Transport Infrastructure of Slovakia and its Protection

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The state and prospects of the transport infrastructure development of the Slovak Republic (SR) in the context of legal standards of the European Union (EU). The ownership and administration of the transport infrastructure. The vulnerability of objects and elements of the transport infrastructure. Implementing the risk management in the area of the critical infrastructure in the transport sector.

Keywords: Transport, transport processes, factors of transport security and safety, risk management, transportation processes, risks in transport.

1. INTRODUCTION

The existence of the transport infrastructure is one of the basic assumptions for fulfilling the requirements placed on transport as a branch of economy not only on the national but more and more on the international level. The interconnection of the transport line of business with the overall economy of the region, country or international economic groupings has two contradictory and at the same time unifying aspects. On the one hand, the construction and improvement of the transport infrastructure are determined by the economic possibilities of the economy expressed by the ability to finance the necessary measures in the transport infrastructure. But on the other hand, the costs expended for ensuring high-quality and functional infrastructures are to be assessed from the point of view of benefits and profits. Transport of high quality, supported by corresponding transport infrastructure generates not only growth of economy but also positive development in the social, environmental, cultural and other areas. To evaluate fully the second aspect is sometimes problematic and it is usually connected with the need for a large amount of financial means and its long-term payback-period. The fact that the predominant part of the transport infrastructure is also widely utilised by the in advance unidentified users who did not invest in the infrastructure, is certainly not a negligible one. This is then connected with the issue of an adequate and just way of payment for utilising the transport infrastructure.

Not only the construction but also the maintenance of the functional transport infrastructure necessarily assumes to adopt and carry out specific measures for ensuring its resistance. This is, of course, connected again with further requirements on resources (financial, personnel, material, etc.). However, the substantiality of the costs expended will really show only after the rise of crisis phenomena and this can happen also during a longer time period. Regardless the possible questioning of the need to protect the transport infrastructure, it is necessary to adopt adequate measures. The whole process of protecting the transport infrastructure has to be prepared and managed by qualified persons and the methods and tools of the modern crisis management have to be used.

2. TRANSPORT INFRASTRUCTURE OF THE SLOVAK REPUBLIC – CHARACTERISTICS

The current state, tasks and further development of the transport infrastructure in Slovakia are the results of a whole range of influences. Besides the

long-term historical, geographic, social, cultural and especially economic factors the following items are enforced in the area of the transport infrastructure development:

- the directives and priority adopted by the EU bodies, especially the share on building the trans-European transport network,
- acquiring resources for financing the transport infrastructure,
- the integration and inter-operability of the infrastructure for individual types of transport
- the security and safety as well as minimising the negative impacts on the environment.

The EU standards have been dealing with the area of a unified trans-European network for a long time. The proposal of the directive of the Council and European Parliament on guidelines for the development of the trans-European transport network [1] is one of the latest documents which have been in the legislation process since 2011. This proposal states a framework of the following measures:

- implementing intelligent transport systems and other integrated information services,
- removing the missing connections especially in the cross-border areas,
- removing the administrative and technical obstacles and ensuring the inter-operability of the network,
- optimising the integration of the individual types of transport,
- achieving suitable accessibility for all EU regions,
- achieving the quality of the infrastructure (effectiveness, security and safety, protection, resistance against crisis phenomena, ecological character, accessibility, quality of services, etc.).

The infrastructure of the road transport is typical by its need of modernisation and extending the capacity of the road network due to the permanent growth of the car transport. This concerns also the lower class roads and this fact objectively supports the necessity to build the highways and expressways. Currently there are at disposal 59 % of the planned highway network and only approximately 20 % of the expressways. The strategic objectives are fully in compliance with the EU directives (the development of the road network with emphasis on the highways, expressway and primary A- roads, modernising and renewal of the road network at all levels, the development of the intelligent transport systems, improving the security and safety with the emphasis on removing the critical localities with frequent occurrence of traffic accidents, reducing the environmental impacts by building diversions of towns and villages, noise barriers and ecoducts). [11]. Selected data about the road transport infrastructure is shown in the table 1.

Table 1. Basic Data about the Road Transport Infrastructure in Slovakia.

Road Network			**Road Constructions**			
Category		**Length [m]**	**Bridges**		**Tunnels**	
			Number [pcs]	**Length [m]**	**Number [pcs]**	**Length [m]**
Highways (including feeder roads)		432	320	62,789	4	7,660
Expressways (including feeder roads)		248	247	30,001	-	-
Roads	Primary A-roads	3,312	1,830	48,593	2	931
	B-roads	3,637	1,478	22,759	-	-
	C-roads	10,415	3,974	45,558	-	-
Local roads		25,350	32	2,633	-	-
TOTAL		43,394	7,881	212,333	6	8,591

Source: own data according to [7].

The constructional and technical state of the road infrastructure can be documented by the following data:

- at the end of 2011, 3 % of highways and expressways were in an unsatisfactory, even poor condition, [11]

- at the end of 2012, 6.38 % of the bridges were in flawless condition, on the contrary 8.98 % of them were in unsatisfactory, even poor condition.[11]

Selected data about the railway transport infrastructure is shown in the table 2.

Table 2. Basic Data about the Railway Transport Infrastructure in Slovakia.

Railways			Railway Constructions					
Parameter		Length [km]	Bridges		Tunnels		Occupied railway	
			number [pcs]	length [m]	number [pcs]	length [m]	stations [pcs]	others [pcs]
Construction length of railways	Main tracks	4,650	2,324	50,644	76	45,004	311	87
	Others	2,245						
Construction length of tracks	Single-track	2,614						
	Multi-track	1,017						
	Non-electrified	2,045						
	Electrified	1,586						
Track security and safety devices	Automatic block	670						
	Automatic signal box	512						
	Semi-automatic block	762						
	Informing by phone	1,620						
Tracks with information transfer for train security and safety device		851						

Source: own data according to [8], [9].

The infrastructure of the railway transport is typical by relatively high network density using outdated technology. The incompatibility of the used safety and security equipment with the modern European railway vehicles is a significant problem. The low technical level and quality of the technical basis of the railway transport results especially from the postponed maintenance and insufficient modernisation. The shortages of the railway transport lead to restrictions of the railroad operation. Due to delays in building corridor railways and the overall low level of the technical basis support, the undesirable trend to transfer the cargo transportation to the road transport occurs. We cannot exclude the risk of further reduction of demand for passenger and cargo transport. The strategic development objectives are therefore aimed at the running modernisation of the railways as an assumption for higher competitiveness, safety and security of operation and extending the intermodal transport. The modernisation, early and sufficient maintenance is to be concentrated on the railways and knots with high transport potential. To improve the security and safety, the task is to improve the level of the security and safety systems at the railroad crossings. [11]

The basic quantitative indicators of the railway transport infrastructure are changed only minimally from the long-term point of view. A certain decline of the reported track length came about due to cancelling some tracks which showed ineffective utilisation especially in the passenger transport.

The infrastructure of the air transport is typical by similar features as the railway one, i.e. relatively dense network of airports, however, they are functionally outdated and have capacity restrictions. The current organisational arrangement of the airlines operating at regional airports with international operation is also problematic. There is a wide scale of types and classification at a relatively large number of airports. The low utilisation of small airports operated by airport companies leads to negative economic indicators with a direct impact on their development. The position of an international airport requires permanent changes of the technical and organisational provision of duties resulting from security protection of the civil aviation. The negative impacts of the operation at the airports and close to them are not serious. The modernisation and building of the airports ranked

to the trans-European transport network, optimising the system of the small international airports based on the analysis of their development potential and importance exceeding the borders of the region are the strategic goal of further development of the aviation infrastructure. The maintenance of the decisive elements and systems of the airport infrastructure with an emphasis on the operability of the runways and other airport areas where the movement activities are realised are connected with this. The airport operators have to guarantee implementing the common basic standards for protection of the civil aviation against illegal intervention which have been adopted by the EU. In the area of controlling the air traffic it is necessary to respect the principle of the single unified European sky. [1], [11]

Selected data about the air transport infrastructure is shown in the table 3.

Table 3. Basic Data about the Air Transport Infrastructure in Slovakia.

I. Airports and Heliports			
Type of airport		**Number [pcs]**	**Runways (RWY)**
Airports	civil international public	7	3x concrete, 2x tarmac
	international military with civil operation	1	Portland cement concrete
	civil intrastate public	5	1x bituminous
	civil intrastate non-public	14	3x tarmac
	Military non-public	2	1x concrete
Total		29	11 airports
Public heliports		8	-
Other airports usable for aviation operations		32	-
II. Technical Means for Aircraft Traffic Control (ATC)			
Navigation	NDB - Non-directional radio beacon	7	-
	VHF – omni-directional radio range	5	-
	DME - Distance measuring equipment	5	-
	ILS - Instrument landing system	6	-
Radar	MSSR – Mono-pulse Secondary Surveillance Radar	2	
	TAR - Terminal area surveillance radar	7	

Source: own data according to [10], [11].

Only two airports with international operation fulfil the parameters of the EU category and a regional airport important for its accessibility. The position of other three international public airports administered by airlines is re-evaluated currently with the goal to optimise their number and financing.

The infrastructure of the water transport and its quantitative indicators are adequate to the position of this type of transportation in the Slovak conditions. The declining trend of the water cargo transport is thus not primarily determined by the problems of infrastructure. In spite of this fact it is necessary to see the duties resulting from ensuring a reliable ship operation on the river Danube which is part of the trans-European transport network. Compared to the previous types of transportation the water ways and part of objects on them belong to a different government department. The narrow spaces on the navigable watercourses, the conditions of the public river ports and indirectly also the low interest in doing business in the water transport are the problems of the current water infrastructure. The equipment of the internal infrastructure of the two largest river ports has an unsatisfactory technical condition and also the ownership relations are of a problematic character. Removing the narrow spaces on the navigable watercourses, carrying out reconstructions of the objects and investing to new warehousing and handling technologies and devices belong to the strategic development objectives. Updating and completing the current Slovak waterways and public ports including the river information systems will be of a more urgent character than realising long-term projects for making other Slovak rivers navigable. A wider utilisation of the already built infrastructure for developing the intermodal transport is the current objective. [11]

Selected data about the water transport infrastructure is shown in the table 4.

Table 4 Basic Data about the Water Transport Infrastructure in Slovakia.

Waterways			Objects on Waterways	
Followed Waterways		Length [km]	Lock Chambers in Operation [pcs]	Ports [pcs]
Rivers sections	Danube	172,00	3	3
	Váh	78,85	2	-
Lock chambers		38,45	-	-
Closed waterways (sport, recreation)		3	-	-

Source: own data according to [10], [11].

This data has been practically without any changes since 2000. The decline of demand to use the water transport can be seen also in the low utilisation rate of the ports which moves in the extent of 10 to 20%.

3. VULNERABILITY OF OBJECTS AND ELEMENTS OF TRANSPORT INFRASTRUCTURE

The construction and organisation of the infrastructures of individual economic branches has, as a rule, a network or point form. Due to the integration role of the transport branch the dominant part of the transport infrastructure has a network character as a consequence of the transport route networks. This is valid for the transport sector as a whole. However, from the point of view of the internal classification of the individual sub-sectors (partial transport system in the individual types of transport) it is necessary to appreciate fully the importance of individual important point objects with a relatively small extent. They need not be (and as a matter of fact they are not) part of the transport network itself but their functionality determines the effective utilisation of the transport routes. From this point of view each partial transport system (and thus the sub-sector infrastructure) is specific. For instance, in the system of the air transport the airports are together with the premises for aircraft traffic control object and not network elements of the infrastructure. And, as a matter of fact, using the air routes in the airspace is impossible when these elements lose their functionality. Except for this, the large international airports and the airspace in their proximity are a critical location from the point of view of taking off and landing aircrafts and this fact also significantly determines the utilisation of the air routes.

Two basic viewpoints have to be harmonised when we build and operate a safe and secure transport infrastructure:

- the arrangement and parameters of the transport infrastructure must not be a possible risk source (it concerns the basic building arrangement of the transport ways and objects but also directing and controlling the traffic including the permanent maintenance and repairs),
- the transport infrastructure has to be adequately resistant against external risks – both natural and antropogene ones (of course, they cannot be stated in advance from the point of view of time and space as well as the possible consequences).

The protection of the transport infrastructure especially against the external impacts is accompanied by several problems. The financing processes belong to the most significant ones. Already during the phase of building the transport infrastructure the planned costs are increased due to special design solutions and also such objects which are not necessary from the point of view of everyday operation (e.g. the flood-control objects). The solution of the failures of the transport infrastructure caused by the crisis phenomena requires large and usually unplanned costs.

The areas and structure of the risks which can potentially affect the transport infrastructure is extensive. The variedness of the risk classification in the professional literature can serve as a proof. The figure 1 shows a possible variant for classifying the risks in relation to the transport infrastructure.

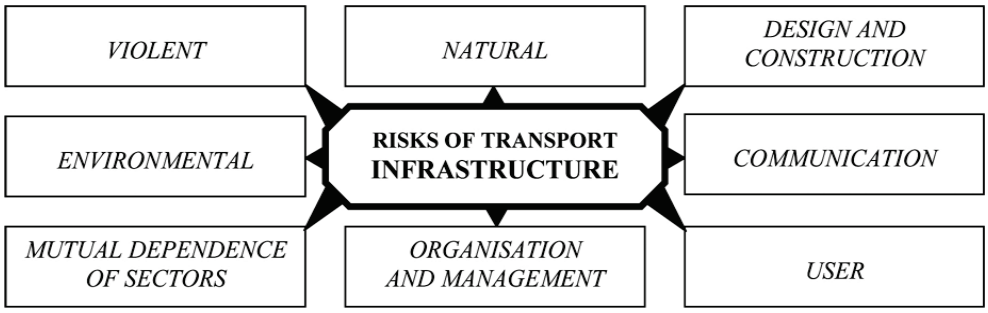

Fig. 1. Possible risk areas for transport infrastructure.
Source: according to [2].

Besides the aforementioned risks the vulnerability of the transport infrastructure is currently increased by the influence of the factors accompanying the globalisation process. These factors can be recognised in the area of new technologies and technical equipment, e.g. the information and communication interconnection of the national infrastructures, building new manufacturing capacities with dangerous operations. The multimodal transport corridors with their dense transport networks and objects represent a certain increased risk for the transport infrastructure. Except for this, the climate changes should not be underestimated either.

The vulnerability of the transport infrastructure is to be derived from the general characteristic and content of this abstract category. The vulnerability represents the sensitivity of an object or system against specific dangers with certain occurrence intensity. [3] It is characterised by the following features:

- it relates to a concrete object,
- it is tied to a specific threat,
- it is typical for an object independently of how the threat performs,
- it is multi-dimensional,
- it a has a dynamic character,
- it has a multi-level structure.

This characteristic shows that the object's or system's vulnerability is based on its specific properties and can differ according to the type of the threat. It can change in the course of time, e.g. it can be reduced by adopting preventive measures but also increased due to extreme events both in the internal and external environment.

The vulnerability is directly connected with the category of risk. If the risk is an expression of a probability for the rise of an event and its consequences, then the vulnerability is expressed by the possible extent of damages. When assessing the transport infrastructure elements (but also the infrastructure as a whole or its individual sub-sector) it is necessary to take into account also the spatial position which can significantly affect stating the risk. The existence of the risk is therefore determined by three basic factors – i.e. the threat, position (location) and vulnerability of the investigated element or system.

In the case of the transport infrastructure elements these three risk components describe only the fact if their failure can or cannot develop as well as if the functionality can be lost. In the framework of the elements and objects which fulfil the criteria for being ranked among the critical elements of the critical infrastructure, it is necessary to deal also with the time aspect of losing the functionality. It can be expressed by completing another risk component defined as resistance. This process includes all measures and resources which can be used before and during the rise of an event as well as after it is finished. It expresses thus the velocity of renewing an infrastructure element and is implemented for long-term losses of functionality.

The loss of functionality of a critical transport infrastructure element can cause a negative consequence for the direct users of the transport system as well as for those who depend on its functionality. Therefore it is necessary to consider another risk component described as criticality. The criticality expresses the relative rate of the critical infrastructure importance or its element in relation to the consequences for supplying the citizens by vitally important commodities and services which arise due to the failure or loss of functionality. This risk component is to be taken into account if the operability of the critical infrastructure in the transport sector with serious consequences for the population is disrupted. [3]

4. RISK MANAGEMENT OF CRITICAL TRANSPORT INFRASTRUCTURE

The risk management is a logical and systematic method determining interdependences of any activities, functions or processes and identification of the risk sources, their analysis, assessment, reduction and continuous monitoring which enables minimising the losses and maximising the opportunities. It represents activities, processes and structures aimed at effective control of possible undesirable consequences of emergencies and crisis situations but also potential opportunities. It is an interactive process consisting of steps which enable constant improvement of decisions and subsequently improvements of results of the processes realised when the planned sequence of actions is maintained. The risk management has to be an integral activity of every management practice regardless to the management level, from the operational to the strategic one (Šimák, L., 2006).

The process of the risk management can be implemented in the activity of a whole range of the public administration institutions, management teams of entrepreneurial subjects, legal entities and natural persons. Here belong as follows:

- the bodies of the public administration (central bodies of the state administration, local bodies of the state administration, bodies of territorial and local self-governments),
- the commercial organisations (manufacturing organisations and services),
- the interest associations (with mandatory or voluntary membership).

The risk management is not only a method and practice for managing the risk but also an integral part of the science about the crisis treatment – its theoretical basis is the theory of management. Its essence lies in directing the creative processes whose result is the assessment of the risks, their objective-oriented reduction, i.e. minimising the probability of developing the crisis phenomena and the size of their negative consequences. It enables assessing the positives and shortages of the management activities and creative processes in a real way, to improve the technological and working processes and to make the operation of the concerned systems better.

The importance of the risk management is currently emphasised also by the fact that in the space observed there is often a high concentration of population, public facilities and industrial premises and thus potential large damages. The new technologies and technical equipment are more and more complicated and can become more and more vulnerable. The nature and environment undergo principal and often irreversible changes as a consequence of the crisis phenomena as well as ill-planned acts of people. That is why the financial compensations cannot make up for losses of life and damages of nature and property in all cases.

The risk management is gradually implemented in the conditions of the public administration institutions, in the framework of the entrepreneurial subjects but also in various design activities and improving the complex safety and security of the society also in the area of the critical infrastructure protection. It is inevitable to respect a whole range of principles and gradual steps when implementing the risk management principles to practice.

First of all it is inevitable for the European Commission and the European Parliament, the Slovak government and individual ministries as well as the top management of the concerned entrepreneurial subjects to support the process of implementing the risk management principles in the area of protecting the critical infrastructure. On the top management level it is important to work out philosophy for reducing the risks of disrupting the critical infrastructure elements´ operability and increasing the level of protection. The active permanent support of a statutory body representative of the concerned organisation is very important. At the same time consensus has to be achieved in the top managements of these organisations and all leading employees have to support the risk management principles in the area of protecting the critical infrastructure. The inevitable financial resources have to be allocated for realising these steps and adequate trainings of the employees have to be ensured too.

The Ministry of Transport, Construction and Regional Development of the Slovak Republic is responsible for operability with emphasis on the critical infrastructure in this sector. It worked out a proposal of the sector criteria and European sector criteria for implementing individual elements to the critical infrastructure. In connection with these criteria individual elements were chosen and the operators were informed about this decision. The ministry continuously deals with the risk analysis

of the transport sector and assesses the security and safety plans of the operators. A register of the elements of the critical infrastructure is not public in Slovakia, in difference to the neighbouring countries. The ministry attempts to minimise the number of these elements and claims that the transport network is sufficiently developed (both the road and railroad network) and provides enough space for bypassing the possible disrupted objects. Another reason for this philosophy is the effort to minimise the volume of the government financial means which should be paid for supporting the protection of the critical infrastructure elements in favour of the private operators.

The individual operators of the critical infrastructure elements have to work out a compact conception in the area of the risk management and to prepare a set of measures. This will create the basic assumptions for the risk management in the whole organisation and in all activities of the company. Such a conception should contain the definition of the objectives which are to be achieved and the justification of the importance of the risk management in the given entrepreneurial subject. Every operator of the critical infrastructure elements has to define unambiguously the relation between the aim and content of the risk management in the process of protecting the critical infrastructure elements and the strategic plan of the organisation as well as the extent of the problems at which this activity is aimed. The definition of the acceptable risk in concrete conditions of the organisation and procedures how to state it as well as stating the personal responsibility for the risk management is an important step. Every operator of the critical infrastructure elements has to state (in the framework of the set of measures) the structure and content of inevitable documentation and to create checking mechanisms for investigating the activities of the organisation. At the same time we implement the accepted principles and procedures in the area of the risk management during checking the activity of the organisation.

The first assumption for successful risk management is that all managers as well executive employees will become familiar with the conception of protecting the critical infrastructure elements. The risk management has to become an integral part of the planning and management processes but also the overall culture of the critical infrastructure element operator. In this framework it is inevitable to state concrete critical infrastructure elements, to work out their assessment, to determine individual dependences and to implement the required documentation to support the crisis management measures. It is necessary to create a team for realising these activities whose member is a member of the top management responsible for internal communication in the area of implementing the risk management policy. It is also necessary to increase the awareness about the inevitability to manage the risks and to create conditions for communication in the whole organisation concerning the risk management and about the company's policy in this area. The competent employees have to acquire skills in the area of the risk management through consultants and the employees through trainings and special professional preparation. Adequate motivation tools – recognition, various awards but also sanctions – are to be ensured. It is also important to create principles and processes for assessing the organisation's performance efficiency in connection with the effectiveness of the risk management.

The risk management on the level of the critical infrastructure element operator has to be integrated with the strategic planning and management processes in the given organisations. In the framework of these procedures it is inevitable to determine the programme for the risk management on the operators´ level regarding to their individual character. This programme should aim at:

- the extent of implementing the risk management principles in the framework of the given subject,
- defining the risks concerning the organisation,
- the analyses and assessments of these risks,
- stating the principles and procedures of the process for the risks assessed,
- the procedures for increasing the awareness in the area of the risk management, acquiring skills, preparing and training the employees on all company management levels.

The lower level of the risk management is to manage the risks on the level of the programme, project and team. Its task is to create conditions for working out and determining a programme for the risk management concerning each element of the critical infrastructure in the transport sector which belongs to the administration of the operator but

also for every activity of the organisation, every programme, project or procedure of the team through implementing the risk management process for concrete conditions. In the framework of fulfilling the tasks it is necessary to integrate the risk management process with other planning and management activities and to document the realised process, the adopted decisions and planned activities. (Šimák, L., 2006).

The last step of implementing the risk management principles in the company which operates the critical infrastructure elements is to create effective tools for monitoring and investigating the risks for us to be able to assess the changes of the development of the risks assessed continuously and in this way also the effectiveness of the risk management process in the given enterprise. Such worked out procedures and tools will help us ensure the up-to-datedness of the policy for the implementation and the risk management itself in the area of transport in the permanently changing internal and especially external conditions. This enables investigating the previous decisions as well as the risks monitored. Effective monitoring and investigating the risk management processes has to be carried out continuously because the risks which threaten the security and safety of the critical infrastructure elements in the transport sector are no static quantities.

However, a whole range of principal errors and shortages occur in the process of realising the risk management in the area of transport. A serious error is that the process of identifying the risk sources is not carried out permanently but it is damped down, e.g. after working out the security and safety report. Another problem is that the risk management components are not integrated into the management structures of transportation companies and are not mutually interconnected either. In some companies the conclusions of the risk management are not transferred to the strategic decisions or to the process of designing the element life cycle of the transport infrastructure or directly the service which it ensures.

During the individual life cycle stages of the critical infrastructure elements in the transport sector the risk management fulfils a whole range of concrete tasks. In the stage of the conception, design and development a concrete element, i.e. a transport object or services it fulfils, the risk management participates in identifying the factors affecting the rise and existence of the risk and in a complex assessment of the designs from the point of view of the input structures and their adequacy for the project processes. The risk management also participates in assessing possible security and safety measures for the design and development of procedures in the operating and emergency conditions. The acceptation of the guidelines in the process of assessing the risks and similarly the evaluation of the variant design conceptions play an important role. In the stage of building, operation and maintenance of a concrete element or ensuring a transport service it is inevitable to compare the real performance with the requirements which were stated in the process of designing the system. The tools of the risk management are used for assessing the inputs into the process of optimising the operating, inspection, emergency and other procedures. It is necessary to update the information about the risk sources continuously, to emphasise the importance of grasping the character and extent of the risk for the operational decisions and to assess comprehensively the effects of the organisational changes. Last but not least, it is necessary to assess the orientation and capacities of the workplaces which participate in improving the professional preparation of the employees in this area.

In the phase of liquidation and shutting down the assessed critical infrastructure element in the sector of transport or services which it ensured, it is necessary to asses the risks connected with liquidation thoroughly and to provide relevant inputs into the disposal process. Last but not least, it is necessary to ensure a guarantee for the liquidation requirements which were stated and approved in the process of designing the given element or service.

The risk management in any environment clearly shows that the security and safety level of the processes, activities or the security and safety level of the environment (the natural one, the environment we live in, the technological environment,…) as well as a transport construction or premises is directly connected with the value criteria. The resistance and reliability level of the constructions can be permanently increased. Looking for optimal criteria arouses a need of carrying out also an economic analysis. The duty of the competent persons working in the environment where crisis situations can arise

(employees in the state administration, the bodies of the legal entities, natural persons operating hazardous activities) has to cover except for managing other operating processes also carrying out activities which belong to the risk management area:

- assessing the interdependences in the processes and their importance for the given subject,
- identifying the risk sources,
- analysing the risks,
- assessing the risks,
- minimising (reducing or removing) the risks,
- informing the concerned persons and subjects about the residual risks,
- the continuous checks (monitoring) of the risk levels. (Šimák, L.: 2006).

The risk management in transport is aimed at assessments in connection with the traffic and transport activities and processes, identifying the risk sources, their comprehensive analysis, assessing the risk rate but also at reduction and continuous monitoring. These activities enable minimising the losses of human lives and health damages, the losses of the material values but also the environment caused by emergencies or crisis situations.

The task of the individual phases of the risk management in transport and transport processes is as follows:

- assessing the interdependences in the transport processes and traffic – to asses the importance of transport and transport processes for the society, their position in the corresponding environment or system,
- identifying the risk sources – determining those activities, processes and quantities whose changes or possible development in the future could negatively affect the security and safety as well as operability of transport,
- analysing the risks in transport – finding out or determining the probability of rising an emergency or a crisis situation and the extent of the negative consequences of these phenomena on the transport process and operation – all of this is realised through qualitative, quantitative or semi-quantitative methods,
- assessing the risk in transport – determining its extent from the probability of the rise of a crisis phenomenon and the size of the assumed damages and losses as well as classifying the risks into acceptable and unacceptable for the concerned subjects,
- reducing the risk in transport – implementing active anti-crisis policy and using concrete methods for reducing the probability of the rise of crisis phenomena in transport and minimising the assumed damages and losses through diversifying the risk, reducing the risk, the retention of the risk, the transfer of the risk and a whole range of other tools,
- informing the concerned forwarders and carriers about the residual risks – part of preventive measures whose goal is to draw attention to the possible crisis phenomena in the transport processes and to state principles of the employees´, forwarders´ and passengers´ behaviour in the given conditions,
- checking (monitoring) the risk levels in transport continuously – a permanent process carried out by corresponding managers as well as executives with the goal to record the growth of the risks early and when the acceptable level is exceeded.

5. CONCLUSION

It is inevitable to respect these facts and principles in the process of protecting the critical infrastructure in the transport sector. Slovakia represents an important transport space and provides transport services for a whole range of countries and entrepreneurial subjects in the centre of Europe. Disrupting these transport facilities would cause large economic losses and would reduce the adequate rate of convenience for the citizens.

The active anti-crisis policy in the sector of transport is realised by a suitable structure and content of the adopted security and safety strategy and its purposeful implementation as well as emphasising positive development trends whose goal is to improve transport systems. The bodies of the state administration as well as the carriers have to assess the external as well as internal security and safety conditions continuously and have to take into account them in their decision-making processes and to create such conditions which enable to respond to the current threats flexibly. The risks can be also reduced by creating a purposeful and economically effective organisational structure and effective HR work as well as permanent trainings of the employees. Last but not least, it is inevitable for the state

administration institutions in the area of transport and carriers to respect the international as well as Slovak standards and routine technological procedures stated by the internal procedures of the forwarders. [6]

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