

# Management of Protection of Czech Republic Critical Infrastructure Elements

LUDEK LUKAS, MARTIN HROMADA

Department of Security Engineering

Tomas Bata University in Zlín, Faculty of Applied Informatics

nám. T. G. Masaryka 5555, 760 01 Zlín

CZECH REPUBLIC

[lukas@fai.utb.cz](mailto:lukas@fai.utb.cz); [hromada@fai.utb.cz](mailto:hromada@fai.utb.cz)

*Abstract:* Contemporary modern democratic society provides its citizens optimal conditions for their life and development. The latest technology are using significantly in several key areas like health care, food, transportation, information and communication technologies, etc. Based on political developments in nineties the concept of critical infrastructure was formulated as one of the security pillars. Infrastructure sectors are elements that support state by essential support functions. The states have been aware of their dependence on the operation of infrastructure sectors and began to be actively in this area. The current approach of the Czech Republic to protect critical infrastructure is based on the approach of the European Union. Its aim is to provide for the elements of critical infrastructure protection.

*Key-Words:* protection, critical infrastructure element, crisis management, security system, guard, technical security system

## 1 Introduction

Contemporary modern democratic society provides its citizens optimal conditions for their life and development. The latest technology are using significantly in several key areas like health care, food, transportation, information and communication technologies, etc. We can not already imagine our life without these technologies. Limitation of functionality of technology would cause substantial difficulties both for the functioning of the state and life of citizens also.

Based on political developments in nineties the concept of critical infrastructure was formulated as one of the security pillars. Infrastructure sectors are elements that support state by essential support functions. Energy, telecommunications, health care, foods are such infrastructure sectors from the perspective of the state. The states have been aware of their dependence on the operation of infrastructure sectors and began to be actively in this area. States define critical infrastructure and its elements gradually. Selection of individual elements of critical infrastructure is made on the basis of sectoral criteria. The Czech Republic has defined the critical infrastructure legislatively by

amendment to the Act No. 240/2000 Coll. on crisis management.

Protection of critical infrastructure is a relatively new branch of application of management functions by state. Due to the results of the analysis of security threats the technological development and society's dependence on energy, products, networks, commodities leads to formulation of the required degree of protection. Modern states solve those problems by multi-level solution. The defining of national critical infrastructure program is usually first step. The legislative pillar is cornerstone of critical infrastructure defining, its components and how to ensure its protection. The organization of critical infrastructure protection is basic part of these programs. Functionality of critical infrastructure determines the effectiveness of state security system. Functionality creates conditions for providing external and internal security measures and protection of population.

It is necessary to protect the critical infrastructure elements especially against physical destructive threats, technological accidents, and cyber attacks natural disasters. The adopted measures are very costly in many cases. The problem lies with critical infrastructure elements

that are owned by private enterprise. Protection costs do not related directly with the object of their business and thus increase the overall cost of services. Private organizations are competitive and decrease its cost but there are costs of preventing associated with increased resistance of the element of critical infrastructure. This problem is currently looking to identify a path to its solution, especially in legislative and economic level.

The current problem of critical infrastructure protection is interdependence between critical infrastructure sectors. Internal dependence occurs at several levels, mainly physic, cyber and organization levels. It arises due to financial flows, energy flows, information flows. Countries and people need a systematic solution.

## 2 Main threats and risks of critical infrastructure

Critical infrastructure is key state asset that will provide the main functions needed for state operation. Security analysis provides what should be protected and which threaten the assets. The risk of execution of threats is determined in the security analysis. Risk is the probability that the threat has become. At present, based on safety analysis, fundamental threats to critical infrastructure are:

- natural disasters,
- technological accidents,
- cyber attacks,
- criminal activities,
- terrorist attacks.

Natural disasters are strong effects of natural phenomena that act negatively on the functionality, structure and integrity of the system. The basic natural disasters are floods, torrential rain, gales and heavy snow in the Czech Republic. Protecting of critical infrastructure elements is the improving of resistance to these threats.

Technological accidents represent incidents in which there is a negative effect on functionality, structure and integrity of the system due to internal factors (reliability mainly). The internal factors may be faults, failures and other unreliability, causing uncontrolled degradation and destruction of functions. Protection of critical infrastructure element is provided by ensuring of technology reliability. The human factor plays an important role as well.

Cyber attack is a targeted activity against information assets of critical infrastructure elements in order to obtain, modify or destroy the data or degrade or destroy the information

system. Protecting of critical infrastructure elements is ensured by security technology for information systems. Protection is provided by cryptography and reliable secure communication protocols.

Criminal activity means the illegal activity in order to illegally obtain or relegating to destroy elements of critical infrastructure. The aim of criminal activities is theft or withdrawal of critical infrastructure elements. Protecting of critical infrastructure elements is a summary of measure of physical security.

A terrorist attack is usually illegal activities leading to the degradation or destruction of critical infrastructure elements to support the enforcement of its policy goals. Protecting critical infrastructure elements is a summary of measure of physical security.

Protective measures to ensure the security of critical infrastructure include personnel, technical, structural, technological measures and measures of physical security. The next section will deal only with the implementation of measures in the areas of physical security.

## 3 Procedure for critical infrastructure protection system building

The aim of the process of protecting critical infrastructure is to ensure the desired degree of physical security and resilience for critical infrastructure elements. The aim is also to ensure the recovery process in case of the degradation function of elements. Designated elements must withstand the effects of all threats. This is the principle All Risk.

The basic standards and rules for the protection of critical infrastructure are included in content of the process of creating a security framework for the system of protection of critical infrastructure. There is included:

- establishment of systems and institutions for the protection of critical infrastructure,
- selection of elements for the protection of critical infrastructure, ensuring their protection and recovery functions in case of degradation.

Security framework for the protection of critical infrastructure represents the definition of critical infrastructure and its relation to the state and society. The framework defines the position of critical infrastructure in the state security system. There is emphasized the reasons for its protection and risks for the society at time of its disposal.

Creation of juridical environment for critical infrastructure protection includes the development and adoption of the law and other standards

activities in this area. The laws and standards should have set objectives of the process, elements and areas of critical infrastructure, institutions for the protection of critical infrastructure and their actions towards the protection and restoration functions. Protection of critical infrastructure is related to crisis management and the efforts of rescue and protection of the population.

The basic standards and rules should specify criteria for the selection of the objects of critical infrastructure. Standards should to emphasis its importance in critical infrastructure and the requirements for physical protection. Standards should be based on the specifications of classes of elements of critical infrastructure. There are 3-5 classes of protection usually. Classification into classes is based on measurements of the impact of the disable of element for function of critical infrastructure on state and citizens. Degrees of influence are the following levels of assessment:

- degraded but does not threaten the basic functions,
- degraded and threatens the basic functions,
- excludes the basic functions.

System and critical infrastructure protection authorities creates a management system for the management of critical infrastructure. The structure of the authorities is created by the obligation of authorities and identification of work rules and processes. The juridical relationship is created between critical infrastructure protection authorities and operators of critical infrastructure. Fire Rescue Corps is a state body responsible for protecting of critical infrastructure in the Czech Republic.

Determination of critical infrastructure element is based on usage of statutory criteria. Cross-cutting and sectoral statutory criteria are used currently. Impact of degradation functions in the area of critical infrastructure, state and society is the basis for determining the critical infrastructure element. Power plants, critical substations and airports are included among such elements.

Ensuring the protection, resilience and recovery infrastructure includes security analysis of critical infrastructure elements, the specification of security, safety and operational measures to ensure the required level of security and reconstruction functions. The Operator Security Plan is basis for the protection and restoration functions. Security Liaison Officer must be designated in each element of critical infrastructure.

The system of Critical Infrastructure Protection is created in the Czech Republic currently. The crisis management law is the foundation for the protection of critical infrastructure. Critical

infrastructure protection authorities place emphasis on:

- selection of critical infrastructure elements,
- protection and recovery plan (Operator Security Plan) for protecting and restoring of critical infrastructure elements,
- ensure the protection and recovery of critical infrastructure elements.

The whole process is aimed at both the national critical infrastructure elements and the elements of European Critical Infrastructure. The basic problem is to apply the principle of the simplest approach to the protection of critical infrastructure. Building of system is reason for that. Critical infrastructure protection system is currently being created in the basic version. Main reason is due to contradictory requirements of security measures to ensure the function of individual elements. For example on airport the deep security inspection is required and check-in a large number of people in a short time is needed too.

The main current problems of the process of critical infrastructure in the Czech Republic include:

- simplifying of access to critical infrastructure protection, protecting only the most important objects,
- system of critical infrastructure protection and security class of elements (objects) is not determined,
- standards are not developed for each class of objects of critical infrastructure,
- there is no system of control and certification of critical infrastructure protection.

Solution of individual problems will be gradual and will be based on both the national analysis and knowledge of the European approach too. Improved protection of critical infrastructure should focus on addressing the following issues:

- specification of critical infrastructure protection system,
- specification of the class of objects of critical infrastructure in terms of impact on the state and citizens' lives,
- specification of standards to ensure protection of critical infrastructure elements,
- specification and optimization of standardized ways of ensuring the protection of critical infrastructure elements,
- evaluation of the protection of critical infrastructure facilities,
- certification of critical infrastructure elements.

#### 4 The methods and measures to ensure the physical security of critical infrastructure elements

Ensuring the protection of critical infrastructure element contains the set of conceptual, organizational, technological and technical measures to ensure required level of protection of critical infrastructure element. Specification has size of projection, setup and operation. The result of this process is a system of critical infrastructure element protection. The basic pillars of critical infrastructure protection are:

- physical security system,
- information support,
- system of personnel training,
- recovery system of critical infrastructure elements.

Physical security system is a summary of regime measure in the element of critical infrastructure, operation of security guard and technical equipments of mechanical and electronic security systems. The quality of the physical security depends on the preparation and implementation of a particular operation. Task for the physical security system is based on an analysis of threats and risks. The analysis is usually done by using software tools. RISKAN is example of such software system. We can also use the methods of modeling and simulation to verify the effectiveness of physical security measures.

Security guard ensures the security oversight of critical infrastructure element. Guard provides patrol of element. In case of violation the guard arrests the perpetrators and ensures its delivery to police. There are used mechanical systems, such as fences, gates, bars, etc to support the implementation of security measures. Sensory and guarding part of physical security system is created by electronic security and alarm systems, motion detectors and camera systems. Technical equipment significantly promotes surveillance activity of security guard.

Information support of critical infrastructure element protection provides information on individual threats. Information support is essential to synchronize all the activities of protection, such as managerial and executive. Information system for critical infrastructure protection element support includes both classic and especially computer-oriented information system. Computer network forms its foundation.

The system of personnel training ensures preparation of security guard to be ready to fulfill his mission. Preparation is designed to educate employees so they know how to proceed in various

ways to undermine the protection of critical infrastructure element. Guard is not only learnt but training and practice also. To prepare staff we can use simulation methods, especially for the coordination of training activities for ensuring the protection of large objects. Preparation of personnel for the protection of critical infrastructure is crucial.

System for recovery of critical infrastructure elements is designed to prepare the system, organizational and technical measures to ensure the recovery function. In the case of degradation function, the element is ready to ensure its renewal and the fulfillment of the objective function. The system of recovery is based on the recovery plan.

Aim of integration of these measures is to improve the preparedness of the element of critical infrastructure to withstand effect both external and internal factors that threaten the function of a critical infrastructure element.

#### 5 Conclusions

The definition of critical infrastructure is currently one of the most important security measures to ensure the feasibility of the state and its basic functions. Protection of critical infrastructure also significantly affects the lives of citizens. Constitution of critical infrastructure was done mainly because of technological dependency the state functions.

Therefore the technology and systems must be not only rugged, but also protected. Protection of critical infrastructure is significantly dependent on the physical security measures. The current approach of the Czech Republic to protect critical infrastructure is based on the approach of the European Union. Its aim is to provide for the elements of critical infrastructure protection. Juridical framework and system is formed, but has some shortcomings that require solutions.

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