

# **Transport Critical Infrastructure in Slovak Republic**

**Eva SVENTEKOVA**

**Faculty of Security Engineering, University of Zilina  
010 26 Zilina, Slovak Republic**

**and**

**Bohus LEITNER**

**Faculty of Security Engineering, University of Zilina  
010 26 Zilina, Slovak Republic**

**and**

**Zdenek DVORAK**

**Faculty of Security Engineering, University of Zilina  
010 26 Zilina, Slovak Republic**

## **ABSTRACT**

Critical infrastructure protection as a term was used significantly about 20 years. The research of all parts of critical infrastructure protection is one important part of societal research. Many different European and world universities, research institutes, private companies and state bodies realise research oriented for protection mainly on transport, energy and communication infrastructure. The paper deals with the transport as a part of critical infrastructure in EU countries and in Slovak Republic especially.

**Keywords:** critical infrastructure, transport, protection, risks, section of critical infrastructure.

## **1. INTRODUCTION**

Any infrastructure, regardless of the area and of the depth of investigation, consists of a relatively complete set of individual objects, devices, equipment and of their elements. It is created by standard conditions, where it has to fulfil its functions.

However, in case operating conditions of the infrastructure are changed, it must inevitably cause its reduction in such a way, that at least the most important functions are preserved while other functions are temporarily restricted. This limit level of the infrastructure may be designated as a critical infrastructure. The subsystem of infrastructure becomes critical when it loses its ability to support the superior system. The critical part of the infrastructure is the one the lack of which makes impossible to sustain the performance of the whole system. Therefore, it is necessary to define which subsystems and elements of the infrastructure might cause the collapse or serious defects of the whole system.

All inhabitants of the country daily depend on the correct functioning of the infrastructure. Critical infrastructure is herein understood as systems, organizations and devices important for the country. Immediately after these devices and systems of the infrastructure cease to operate, serious implications for the country, economics, society and each citizen follow. Their

disruption has a lasting impact on the most important provision; it causes major defects of civil order or brings other negative implications. The more complex these infrastructure systems are and the more they depend on each other – the more serious are the impacts. Today, the majority of infrastructure systems is interconnected. The disruption in one section may spread in other places, sectors or departments and thus significantly increase the original damage.

## **2. CRITICAL INFRASTRUCTURE AND EU**

Critical infrastructure is distinguished by a number of specific features. The individual service areas of infrastructure are physically, virtually or logically connected in networks. There are nodes formed in these structures, the disruption of which leads to regional, country-wise or cross-border negative impacts. Networks of this type are mainly the power engineering systems (electric power transmission system, long-distance gas pipelines) and information and communication systems. Network connections between the sections form the higher development stage of the infrastructure, enabled mainly by the expansion of information technologies.

On one hand, it enables a disproportionately more effective utilization of the infrastructure; however on the other hand, a higher degree of mutual dependence may lead to large scale chain type disruptions. What's more, even slight disruptions in the infrastructure may have serious consequences. The on-going process of rapidly developing information technologies has a potential of various hidden risks. These include insufficiently tested new products in hardware and software, incompletely trained personnel and at the same time, a concurrent application of new and former procedures and components. The impacts of critical infrastructure disruption may be manifested in medical and psychological impact on people, in tangible economic damage up to the loss of confidence of the population in political representation of the region or of the country.

Always progressing network-like nature of the infrastructure carries the issue of critical infrastructure – i.e. its specification, adopting measures for its protection – through the borders of a

single country. Despite national variations, there are only minor changes in the defined areas of classical infrastructure from country to country. At the same time, it is necessary to permanently re-assess the seriousness of the risks of the respective units and elements of critical infrastructure. The comparison of sectors included in critical infrastructure of the selected countries is shown in Table 1.

Tab. 1 The comparison of sectors included in critical infrastructure of selected countries [2]

| The area of critical infrastructure        | EUROPEAN CI | INDIVIDUAL EU COUNTRIES | SWITZERLAND | NORWAY | DENMARK | UNITED STATES | CANADA |
|--|-------------|-------------------------|-------------|--------|---------|---------------|--------|
| POWER ENGINEERING                          | x           | x                       | x           | x      | x       | x             | x      |
| TRANSPORT                                  | x           | x                       | x           | x      | x       | x             | x      |
| INFORMATION AND COMMUNICATION TECHNOLOGIES |             | x                       | x           | x      | x       | x             | x      |
| MEDICAL CARE                               |             | x                       | x           | x      | x       | x             | x      |
| FOOD INDUSTRY                              |             | x                       | x           | x      | x       | x             | x      |
| WATER SUPPLIES                             |             | x                       | x           | x      | x       | x             | x      |
| FINANCE                                    |             | x                       | x           | x      | x       | x             | x      |
| CHEMICAL INDUSTRY                          |             | x                       | x           |        | x       | x             | x      |
| AGRICULTURE                                |             |                         |             |        |         | x             | x      |
| ARMS INDUSTRY                              |             |                         |             |        |         | x             | x      |
| CULTURE                                    |             |                         | x           |        | x       | x             | x      |
| DEFENCE                                    |             |                         | x           | x      |         |               |        |
| MAIL SERVICE                               |             | x                       | x           |        |         | x             |        |
| SCIENCE AND RESEARCH                       |             |                         |             |        | x       |               |        |
| EMERGENCY AND RESCUE SERVICE               |             |                         | x           | x      | x       | x             | x      |
| GOVERNMENT AND ADMINISTRATION              |             |                         | x           | x      | x       | x             | x      |
| NUCLEAR INDUSTRY                           |             | x                       |             |        |         |               |        |
| SPACE                                      |             | x                       |             |        |         |               |        |

In the individual documents successively issued by the European Commission, the suggestions and comments of EU member countries with respect to the basic issues of critical infrastructure have been formed and unified, mainly [4]:

- the choice of critical infrastructures of multinational nature and their identification as a European critical infrastructure,
- clear responsibility of each member country for the protection of its internal critical infrastructures,
- the necessity of common framework in application of measures to increase the protection of European critical infrastructure,
- the necessity of full participation of private sector as an operator or the owner of the majority of critical infrastructure in its effective protection, as enabled by standard commercial agreements,
- observing principles of subsidiarity and proportionality in designating European critical infrastructures,
- the rules of communication, coordination, cooperation and exchange of information also on the community level,
- definition of critical infrastructure sectors,
- implementation of European programme for the protection of critical infrastructure including accompanying financial issues.

Graphic expression of the relation between national and European critical infrastructure is in the Figure 1.

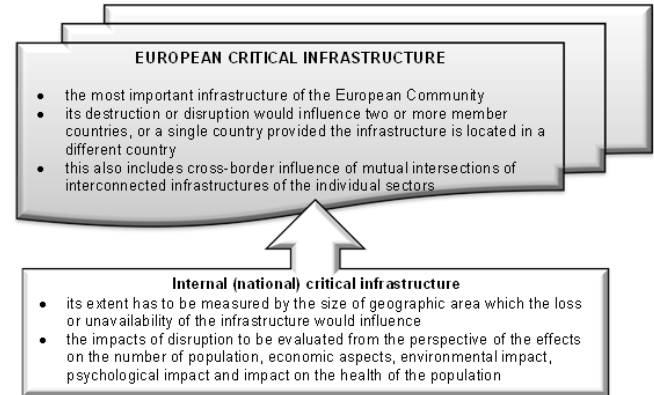


Figure 1 The relation between national and European critical infrastructure [9]

### 3. CRITICAL INFRASTRUCTURE IN SLOVAK REPUBLIC

Slovak Republic, as a part of North Atlantic territory pays permanent attention to the questions related to critical infrastructure and its protection. The document “Proposal of the Concept of Critical Infrastructure in the Slovak Republic and Means of its Protection” was processed based on the newly adopted “Security Strategy of the Slovak Republic 2005”. In connections with the documents published by the European Commission, the “National Programme of Protection and Defence of the Critical Infrastructure in the Slovak Republic” was issued in 2008 and the Act on Critical Infrastructure was adopted in 2011.

One of the main reasons of focus on this issue in Slovakia is the insufficient legislation. The legislation up to now was only focused on the defence infrastructure related to promoting the defence of the country. The new concept of critical infrastructure expands this area by further elements and also takes into account the risks of non-military nature.

The Act No. 45/2011 Coll. on Critical infrastructure defines eight sectors of critical infrastructure, which are shown in the Figure 2.

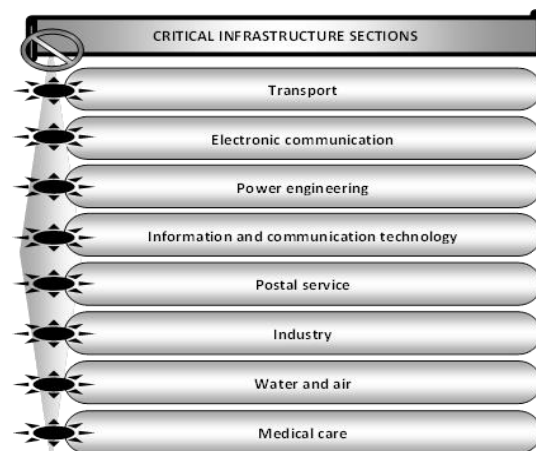


Figure 2 The sections of critical infrastructure in Slovak Republic [9]

To recognize the elements of national infrastructure eligible in the category of critical infrastructure, the following criteria were defined [1]:

- sector criteria (defined in accordance with the respective sector’s character)
- cross-sectional criteria, which are defined in accordance with these assumptions:
  - the number of threatened persons, dead and wounded of this number,
  - economic impact (the extent of economic losses, deterioration of the quality of goods, deterioration of the quality of services offered in public interest, negative environmental impact),
  - impact on population (impaired quality of life due to seriousness of the outage of goods supply and the time necessary to resume it, seriousness of the outage in the supply of services offered in public interest and the time necessary to resume it, availability of alternative goods supply, availability of alternative supply of service in public interest).

#### 4. TRANSPORT AS A PART OF CRITICAL INFRASTRUCTURE IN SLOVAK REPUBLIC

The assessment of transport infrastructure as a part of critical national infrastructure must be based on the specific position, importance and tasks of the whole section of transport. Interconnection with other sectors of the country’s economy, direct influence on the economic results, integration of the economy from multinational point of view, the influence on changes in the standards of living by meeting the needs of the population belong to the aspects that have to be considered. Therefore, when building transport infrastructure, public and defence interests of the country are emphasised strongly. The relation between the transport infrastructure and national infrastructure is shown in Figure 3.

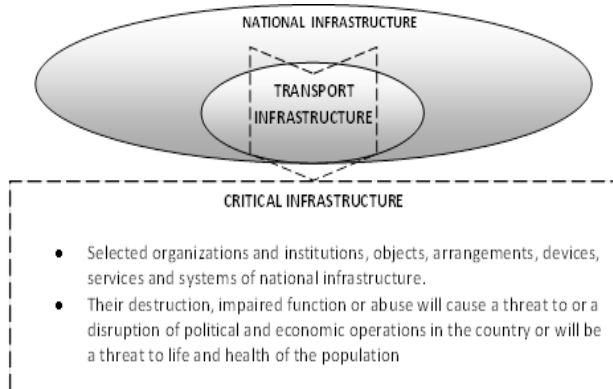


Figure 3 The sections of critical infrastructure in Slovak Republic [9]

However, specific position of transport cannot be the reason to build its infrastructure with no respect to any limitations. It is necessary to take into account mainly the high energy dependence of transport, safety, and environmental as well as aesthetic aspects. At the same time, the selection of sectors and elements of critical transport infrastructure must only include the entitled objects and equipment. General overview of possible infrastructure elements in transport sector is provided in Tab. 2.

Tab. 2 Possible elements of critical infrastructure in the sector of transport [8]

| Transport type         | Critical line type constructions  | Critical objects  |
|------------------------|---|---|
| Road transport         | selected terrestrial communications of higher category (motorways, 1 <sup>st</sup> class roads)               | crossings, bridges, terminals, garage compounds, areas of terrestrial communications maintenance, petrol stations       |
| Rail transport         | selected railway lines, important tracks, overhead power lines, lines for information and security technology | railway nodes, railway stations, bridges, tunnels, operation facilities (depots, repair works, trans-loading terminals) |
| Air transport          | airport access and servicing communications   | airports, control sites of aviation and operation services, terrestrial navigating and radar equipment                  |
| Inland water transport | floatable sections of rivers, canals  | ports, locks, docks, berths, floatable bridges and tunnels  |

The main directions and tasks of transport development in Slovakia are defined in the document “Strategy of Transport Policy Development of Slovak Republic until 2020”. Besides the issues of modernization and development of transport infrastructure, one of the strategic areas is also in increasing the safety of transportation.

The national programme of protection and defence of critical infrastructure in Slovak Republic (in the same way also the Act No. 45/2011 Coll. on Critical infrastructure) divides the sector of transport in the respective subsectors, where their current status is defined in the following way [1]:

##### A. Subsector of road transport:

- no type of protection is performed currently and even in the future no type of critical infrastructure elements protection is considered,
- the important issue will be the cooperation in the management of decommissioning of the road or of the object out of service, mainly in the areas where the extent of disruption is monitored by helicopters, information on possible detours in media, detours organization and marking in cooperation with traffic police, utilization of forces and resources of the integrated rescue system.

##### B. Subsector of rail transport:

- the protection of critical infrastructure elements in conditions of rail transport is solved by means of:
  - utilizing the employees at the workplaces of the railways (regular checks, supervision and control in the working hours),
  - technical facilities (monitoring via camera systems, signalling devices of object’s violation, electronic fire alarm signalization),
  - combination of the above procedures,
  - adopting measures (elimination of anti-social activities, provisions to secure the fluency and safety of the rail traffic, prevention and elimination of the emergency events).

##### C. Subsector of air traffic:

- from the point of view of critical airport infrastructure protection in civil aviation, there is a participation of navigation services (aviation operation services, aviation telecommunication services, aviation information services and aviation meteorological service) and air carriers,

- the protection of critical infrastructure elements is managed in accordance with international regulations (Agreement on civil aviation, membership in the European Civil Aviation Conference, membership in the European Community), Act No. 143/1998 Coll. on Civil Aviation (Aviation Law) and on the modifications and amendments of some laws as amended.

#### D. Subsector of water traffic:

- the ordinance of immediate suspension of navigation or its limitation by competent authorities at the specified territory in the Slovak Republic in case of immediate threat to the operational safety of ships' navigation (State Navigation Administration),
- protection of objects in public ports is subcontracted and provided by means of private security service company,
- securing ships' navigation through inland waterways, issuing navigation measures in case of threats to navigation safety, i.e. protection of inland waterways is in the competence of the State Navigation Administration.

**Pipeline transport** is included in power engineering sector, specifically speaking in its subsectors of gas, oil and oil derived products. From the point of view of protection and defence of critical infrastructure of these subsectors, the following requirements may be mentioned:

- the condition of a safe system in power engineering is the integration of technical resources, human resources and organization measures,
- the establishment and the knowledge of the corresponding safety documentation,
- the construction of accident refurbishment systems, their professional personal formation and the corresponding equipment and material resources.
- exact specification of competencies in the area of securing objects' protection between the state, owners and operators of the respective elements of the critical infrastructure.

## 6. CONCLUSIONS

The protection of critical infrastructure in transport sector consists of preparation and implementation of measures to decrease all risks (physical, social, overload of transport networks) and to minimize the dependence of transport on other sectors, mainly power engineering. These measures must lead to continuous fulfilment of functions by transport objects, devices, means of transport, and employees under any kind of threats or risks.

Designation of objects as preferred parts of critical infrastructure in transport sector is derived from the importance and development of the respective types of transport. For example in railway transport about 60% of the whole length of the railway network and about 75 % of all railway stations are selected for the purposes of defence. In the same way, the roads necessary for the purposes of armed forces amount to about 35 % of the total length of higher class roads. In case of air traffic infrastructure, the classification criteria of critical infrastructure are probably fulfilled by the majority of the existing objects. On the contrary, in case of water transport infrastructure, the conditions for critical infrastructure elements selection is rather

fulfilled by objects of multipurpose water management facilities.

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