

Stepanov A. V.
PhD in Technical Sciences,
Associate Professor,
Kharkiv National Automobile and Highway University

AN AUTOMOBILE SAFETY: PROBLEMS AND PERSPECTIVES

Abstract. *The article examines special aspects of the concept of motor vehicle safety and the concept of transport safety. The problems and prospects of motor vehicle safety were given herein. A wide range of internal and external threats, which impair transport safety of the country were observed. Along with the concept of transport safety threat, a classification of transport safety threats was introduced. It was concluded, that further development of transport system and provision of its stable operation in conditions of transport safety refer to strategic tasks of the State.*

Key words: *automobile transport, motor vehicle safety, transport safety, threats.*

Introduction. Automobile transport is one of the most important sectors of the national economy that serves as a kind of circulatory system in a complex organism of the country. Besides motor vehicles play a major role in the economy. As an integral and extremely substantial part of the infrastructure, automobile transport allows for delivery of export and import cargoes of various purposes in the interest of international cultural and technical cooperation, as well as integration into the world economy. It accounts for more than a half of the passenger traffic.

In recent years, the problem of traffic safety has aggravated. Due to the large number and mobility of motor vehicles, the problems of automobile transport safety are acute. There is a tendency to rapid deterioration of the situation, which requires an urgent response. According to general estimates of the United Nations Economic Commission for Europe (UNECE) Inland Transport Committee experts, the minimum estimated loss from death and injury of people, damage and destruction of vehicle cargo is 3–4% of the value of the gross national product [10].

The current views and knowledge of the issue of motor vehicle safety allow making conclusions about the perception and understanding of the problem, thus causing a change in the paradigm of traffic safety. Consequently, vehicle safety is a serious social and economic problem. Further development of the transport system and provision of its stable operation in conditions of transport safety refer to strategic tasks of the State. The solution to this problem should be complex and should take into account the possibilities of all links of the “driver – vehicle – road – environment” system.

The rapid growth of car park that takes place in recent years significantly increased the loading level on the road network and all transport infrastructure, which were not designed for such a number of vehicles, drivers and pedes-

trians we observe these days. As a result of this situation, the number of people dying each year in car accidents has increased by about 45% between 1994 and 2004. Over the last decade, more than 2 million people were killed and more than 17 million were injured. [6]

The category of vehicle safety was studied from various points of view in scientific literature, therefore this definition has different meanings [6–10, 12, 13]. For instance, investigation of transport safety through the basic principles of vehicle efficiency and reliability was presented in the works of V. Ya. Anilovich, O. V. Bazhinova, V. M. Varfolomeev, E. S. Wentsel, E. M. Getsovych, M. Ya. Govoruschenko, O. S. Grynchenko, I. E. Dyumin, M. S. Zhdanovsky, I. V. Kragelsky, V. G. Kukhtov, A. T. Lebedev, V. V. Nichke, M. A. Podryhalo, O. S. Polyansky, A. A. Staroselsky, A. M. Turenko, V. N. Tkachov and of many other authors. It should be noted, that despite the large number of general works, statements and studies, there is still not enough research on the complexity and contradiction of modern motor vehicle safety.

The aim of the study, problem statement. The aim of this study is to consider the problems of motor vehicle safety and prospects for their solutions. To achieve this goal it is necessary to examine the automobile transport safety improvement, the transport safety concept and possible threats to transport safety.

Research materials. Providing safety on different types of vehicles became one of the priority requirements to transport systems nowadays. Active safety systems for automobiles, namely components and assemblies, which prevent traffic accidents: brake systems, steering control, lighting and visibility systems, information systems, antispin and anti-lock braking systems, tires and so on, are being constantly improved. An intensive development and prevalent adoption of passive safety systems happen,

namely devices that limit or even eliminate the negative consequences of an accident, such as seat belts, front and side airbags, collapsible steering tubes and pedal boxes, fire resistible fuel systems, folding mirrors, robust designs of door locks, door handles, etc. Active use of the above implements allows to reduce the severity of consequences and the number of deaths in car accidents in some Western European countries [14].

The issue of road safety overtook a special place among the main problems of the entire world. The following complex decisions related to effective organization of traffic are applied in European countries, Japan, USA and Canada: replacement old traffic lights with light-emitting-diode (LED) ones, introduction of traffic lanes for “slow” vehicles, installation of locators to separate oncoming flows, systematization of routes for different types of transport, implementation of high technologies of road accidents prevention. For example, in Europe and the US connected to vehicles GPS-tracking systems are widely used. In the event of a car accident, the tracker records the vehicle position, the number of passengers, strength and geometry of the crush, air bags operation and sends this information to emergency services. In their turn, car manufacturers try to make their cars as safe as possible both for passengers and for other road users [14].

While considering the transport safety we must distinguish between the concepts of “motor vehicle safety” and “traffic safety”. In many languages to refer to both of the concepts the same word “security” is used. When applied to the motor vehicle industry as a whole, these two terms are explained as follows [11].

We must understand motor vehicle safety as a level of safety or a collection of measures to prevent illegal activities (fraud, attacks on drivers and vehicles, theft of goods and cars) as well as terrorist attacks. And the traffic safety implies a level of safety and collection of measures to prevent accidents on public roads that lead or do not lead to property damage, injuries or fatalities. Both of these states are of great political significance and the situation in this field bears extreme importance for the population of the country.

The motor vehicle safety measures and traffic safety measures should not be done in parallel and in isolation one from the other. Programs to improve the situation in these two areas should be implemented together in order to get mutual benefits, given the obvious connection between them.

It should also be borne in mind that there is no zero risk in natural environment and it is impossible to guarantee complete safety. However, the automobile industry is strongly interested in safety advancement. States and their authorities have the leading role in its provision [1–5]. Resourcefulness and active participation of the

motor vehicle sector is an essential element of ensuring the success of any measures aimed at improving safety. It is necessary to strengthen cooperation between the public and private sectors in safety providing, which can be highly effective.

The currently existing means of safety and effectiveness ensuring, which provide benefits of the both should be used to the maximum extent. These funds include the TIR system of the United Nations (Customs Convention on the International Transport of Goods under Cover of TIR Carnets – the international agreement adopted in 1975 under the auspices of the European Economic Commission of the United Nations. The goal of the Convention is the creation of goods transporting system, General Transit system of EU and of other international legal instruments that aim to simplify procedures of goods registration during borders crossing [11].

It is obvious that safety policy should be based on relevant information. Rational and effective measures of safety improvement should be based on reliable information and understanding of the situation in the field of international criminality and terrorism, and recording of safety-associated risks. Herewith it is always necessary to clarify terminology. For example, when it comes to the notion of “transport safety” acts of unlawful interference in transportation system should be mentioned, since it is a wider term than anti-terrorist threat. For instance, a false message about a bomb causes evacuation of thousands of people and schedule or flight delays.

Today, the concept of transport safety is mainly interpreted as transport terrorism prevention. The anti-terrorist imperative of transport safety is objective and generally triggered by a significant increase of terrorist attacks in the world, as well as the degree of its danger directly to the transport sector. The dramatic events of a number of acts of terror in recent years where vehicles filled with explosives were used as a weapon by terrorists. However, given the fact that protection of an individual, society and the state from terrorism, including in the transport sector, was announced a priority task nowadays, we should keep in mind that preventing and countering terrorist attacks on transport is only a part of the problem of transport safety providing in the country as a whole. Its additional integral fragment is the protection of transport sector from other fields, including criminal forms of unlawful interference with transport, and also from various kinds of emergencies.

In the most general understanding, the concept of “transport safety” [13] can be defined as: system of prevention, opposition and suspension of crimes, including terrorism, in the transport sector; system of avoidance of natural and human-caused emergencies in the transport sector; system of prevention or minimization of material

and moral damages in transport sector from crimes and emergencies; system aimed at increasing environmental safety of transportation and ecological sustainability of the transport system; system of implementation of national security purposes of in the transport sector as a whole.

The systemic nature of the concept of transport safety determines the need for a comprehensive, systemic solution to the problems existing in this area.

Transport safety aims to protect passengers, owners, addressees and carriers of goods, owners and operators of vehicles, transport sector and its workers, the economy and budget of the country as well as environment from threats in the transport sector.

Transport security is designed to ensure safe conditions of transportation for life and health of passengers; goods, load and cargo transportation safety; performance and operation safety of transport facilities and means; economic safety, including foreign economic; environmental safety; information security; fire safety; sanitary safety; chemical, biological, nuclear and radiation safety; mobilization readiness of the transport industry sectors.

Large-scale range of different reasons of natural, technical and social nature causes existence of a wide variety of internal and external threats that weaken transport security of the country. Transport safety threats refer to illegal actions or intentions to commit such acts and natural or man-made processes or their combination that obstruct the implementation of vital interests of an individual, society and the state in the transport sector, causing or may cause accidents in transport complex [13]. Transport safety threats are classified in a number of aspects: according to the degree of importance, the nature of threats, the areas and types of manifestation and so on.

The main threats to transportation include: terrorist acts and sabotage (hijacking or commandeering of aircrafts, sea and river vessels, railway trains, vehicles, explosions at railway stations and public roads, sabotage against hydrotechnical constructions, etc.); other cases of unlawful interference with the functioning of transport (imposing foreign objects on the rails, breaking of

railroad devices, telephone "terrorism", illegal blocking of airports and major highways) that threaten the safety of passengers' lives and health, bring direct harm to the transport sector and generate negative socio-political, economic and psychological effects in society; criminal actions against passengers; criminal actions against goods and cargoes; events (accidents), caused by malfunction of technical systems of transport (depreciation, degradation, disrepair, high accident rate, imperfection), violation of operation rules of technical systems, including regulatory requirements for environmental safety during transportation, as well as by natural factors, create an alarm situation and entail material losses and casualties.

The threats should include the negative consequences of insufficient elaboration of normative legal framework governing relations in the transport sector, as well as imperfections in law application.

Conclusions. The situation in transport safety interacts with the fundamental interests of individuals, society and the state as well as interests of all physical and legal entities involved in the transport sector. Therefore, the questions of transport safety advancement cannot be of interest to public authorities only, and must concern everyone. Only unified forces are able to provide a stable and strong safety, including motor vehicle safety. The State cannot and should not solve this problem alone, because it requires significant physical, financial and human resources. The society has to participate actively in the financing of transport safety tasks execution, and each person in particular should strengthen his own moral position and maintain law and order, should respect lives and rights of others and as a result each one will be able to feel safe.

Effective and successful work of specialized organizations and entities of transport infrastructure as to the introduction and implementation of motor vehicles safety requirements on automobile transport is only possible upon condition of further improvement of the existing regulatory legal framework through its integration into the international security system.

References

1. Law of Ukraine “On Transport”. – VVR – 1994.
2. Law of Ukraine “On the Automobile Transport”. Journal of Verkhovna Rada of Ukraine (VVR), 2001, N22, 105) {As amended by Law N3492-IV as of February 23, 2006, VVR, 2006, N32, art.273} with additions and amendments.
3. Decree of the President of Ukraine “On the Regulations of the State Inspectorate of Ukraine on Land Transport Safety, as amended by Presidential Decree N506/2013 as of September 11, 2013.
4. Resolution of the Cabinet of Ministers of Ukraine dated October 30, 2008 № 1384-r “On Approval of the Concept of the State Program of Traffic Safety Advancement for Years 2009–2012”. – Kyiv: Council, 2008.
5. Resolution of the Cabinet of Ministers of Ukraine dated October 20, 2010 № 2174 “On Approval of the Transport Strategy of Ukraine for the Period till 2020”.
6. Traffic Safety of Pedestrians: Overview information / Kyiv: SIC of Traffic Police Ministry of Internal Affairs of Ukraine, 2010. – Vol. 12 – page 28.
7. Belyi O. V. Concept of Integrated Traffic Safety/ Belyi O. V., D. A. Skorokhodov, A. L. Starichenkov // Miscellany of studies of All-Russian Scientific Conference “Transport of Russia: Problems and prospects. – 2009 “. Moscow: MSUT, 2009. – с. II-5 – I-6.
8. Ibadulayev V. A. Evaluation of Risks during Hazardous Cargoes Transportation / V. A. Ibadulayev, A. L. Starichenkov, I. V. Stepanov // Transport: Science, Technology, Management. Miscellany of general information, № 8, 2004.
9. A. V. Kurbatova. Prognostication of Transport Systems Development: Ideology, tools, calculations / Kurbatov A. V., Kuznetsova E. Yu. – Ekaterinburg: USTU, 2000. – page 185.
10. Provision of Traffic Safety in the countries of Asia and Pacific Region: General information. – Moscow: SIC Traffic Police the Ministry of Internal Affairs of Russia, 1997. – Vol. 4 – page 48.
11. Access: www.iru.org. – Date of application: April 02, 2015.
12. D. A. Skorokhodov. Motor Vehicle Safety Problems / D. A. Skorokhodov, A. L. Starichenkov // Transport Security and Technology. № 2 (3), 2005. – pages 24–27.
13. I. E. Surkhachev. “Transport Safety” / I. E. Surkhachev. – 2007. – page 270.
14. Proceedings of the Sixteenth Scientific and Technical Conference “Safety Systems” – SS-2007 of International Information Forum, October 25, 2007, Moscow. – Moscow: Academy SBS, 2007. – page 235.