Protection of the Object of the Critical Infrastructure in the Czech Republic

Michaela Vašková

Abstract—With the increasing dependence of countries on the critical infrastructure, it increases their vulnerability. Big threat is primarily in the human factor (personnel of the critical infrastructure) and in terrorist attacks. It emphasizes the development of methodology for searching of weak points and their subsequent elimination. This article discusses methods for the analysis of safety in the objects of critical infrastructure. It also contains proposal for methodology for training employees of security services in the objects of the critical infrastructure and developing scenarios of attacks on selected objects of the critical infrastructure.

Keywords—Critical infrastructure, object of critical infrastructure, protection, safety, security, security audit.

I. INTRODUCTION

THE subject of work is to review critical infrastructure protection in the Czech Republic. The first part is an analysis of the current state with an emphasis on the development of critical infrastructure in the Czech Republic. In the first chapter, there is also made an explication of the fundamental concepts of the tackle.

The main task of the government of every state is to ensure the development of their country and the safety of citizens. Czech Republic, like other developed countries, began to deal with possible threats to the population and vulnerability economic operators by ensuring the basic functions of the state and ensuring basic living needs of the population, especially in emergency. Protection of lives, human health, property and environment is not possible without ensuring the correct functioning of the systems that make up the physical and cyber base of the state. In this context, in the late 90s, the Czech Republic started to talk about identification of the critical infrastructure.

To ensure the smooth functioning of basic vital needs, it is necessary to define the infrastructure that is vital or the critical, and without which it would be impossible to ensure the smooth functioning of the state. The concept of the critical infrastructure includes the physical resources, the service and information technology facilities, networks, and objects (elements) of the infrastructures whose damage or destruction would have a serious impact on the health, safety or the economic well-being of the population, or government functions. This critical infrastructure is needed to be protected, strengthen it and taken care of its reliable operation, because the infrastructure of developed countries is highly vulnerable and highly connected to each other [1].

Michaela Vašková is with the University of Defence, Department of Crisis Management, Brno, Czech Republic (e-mail: michaela.vaskova@unob.cz).

The biggest breakthrough in the approach to the protection of the critical infrastructure all around the world has occurred after September 11, 2001, when there was a terrorist attack in the United States. Based on this event protection of critical infrastructure against terrorist attacks came to the fore.

II. THE THEORETICAL PART

A. Critical Infrastructure of the Czech Republic

The basic function of government is to ensure the protection and development of the protected interests and sustainable development of human society. The Constitution of the Czech Republic, as the highest legal document of the Czech Republic, declares that the protected interests of the state are the goals that are cherished as a priority, i.e. the lives and health of people, property, the environment, and safety.

The critical infrastructure of the Czech Republic is defined as production and non-production systems and services, whose malfunction could have a serious impact on national security, the economy, public administration and on ensuring of fundamental life needs of the population [2].

The object of critical infrastructure is then a building or facility to ensure the functioning of critical infrastructure. Objects of critical infrastructure are the production and non-production systems and services whose disruption or complete destruction would have a serious impact on the running of the state, for its operations and performance of its functions [2].

To enhance the protection of the objects of the critical infrastructure and minimize the risk of attack those objects, especially by terrorists, it is appropriate to apply the detectors and analysers of explosives.

B. The Development of Critical Infrastructure in the Czech Republic

In the former Czechoslovakia, there functioned systems increasing the resilience of the economy directed to the preparation activities for the war until 1989. Over time, it started to change the structure of the system. In the 90s of the 20th century, it resulted in reduction of emphasis on the protection and defence of the population. There were abolished civil defence units in the homes and workplaces, the implementation of the military training of the population was stopped, and there was also high reduction of the other activities related to the preparation for war (all civil protection activities). Great progress in this area was the adoption of the Emergency laws in 2000, which among other things led to the building of the Integrated Rescue System of the Czech Republic. The issue of protecting the population began to be

World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:9, No:12, 2015

integrated into international structures, both in NATO and the European Union. The Czech Republic´s initial activity within the critical infrastructure was oriented to protect computer networks [1].

In 2001, the Committee for Civil Emergency Planning and National Security Council debated a resolution entitled "Definition and extent of the basic functions of the state," which was the first official government document dealing with the basic functions of the state in case of emergency or non-military crises. The analysis conducted in response to the floods in 1997 and 1998 and the analysis of foreign literature on the response to natural and other disasters, have led to processing of the material, which concerned the protection of the critical infrastructure of the Czech Republic [3], [4].

In 2002, the Committee for Civil and Emergency Planning considered a resolution "Extend of basic state functions in crisis situations" and the document "Report on the nation's critical infrastructure," which stated the focus of national critical infrastructure the following areas:

- The system of energy supply (especially electricity),
- Water supply system,
- Waste management system,
- Transportation network,
- Communication and information systems,
- Banking and financial sector,
- Emergency services (police, fire brigade, and health care),
- Public services (supply of food, social services, and funeral services),
- State and local administration [1], [5].

In 2003, the Ministry of Interior prepared for the meeting of the Committee for Civil and Emergency Planning material titled "Project Analysis of the principal functions of the state, including the protection of critical infrastructure in the event of emergencies." This material represented the first coherent and comprehensive overview of the situation in the various sectors of the critical infrastructure, including legislation, the first definition of basic state functions during emergencies and critical infrastructure. List of entities at the national, regional and local levels was passed by the Committee for Civil and Emergency Planning. A year later it was established ten regions and forty-two products or services of the critical infrastructure [1], [6], [7].

C. The Fields of Critical Infrastructure in the Czech Republic

The critical infrastructure of the Czech Republic can be comprehended as a system, which consists of two levels:
- The level of sectors (fields)
- The level of products and services.

Fields of critical infrastructure in the Czech Republic is written in Table I.

Currently, there are defined 9 fields of critical infrastructure and 37 products and services. They are in terms of the functioning of society considered a priority. In comparison with fields listed in Table I, there have been changes for some. For the field Health care has changed the product Distribution of drugs. This item has been replaced by the production,

storage, and distribution of pharmaceuticals (drugs) and medical devices. Field Emergency Services has been modified and adjusted according to Table II.

TABLE I
FIELDS OF CRITICAL INFRASTRUCTURE IN THE CZECH REPUBLIC [1], [8]

Fields of critical infrastructure	Products/services
Energetic	Energy
	Electricity
	Gas
	Thermal energy
	Oil and petroleum products
Water management	Drinking and industrial water supply
	Securing and managing surface and groundwater resources
	Wastewater system
Food and agriculture	Food production
	Caring for foodstuff
	Agricultural production
Health care	Pre-hospital emergency care
	Hospital care
	Protection of public health
	Distribution of drugs
Transport	Roadside
	Railway
	Aviation
	Inland waterways
Communication and information systems	Services of fixed communication networks
	Services of mobile communication networks
	Radio communication and navigation
	Satellite communication
	Television and radio broadcasting
	Internet access and data services
	Postal and courier services
Banking and financial sector	Management of public finances
	Banking
	Insurance
	Capital market
Emergency services	Police, Fire protection units
	Fire brigade
	Medical rescue services
	Air medical rescue services
Public administration	Army
	Radiation monitoring
	Forecasting, warning and warning services
	Social protection and employment
	Diplomacy
	Performance justice and prisons
	State and local administration

TABLE II
DEFINITION OF PRODUCT AND SERVICES FOR EMERGENCY SERVICES [1], [8]

Field of critical infrastructure	Products/services
Emergency services	Fire brigade of the Czech Republic and fire protection units
	Police of the Czech Republic (internal security and public order)
	The Army of the Czech Republic
	Radiation monitoring incl. Bases for deciding measures to reduce or avert exposure
	Forecasting, warning and warning services

The infrastructure of the state is made up of elements which are systems with other elements. Critical infrastructure in most countries includes:
- Water supply systems and food,
- Energy Systems,
- Banking and financial sector,
- Transport and logistics system,

World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
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- Information and communication systems,
- The system of public administration.

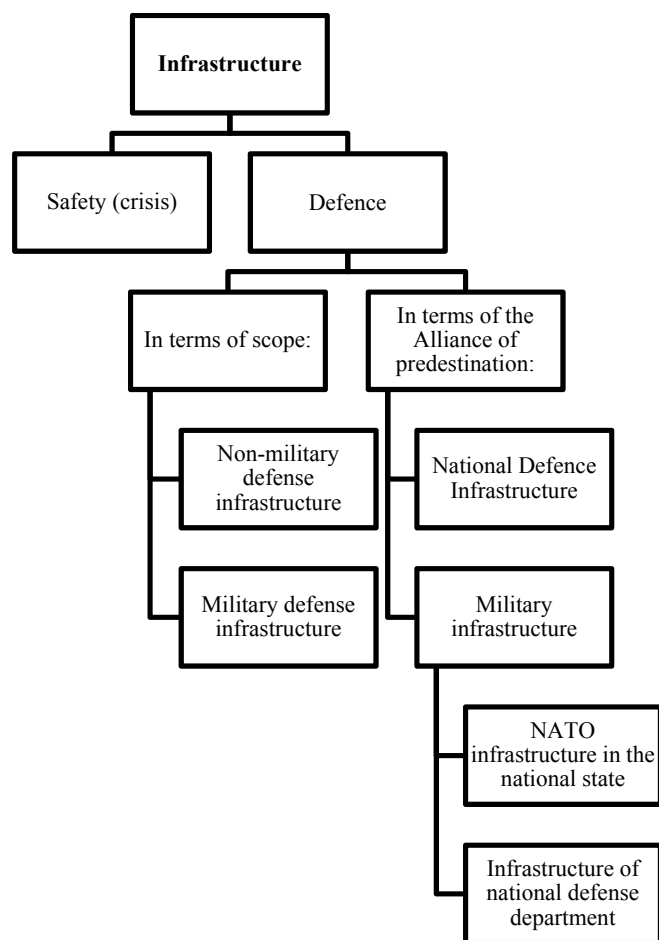The actual division of state infrastructure is shown in Fig. 1.

Fig. 1 The concept of infrastructure from external (military) perspective [1]

III. METHODS

This paper uses basic methods of scientific work, like the analytic-synthetic method. Because the investigated area of critical infrastructure is very large, it was necessary to separate the important information from the irrelevant.

Especially the theoretical part uses the method of literature review that summed up the knowledge about critical infrastructure of the Czech Republic.

The practical part of the work uses mainly the method of security audit and comparison method of approaches to the critical infrastructure in the Czech Republic and in the European Union.

IV. THE PRACTICAL PART

A. Role of Education in the Critical Infrastructure Protection

Education and training of employees, their job involves the performance of civil emergency preparedness and it is an important step establishing conditions for responding to extraordinary events or large-scale crisis situations (emergencies).

Due to the vertical and horizontal cross-cutting nature of the critical infrastructure and the need to cover all the groups involved in the process of its protection, education in the field of critical infrastructure protection will also cover security staff. This will ensure not only the appropriate level of qualification of these workers, but also sharing information, and also raise awareness of the interdependence and integration processes in the field of critical infrastructure.

Security Council Resolution approved an updated (November 16, 2004) Concept of education in the field of crisis management, which regulates the preparation and education of government and other employees in administrative offices and local government officials [8].

The concept aims:
- Systematic solutions for persons in the area,
- To identify target groups,
- Establish methods and principles for processing framework educational programs for individual target groups,
- Create the conditions for acquiring and improving skills and the improvement of the area necessary for the operation of professional workers and affected areas of crisis management,
- Coordination and execution of state administration in the area of activities related to education in crisis management are the responsibility of the Ministry of Interior in cooperation with other relevant central administrative authorities [8].

The issue of protection of critical infrastructure, especially maintaining the operability of individual vital elements of critical infrastructure and linkages between them, belongs to crisis management.

B. Security Audit Method

The method of security audit will be used in the work to find weak points in security of the object of the critical infrastructure. At first period of the method we have to choose two or three relevant object of the critical on which we will apply the method.

Audit is an integral part of the safety management and it is a very effective tool to check its status. It allows identifying strong and weak points of chosen objects. It also helps in the planning process to meet the objectives set out in security area.

The audit is also a systematic, independent and documented process obtaining evidence order to determine whether the activities and their results are consistent with the defined audit criteria and to what extent. While the audit criteria may be policy, procedures and requirements applying by organizations [9].

The outcome of the security audit is not only the assessment of compliance, but also to assess the effectiveness and reliability of safety management. The audit must take into account:
- Effectiveness of the organization,

World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:9, No:12, 2015

- Risks,
- Level control and process efficiency,
- Level of management and process efficiency,
- Opportunities for cost reduction, waste and other forms of waste,
- Opportunities for process improvement, the overall security status of the organization [9].

To make audit plan to function, it is necessary to pay great attention to the selection and qualification of auditors. Procedures for carrying out the audits a company prepares itself and in accordance with the standard must include:

- The subject and scope of the audits and their frequency,
- Auditing methodology, defining responsibility and authority for the audit program, the audit arrangements in terms of management,
- Own auditing procedure,
- The conditions and specifications to present reports on the results of the audit,
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- Competence requirements and training of auditors,
- Way to discuss the audit findings with relevant staff,
- The monitoring and verification of the effectiveness of corrective measures [9]-[11].

As one of the objects of critical infrastructure, chosen as a model, is airport Brno-Tuřany. There will be carried out a research focused on the airport of Vaclav Havel in Prague, in the near future. As a second object of the critical infrastructure, there was chosen the Nuclear Power Plant Dukovany.

To enhance the protection of the objects of the critical infrastructure and minimize the risk of attacking those objects, it is appropriate to apply the security audit method to find weak points (gaps) in security.

V. Conclusion

The paper approaches the issue of the protection of the critical object of the critical infrastructure in the Czech Republic. The issue of critical infrastructure protection came to the fore after the events of September 11, 2001, and it still acquires new content and size.

The issue of solution to the critical infrastructure is so complex and cross-cutting mutually interconnected across all sectors with a large number of participating economic subjects and Czech public administration bodies, that it requires a range of technical, organizational and other support elements corresponding time and space, that´s necessary to solve them. In addition, other member states of the European Union have to face to the similar problems in this area.

Acknowledgment

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Michaela Vašková was born 13th June 1990 in Nové Město na Moravě, Czech Republic. She was graduated 2014 at University of Defense in Brno, Czech Republic, Faculty of Economic and Management. Now she is studying at the University of Defence in Brno too. She is study the field of protection of the population at the Faculty of military leadership, and she is focused on the application of the security audit method on selected object of critical infrastructure. Her supervisor is a university teacher doc. Ing. Josef Kellner, Ph.D.

She is the author of more than 50 scientific articles, 2 patents and co-author of two monographs collective expertise.