another vehicle. In such a case, a traffic event may be caused by poor condition of the road and other factors. 12.8% of the total number of traffic events occurs, if the driver failed stopping the truck in time. Talking of unpredictable factors, getting a small stone onto the windscreen should be singled out as the most frequent causer of traffic events (21.8%). A considerable number of traffic events are caused by blowing-out of a tire or appearance of an animal on the road.

Table 1. The factors influenced an occurrence of traffic events caused by vehicles of an enterprise (compiled by the authors): a) Traffic events occurred through a fault of the Driver; b) Traffic events occurred through a fault of other traffic participants; c) Unpredictable factors.

a)

No.	Types of traffic events	Perc.			
		Micro-Enterprises	Small enterprises	Medium enterprises	Large enterprises
Traffic events occurred through a fault of the Driver					
1.	A truck of the enterprise grazes another vehicle on changing lanes, passing each other or overtaking	18.4%	23.4%	15.8%	23.4%
2.	A truck of the enterprise gets into rear-end/lateral collision against another vehicle	11.6%	9.8%	11.5%	11.8%
3.	A truck of the enterprise fails to let passing or grazes another vehicle on leaving a parking or a filling-station	8.2%	7.5%	7.8%	6.4%
4.	A truck of the enterprise grazes or knocks against another vehicle or other property on turning/ parking/ back running	24.5%	19.8%	16.8%	12.8%
5.	A truck of the enterprise turns to the opposite lane and grazes another vehicle	4.6%	3.7%	11.3%	3.2%
6.	A truck of the enterprise off-goes from the road or makes with its trailer an angle typical for spread scissors	9.6%	12.7%	9.5%	14.5%
7.	A truck of the enterprise overturns	6.4%	8.2%	7.6%	8.6%
8.	A truck of the enterprise takes a swipe at or grazes a road component (does not pass under a viaduct, goes on a ring and so on)	3.9%	4.7%	5.2%	3.9%
9.	Other traffic events	12.8%	10.2%	14.5%	15.4%

b)

No.	Types of traffic events	Perc.			
		Micro-Enterprises	Small enterprises	Medium enterprises	Large enterprises
<i>Traffic events occurred through a fault of other traffic participants</i>					
1.	Other traffic participant grazes a truck of the enterprise on changing lanes	14.6%	18.7%	19.8%	14.7%
2.	Other traffic participant grazes a truck of the enterprise on passing each other	9.4%	7.8%	8.2%	9.5%
3.	Other traffic participant grazes a truck of the enterprise on moving from the acceleration lane or on off-side overtaking (along the roadside)	9.8%	12.5%	15.4%	12.1%
4.	Other traffic participant turns to the opposite lane and grazes a truck of the enterprise	4.6%	4.2%	6.4%	3.2%
5.	Other traffic participant comes from the sideway and grazes a truck of the enterprise	15.6%	12.8%	11.5%	11.8%
6.	Other traffic participant knocks against or grazes a parked truck of the enterprise.	10.8%	9.7%	10.9%	8.9%
7.	Other traffic participant gets into a rear-end collision against a truck of the enterprise	6.4%	8.3%	9.2%	9.6%
8.	Other traffic participant fails to let passing or grazes a truck of the enterprise	17.5%	14.5%	12.5%	14.5%
9.	Other traffic events	11.3%	11.5%	6.1%	15.7%

c)

No.	Types of traffic events	Perc.			
		Micro-Enterprises	Small enterprises	Medium enterprises	Large enterprises
Traffic events occurred through a fault of the Driver					
1.	A tire blows out	17.3 %	8.9 %	10.9 %	7.4 %
2.	A stone gets into the protector	21.8 %	27.6 %	25.8 %	35.1 %
3.	An animal appears on the road	15.2 %	18.9 %	17.4 %	17.9 %
4.	Parts/a tire falls from another vehicle	6.9 %	14.6 %	9.8 %	13.6 %
5.	A slippery road	36.2 %	28.5 %	33.7 %	23.5 %
6.	The truck ignites	2.6 %	1.5 %	2.4 %	2.5 %

The analysis of activities of small enterprises shows that the most frequent cause of traffic events through a fault of drivers is an error of the driver on overtaking or failure to assess the situation from his side; a share of such causes forms 23.4%. Many traffic events occur on turning or back running. Another notable aspect is loss of control of the vehicle by the driver that may be caused by poor load surface or other factors, when the vehicle off-goes from the road or makes with its trailer an angle typical for spread scissors. In such a case, the situation is hopeless and the consequences are sad. Among the unpredictable factors, a little stone that causes cracking of the windscreen dominates (27.6%).

A majority of traffic events through a fault of drivers at middle enterprises occur on turning, changing the lanes or back running (about 32% of the total number of traffic events). In many cases, the driver himself unsuccessfully assesses the distance to the oncoming vehicle and starts overtaking too late or fails stopping the heavy vehicle in time. Traffic events through a fault of other traffic participants most frequently occur, when the other vehicle knocks against the truck of the enterprise on changing the lane or fails to pass the truck while it is moving on the main road on turning of the other vehicle from the acceleration lane – 15.4% of the total number of traffic events. Among the unpredictable factors, the road coating dominates (the vehicle off-goes from the asphalt road on overtaking and a little stone from the tire of another vehicle flies onto its windscreen and causes cracking of the latter and so on).

A majority of traffic events through a fault of the driver at large enterprises occur on changing lanes, passing each other or overtaking – such events form 23.4 % of the total number of traffic events. A traffic event also may be caused by loss of control of the vehicle by the driver, when the vehicle makes with its semitrailer an angle typical for spread scissors. Many traffic events are caused by loss of control of the vehicle by the driver that may be caused by poor load surface or other factors, when the vehicle off-goes from the road or makes with its trailer an angle typical for spread scissors. Traffic events through a fault of other traffic participants occur, when other vehicles fail to pass the truck of the enterprise thus causing a traffic event. Talking of unpredictable factors, a small stone flying from

under another vehicle directly onto the windscreen of the truck should be singled out as the most frequent causer of traffic events (35.1%). A considerable number of traffic events occur through a lack of proper assessment of the condition of the road by the drivers.

6. The ways for improving traffic safety in heavy transport sector

In course of analyzing traffic events both in Lithuania and abroad, it was found that most frequently they occurred through a fault of drivers and for the same causes; however, their circumstances varied. The completed study shows that in the totality of the traffic events under analysis, most frequently they occurred through a fault of truck drivers. According to data provided by the largest Lithuanian insurance company „PZU Lietuva“, 95% of car and truck drivers believe that they will not be involved in any traffic event. The driving culture in Lithuania is often assessed negatively. Maybe, such a situation is caused by the mentality of our people and their disrespect to other traffic participants.

Another aspect of sufficient importance is traffic control, because the velocity of trucks is not duly controlled. During their contacts by means of communication or other technologies, truck drivers get to know where they can choose a higher or lower velocity; however, they do not take the road condition into account and may cause a traffic event. The places of traffic events concentration, referred to as "black spots", are 500 metre road segments where 4 and more traffic events occurred within 4 years. In our opinion, analysis of the causes of traffic events in places of their concentration is a task of a higher importance. Most frequent causes include dangerous crossroads, hitting a pedestrian or a bicyclist, narrow bridges and so on. We think that truck drivers are insufficiently informed on the potential dangers on the road.

The number of traffic safety means and measures introduces on Lithuanian roads increasingly grows annually; however, the statistics of traffic events shows that their number is not enough or their use is insufficient or ineffective.

Prior to analysis of the accident rate dynamics, a prognosis should be developed. On the base of the statistical data, the optimistic prognosis up to the year 2020 was provided.

According to the limits set in Europe, the accident rate should be reduced by 50% to the year 2020 – so, it is a real task for Lithuania. However, it should be taken into consideration that changes in the number of vehicles and changes of transport corridors may take place as well and they may cause obstacles for pursuing the set goals [8].

The statistics provided in the theory attests that traffic events caused by heavy vehicles form from 4% to 7% of the total number of traffic events (5.5% on the average). The said average value was used for obtaining the average data on the accident rate in the heavy transport sector (regrettably, there is no official statistics on accident rates of trucks; it was only found that 137 traffic events took place in 2013). According to the average calculations, trucks were involved in 186 traffic events in 2013. Thus, the average precondition is not

precise; however, it is usable for preliminary modelling the traffic events caused by trucks up to the year 2020. The prognosis shows that the accident rate will decrease. It was preliminary forecasted that the accident rates will decrease annually by 12% to 18%.

The results of the completed research show that the accident rate in heavy transport sector will decrease annually by 3% to 7%.

When data for a long period are analyzed, a clear trend is visible: the accident rate decreases. The comparison of the prognoses shows a decrease of the accident rate both in the car sector and the heavy transport sector. The prognosis shows the maximum annual decrease of the accident rate to be 18% for all vehicles, including trucks. The results of the study performed in the research are less: they show the annual decrease of the accident rate in the heavy transport sector to be 7%. The said difference may be caused by a low number of enterprises involved in the research.

The accident rate is affected by different environments and the factors impacted by them. Economic, social, technological or legal political environments may be analyzed. The number of heavy vehicles increasingly grows from year to year. In Europe and worldwide, various measures for reducing the accident rates are taken; however, in Lithuania, the situation remains one of the worst in Europe. Hereinafter we analyze economic and social factors expressed by indicators, for example, how the number of load-carrying vehicles impacts the accident rate. The period between the years 2000 and 2013 was analyzed.

The number of load-carrying vehicles grows from year to year and the accident rate decreases. On the base of the available data, the coefficient of correlation between the number of load-carrying vehicles and the number of traffic events in the heavy transport sector was established. So, the average inverse dependence between the said two lines of data shall be established. The following regression equation was formed:

The accident rate in heavy transport sector = $680.63 - 0.0024 \cdot$ the number of heavy vehicles;
 $R^2 = 33.25\%$

(1)

It may be seen that when the number of heavy vehicles grows, the accident rate decreases. The regression equation shows a weak dependence – 33.25%, so the regression equation is valid for 33.25% of cases only.

In the other case, we analyzed the interdependence between the number of load-carrying vehicles and the traffic intensity within a day. The period between the years 2000 and 2013 was analyzed.

Growing of the number of load-carrying vehicles is accompanied by growing of the indicator of traffic intensity / a day as well. Although the number of heavy vehicles decreased by 0.6% in 2013, as compared to 2012, the total traffic intensity increased by 1.8%. The calculation shows the correlation between the factors under analysis to be very high (these two factors are interdependent). The image is quite another, as compared to the previous case. The following regression equation was formed:

The traffic intensity / day = $-593.3 + 0.0106 * \text{the number of heavy vehicles}$; $R^2 = 92.54\%$
(2)

Growing of the number of cargo-carrying vehicles is accompanied by growing of traffic intensity / a day. For example, if the number of cargo-carrying vehicles increases by one unit, the traffic intensity increases by 0.0106 of vehicle / a day. So, the regression equation is valid for 92.54% of the analyzed cases.

Other factors under analysis include:

- The distribution of the percentage of the persons suffered in traffic events according to age groups
- The distribution of damage to Lithuanian economy caused by traffic events through a fault of drivers according to the age groups of the causers

Causers of all traffic events are divided to 6 age groups. The period between the years 2000 and 2013 was analyzed. The percentage of the persons suffered was calculated on the base of the average data for the period. The damage to Lithuanian economy caused by traffic events through a fault of drivers was calculated in an analogous way [10].

Talking about the suffered persons, it is notable that most frequently "young" and "old" traffic participants suffer. Drivers over 64 years old mostly suffer (21%). The youth forms a considerable share of the suffered as well (18.4%). Then drivers from 45 to 54 years old follow (16.9%). The indicator of damage shows very sad situation. The largest damage to Lithuanian economy is caused by youth under 24 years (25.5%). Then drivers in the age from 25 to 34 years (23.8%) and from 35 to 44 years old (18.4%) predominate.

In the regularities under the analysis, the impact of social, economic and political factors may be envisaged.

The following regression equation was formed:

Damage = $0.3035 - 0.0391 * \text{the age group}$; $R^2 = 97.52\%$
(3)

It was found that drivers of age groups of higher numbers cause less damage to Lithuanian economy. The coefficient of correlation between the factors is very high and it is negative. Elder drivers cause less damage. The regression equation shows that the formula is valid for 97.52% of cases. After transfer to a higher age group, the caused damage decreases by 3.91 percent on the average.

Other two factors under analysis that may seem to be very interesting in the context of the analyzed subject are the minimum wage and the fines for violations of traffic rules, for example, for overspeeding by 21 km/h to 30 km/h. Five European states were randomly chosen. For the comparison, analogous violations of traffic rules were chosen for each of the said state.

In 2013, the minimum wage in Lithuania (the minimum wage of all employed citizens, not only drivers) amounted to 289.63 EUR. Whereas it was higher in Poland (by 10.5%) and Estonia (by 27.4%). However, the living standards in France and Germany are considerably

higher: in these states, the minimum wage is almost 5 times higher. It was decided to compare the fines for overspeeding. Most frequently 20–30 km / h overspeeding takes place. The amounts of fines for such violation in Lithuania, Poland and Germany are very much alike (in Lithuania – from 29 EUR to 87 EUR, in Poland from 36 EUR to 72 EUR, and in Germany from 57 EUR to 77 EUR). In Estonia, the fines are higher (about 115 EUR). The fines in France amount to about 135 EUR. Fines in all countries may differ considerably, because the first fine in a current year is halved. In addition, fines for violations committed in an urban street and out of a town differ; the amount of a fine is affected by other factors as well. While comparing the minimum wage to the amount of the fine under analysis, a large difference is found to be in France and Germany. On analysis of accident rates in EU Member States in 2013, the said countries were included into the group of ten countries with the best indicators of accident rates. The indicators of Lithuania were among the worst – it was the 26th. In our opinion, the amounts of fines for violations of traffic rules are not low in Lithuania; in some cases, the penalties are even drastic (such as a driver's license revocation for 3 or 4 years). We've noticed that the fine for U-turn in a segment of a highway where such a turn is prohibited may be less, as compared to the fine for vehicle parking on grassland. We agree that sufficient attention should be paid to environmental problems. However, what of the above-provided cases causes a higher risk of an accident? After summarizing the examples of European states that enjoy low accident rates, it may be stated that such drastic driver's license revocation is not effective because such a person continues driving in absence of the license.

On the base of the completed research and after modelling the situation, the following accident rate model is proposed [12]:

- 1. Identification of accident risk factors** – in this phase, all factors that cause a risk of involvement in a traffic event should be identified. All the risk factors shall be divided to four groups, including:
- 2. A decision** – after the identification of accident risk factors, an analysis shall be carried out and decisions on the existing situation shall be passed. If the decision is „YES“, we'll go to the next phase when preventive measures are chosen. If the decision is „NO“, we'll go back to the beginning of the process.
- 3. Application of preventive measures** – all and any preventive measures are intended for preservation of working capacity, health and life of drivers in their professional activities, they are planned and applied in all phases of the activities of the enterprise to ensure protecting the drivers against the professional risk or its minimization. On the base of the completed research and modelling the situation, we propose the following preventive measures:
 - A system for training and improvement of qualification of transport sector employees
 - Introduction of EuroRap in Lithuania
- 4. Reviewing the results** – drivers should be accessed to work after familiarization with the key safety and health provisions and perception of them. The head should set the procedure of implementation of the preventive measures and their control. The results may cause further positive consequences. Both the results and their consequences

shall be analyzed; the found imperfections shall be eliminated and further changes shall be initiated.

7. Conclusions

1. The completed analysis of scientific literature showed the existing situation of accident rates in the heavy transport sector and disclosed its problems both in Lithuania and abroad. It was concluded that most frequently traffic events occur through a fault of drivers. Talking of the situation of accident rates in the heavy transport sector, it should be stated that the situation is being improved, but this process is slow, in spite of increasingly growing number of traffic safety measures; however, in Lithuania the indicators of accident rates remain among the worst in Europe.
2. On the base of the statistical data, a prognosis of traffic events up to the year 2020 has been developed. The impact of economic, technological and social factors was compared and their interdependence was examined.
3. On the base of the completed research, two proposals were provided. The first of them is related to introduction of EuroRap programme. The second proposal is related to formation of a system for training of drivers and improvement of their qualification.

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