

NATIONAL UNIVERSITY
OF PUBLIC SERVICE
Doctoral Council

TÜNDE BONNYAI

- Analysis of the critical infrastructure protection in the light of preparing the public -

Author's introduction and official critics to the PhD dissertation

Budapest
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Supervisor:

Ret. Col. Ferenc Kovács PhD

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1. THE SCIENTIFIC PROBLEM

Among the factual cases of special legal order stated in the Fundamental Law of Hungary, the fact that the case of emergency is set in a fundamental law provides an opportunity for integrating the tasks related to the protection of critical infrastructure into defence administration. In connection therewith, the legal framework concerning protection against disasters ensures that disaster risk and state of emergency can be announced in the area of the country related to the operation of critical infrastructures, which reflects the exceptionally high priority of the task and scope of responsibility. It is important to mention that within the system of protection against disasters, critical infrastructure protection is primarily identified as a task of civil protection, through which connections to the protection of population receive emphasis.

Resulting from the defensive nature of critical infrastructure, through taking the aspects of civil population protection into account, the issue of preparing and informing the public also arises, whose organisational framework, scopes of responsibility, the conditions of implementations and methodology was not defined at the time of the research. In my opinion, the responsibility of the state, which involves increasing the safety and sense of security of the civil population, and the obligation of preparing the public can be guaranteed through the creation and use of the appropriate methodology. In order to prevent the inefficiency of ad hoc information provided after the given events had occurred, both the content-related and formal implementation of preparation must be established.

My dissertation fundamentally combines two main directions of research in order to remedy the mentioned deficiencies. I examine the currently prevailing legal environment, both from the viewpoint of critical infrastructural systems, and from that of the preparation of the civil population. On the basis thereof I have found that, although the legal framework is incomplete, it provides a basis for the creation of the preparation methodology concerning critical infrastructure protection, however, the legislative intent aiming thereat must be established. Through the above I aspire to highlight the responsibility-related, organizational, and methodology-related feasibility of the task of civil preparation that will be inevitable in the future.

With my research I intend to emphasize the fact that it is necessary to set protection-related requirements concerning critical infrastructure, especially with regard to demands concerning civil preparation and the skills to be developed within the population. This is based on the creation of opportunities for skills development aimed at the conscious safety education of the civil population, at the establishment of social responsibility, and on the methodology

elaborated in the course of my research, which – through preparation activities – in time can be incorporated into lifelong learning.

2. RESEARCH AIMS

The protection of critical infrastructure, as a special area of defence administration, anticipated a new type of activity, a new framework of responsibility and tasks several years ago. However, I have not encountered the detailed elaboration of the issue in literature. At the beginning of my research I frequently experienced that people outside the professional sphere find it difficult to interpret critical infrastructure as a concept. This has led me to begin the substantive examination of the connections of critical infrastructure protection and civil preparation. Therefore, the main aims of my research are the following:

- *To review and systematize* critical infrastructure as a newly formulated concept.
- *To examine and present* the system and characteristics of public services that affect the daily life of civil population.
- *To provide an up-to-date picture* of the over decade-long process, which has resulted in today's European Union and national activity aiming at critical infrastructure protection.
- *To interpret* the importance and flow of information and the right to receive information, with regard to critical infrastructure.
- *To explore* the development and current regulation of the preparation of population as carried out by disaster management.
- *To support* the hypothesis that the preparation of population is going to arise as a task related to the operation and protection of critical infrastructure.
- Through analysing and evaluating the vulnerability of the country to disasters, I wish to *highlight* the necessity of the preparation of population within the regulation of critical infrastructure protection, which I consider practical to be named as dual, sectoral and disaster management-related responsibility.
- *To develop* a methodology for the preparation of population, aiming at critical infrastructure protection, on the basis of which I can make recommendation for the remedy of insufficiencies present in the national legal environment, aiming at the regulation of the preparation of the population.

3. RESEARCH METHODS

In order to be examine the two research directions in depth, and to fulfil the research aims I applied several research methods, mainly relying on the general research methodology, including analysis, induction, deduction and synthesis.

I applied a chronological-historical method with regard to the NATO and the European Union, which resulted in gathering extensive literature. In addition to studying and processing literature, I also studied the relevant legal framework, and consulted national and international experts.

I divided the gathered literature with analytic method in accordance with the two main directions of my research, then I synthesised the theoretic and practical statements.

I subjected the general definitions providing the bases of my research (infrastructure, critical infrastructure, information, flow of information) to logical comparative analysis, depending on the approach through which they can be formulated. I founded the methodology of preparation by gathering the professional terms related to the task of preparing the population, and by categorizing them, with special focus on critical infrastructure protection. I attached personal experiences to these through empirical research method.

As an external expert, I participated in the European Union project entitled „System of Maps Assessing Risk of Terrorism against Critical Infrastructures in Big Events Rallies”, which enabled me to become familiar with approaches used by other countries.

4. THE BRIEF SUMMARY OF THE RESEARCH BY CHAPTERS

In the *first chapter* I presented the evolution of the 21st century circumstances of critical infrastructure protection in the European Union. In order to render my statements concerning the protection of critical infrastructures appropriately well-founded, I presented an overview of the relevant activity of certain European nations, and of the two determining North-American countries. Statements concerning the external dimension of the CIP prove that the early initiatives have evolved into measures and processes. In addition to the baseline characteristics of infrastructure, I also considered it essential to reconsider the categorization of the potential hazards concerning infrastructure operation, thus I defined two main categories divided into sub-categories, by taking the actual threats, risks and challenges into consideration. On the basis of examining public utilities, in connection with critical infrastructure I found that the available public utility services can be differentiated depending on whether they ensure the conditions of habitual existence. Accordingly, I introduced an

umbrella concept, and thus I call water supply, sewage removal, gas, electricity and, heating energy supply, communication and telecommunication as basic public utilities.

The above has unequivocally lead me to the conclusion that the malfunctioning, breakdown or destruction of the critical infrastructure would expressly generate a wide range of civil exposure, thus approaching the issue from the civil side is inevitable.

In the *second chapter* I reviewed the period between 2008 and 2013, and provided a detailed picture of the development of the Hungarian national critical infrastructure protection, its major milestones. Therefore, besides the legislative activity, the interpretation of aims, and the definition of tasks and scopes of responsibility can also be traced. Act CLXVI of year 2012 concerning the identification, designation and protection of essential systems and facilities, then the implementation government decree containing detailed rules, provide the framework which ensures that the identification and designation of critical infrastructures can be realised within a single framework.

Sectoral regulations are specific complements thereto, interpreting the provisions of the framework regulation through detailed rules. Examining the legal environment, I found that sectoral government decrees concerning essential public utilities – similarly to the act and the implementing decree – do not mention rules of behaviour for events of malfunction, or the responsibility and tasks of informing and preparing the population.

The examination of Hungary's vulnerability to disasters, and the tripartite structure of the identification, analysis and evaluation of risks provided me with the opportunity to focus on natural and civilisational characteristics. On the basis thereof I derived the potential consequences of each risk factor. In the resulting system of cause and effect I identified the most fundamental cumulative effects, which I then used in defining the vulnerability of critical infrastructure. On the basis of general risk factors and the country's vulnerability to disasters, and through applying set theory, I determined the level of vulnerability concerning critical infrastructure in Hungary.

5. SUMMARIZED CONCLUSIONS

Everything that we call 21st century, modern technology, surrounds and serves us, ensuring our comfort. However, we seldom ask the question what actually enables the operation of essential public utility services, which guarantee the smooth flow of everyday life. The concept that we now call critical infrastructure is not a novelty, and its protection has had a priority throughout history. In the present days this has evolved into an independent function of defence administration, as proved by the chronological overview that I studied and

presented in the course of my research. In accordance with my aims, I examined the activity that can be exemplary in terms of addressing, informing and preparing the civil population with regard to critical infrastructure.

With special regard to the above, I provided a detailed overview of the system of the national tasks concerning the preparation of population in terms of disaster management. Through combining the presentation of theoretical background with my own professional experience, I determined the definition of necessary and sufficient information concerning critical infrastructure, which, during the elaboration phase of my research, served as a framework for the methodology of the preparation of the population.

Having explored the international and national regulatory framework, in order to become familiar with characteristics, I studied the method of identifying and designating national critical infrastructure, in which the professional disaster management authority plays a key role. An important connection is the wide coordination activity performed by disaster management as a law enforcement authority.

In connection therewith, through studying the available literature I examined the effects of major risk factors, which were complemented with the experiences and lessons learned from recent events. As a result, I highlighted the vulnerability of national critical infrastructure, which I could define on the basis of the results of the disaster risk assessment and analysis concerning Hungary.

Based on the analysis and evaluation of the legal environment, the appropriate professional knowledge of the preparation of the population concerning disaster management, and on my conclusions concerning the vulnerability of national critical infrastructure, I developed a preparation methodology. A special feature of the methodology is that it is aimed specifically at preparing the civil population with regard to critical infrastructure, but also incorporates general recommendations provided by parties involved in the issue through public administration, in addition to suggestions concerning the methods of preparing service providers. I am convinced that critical infrastructure protection does not only involve ensuring state supervision and the availability of service providers. In the future it will need to involve the civil side as well, which will mainly present itself in the segment of preparation.

In the *third chapter*, having studied the definition of information and the importance of information flow, I emphasized the fact that masses of data we are unable to interpret, cannot be regarded as information, as they do not contain added value for the individual. Therefore, in case of every piece of widely shared information, sufficient content, clarity and credibility should be the priority. By emphasizing timeliness in addition to content, through international

and national examples I highlighted the fact that the lack of information or the late disclosure thereof can set off such a chain of events that can aggravate the scale of occurred damages. Having examined the prevailing legal environment, I concluded that at present no pronounced legal provisions exist concerning critical infrastructure, which would define the obligation of preparation and providing information towards consumers. In order to promote a positive change in the situation, I consider it essential to formulate the definition of necessary and sufficient information, especially from the aspect of critical infrastructure protection.

Having provided an overview of the prevailing disaster management activity aiming at the preparation of the population, with regard to feasibility I concluded that the system of preparation currently used by disaster management can provide an appropriate basis for developing the method for preparing the population concerning critical infrastructure protection.

I presented the most significant results of my research in the *fourth chapter*. In the course of defining the framework for the civil preparation methodology concerning critical infrastructure protection, I defined the parties who are primarily responsible for preparation, thus providing a dual pillar for implementation. I attached requirements and priorities to the information provided through integral and sectoral preparation, which clarify the nature, form and aim of the disclosure of fundamental information concerning critical infrastructure. Through naming target groups, I made a recommendation for including all parties involved in the operation of critical infrastructures, although I primarily focused on consumers, that is, on the civil population affected by the services. Bearing the above in mind, I differentiated modules concerning the nomination of content elements, depending on the time period when the information is provided. In connection with preparing the population concerning critical infrastructures, I introduced the types of damages affecting the infrastructures (structural damage or damage of supply) and the level of their effect (temporary malfunctioning, limitations, extended breakdown, destruction), whose conscious application can facilitate the understanding of occurring events for the affected parties. Both in case of civil preparation and the information of the public, I emphasized the importance of defining the notion of exceptional occurrence, as it can contribute to ensuring uniform interpretation as well. Finally, by naming the set of instruments, defining fundamental and refresher types of preparation, and by specifying the active and passive instruments, I created the possibilities for the practical implementation of the preparation methodology that had been presented in theory.

6. NEW SCIENTIFIC RESULTS

1. In the overall system of services I defined the scope of fundamental public utilities as an umbrella concept, based on the characteristics of critical infrastructures. This step was essential for developing a methodology for preparing the population.
2. I interpreted the definition of necessary and sufficient information concerning critical infrastructure for the first time, emphasizing the significance of disclosing information from the point of view of preparing and informing the population.
3. On the basis of the official disaster risk assessment of Hungary and the general endangering factors concerning national critical infrastructures, I ranked the vulnerability of national critical infrastructures, categorizing it by the eight factors I had created. In order to facilitate the interpretation and understanding of consequences by the public, I defined four levels to express the scale of the effects.
4. Through analysing the legal environment and the evaluation of risk factors, I proved that the preparation and information of the public will arise as a task related to critical infrastructure protection. Based on this, I developed a civil preparation methodology to be created in the future, whose pillars, requirements, aims, content elements and instruments I defined through taking the special nature of critical infrastructure protection into account.

7. PRACTICAL USE OF RESEARCH RESULTS

- It can contribute to the uniform interpretation of activities related to critical infrastructure protection.
- It can be of use for the students of the National University of Public Service Institute of Disaster Management and of the Doctoral Schools, for experts teaching this subject, and for all central, regional and local authorities that carry out tasks related to critical infrastructures within the system of national defence.
- It may facilitate further research concerning the examined issue.
- It can assist the operators and owners of critical infrastructures in preparing for future activities of preparing and informing the population.
- It can provide a basis for the legislative framework of the preparation and information system for public administration, service providers and the civil population, concerning critical infrastructure protection, and for its practical implementation.

8. RECOMMENDATIONS

I recommend my research results to be taken into account in the course of the future legislative activity carried out by the professional authority of disaster management, and by sectors involved in critical infrastructure protection.

I recommend my dissertation to be used for educational purposes by the students and instructors of the National University of Public Services, and for those public administration authorities, that carry out the supervision of owners/operators responsible for the operation of critical infrastructures.

9. PUBLICATIONS LIST OF THE CANDIDATE IN THIS TOPIC

University textbook (chapter)

Balázs Bognár – Katalin Görög – Tünde Bonnyai: Critical infrastructure protection; Industrial safety I. Manual for the performance of official duties and operators of industrial security (2. Chapter), National University of Public Service, 2013.
ISBN 978-615-5344-12-1.

Lectored publications in foreign scientific journals

Réka Magdolna Kirovne Rác, Tünde Bonnyai: Preparing and Educational Issues Related to the Hungarian National Environmental Protection Programme and Critical Infrastructure Protection; Journal on Law, Economy and Management, Vol. 4. / 2014. No. 1., pp. 87-92.
ISSN 2048-4186

Lectored publications in Hungarian scientific journals

Judit Mógor – Tünde Bonnyai: Methods and tools for public information of the disaster management system; Katasztrófavédelmi Szemle, Vol. 19. No. 3. pp. 11-14.
ISSN: 1218-2958

Tünde Bonnyai: On the way to the identification and designation of critical information infrastructures; Hadmérnök, Vol. 7. No. 2. pp. 90-105. ISSN: 1788-1919

Tünde Bonnyai: Critical infrastructure protection in the European Union - from the beginning to the present; Magyar Rendészet, Vol. 12. No. 1. pp. 132-137. ISSN: 1586-2895

Tünde Bonnyai: Effects of natural phenomena in the recent months on the operation of essential utilities; Műszaki Katonai Közlöny, Vol. 23. Special issue pp. 94-114.
ISSN: 2063-4986

Tünde Bonnyai: Critical infrastructure protection in the context of environmental principles and the civilian bombings connection points; Műszaki Katonai Közlöny, Vol. 23. No. 1. pp. 69-79. ISSN: 2063-4986

Tünde Bonnyai: Disaster-sensitivity of critical infrastructures; Műszaki Katonai Közlöny, Vol. 23. No. 1. pp. 204-223. ISSN: 2063-4986

Tünde Bonnyai: A possible method for preparing the public in the system of critical infrastructure protection; Hadmérnök, Vol. 8. No. 3. pp. 58-73. ISSN: 1788-1919

Tünde Bonnyai: Examination of preparing public in connection with critical infrastructures from the prospective of sectors providing essential services; Társadalom és Honvédelem, Vol. 17. No. 3-4. pp. 428-441. ISSN: 1417-7293

Lectored publications in Hungarian scientific journals in foreign language

Balázs Bognár – Tünde Bonnyai: The process of critical infrastructure protection; Academic and Applied Research in Military Science; Volume 8, Issue 3, 2009. pp. 499-513. ISSN 1588-8789

International professional's conference presentation

Tünde Bonnyai: Ensuring information for the public in connection with critical infrastructures; IV International Symposium „Engeneering Management and Competitiveness”, Zrenjanin, 20-21 June 2014. pp. 87-92. ISBN: 978-86-7672-224-2

Hungarian professional's conference presentation

Tünde Bonnyai: The impact of the economic and social crisis for the security of critical information infrastructures; Crisis and Security scientific conference 2009. TIT HABE, Budapest, pp. 69-77. ISBN: 978-963-88723-0-2

10. SCIENTIFIC-PROFESSIONAL BIOGRAPHY OF THE CANDIDATE

Name: Tünde Bonnyai
Birth date: 29 June 1986
Phone: +36-20/446-2639
E-mail: bonnyai.tunde@gmail.com

Education

2011 – National University of Public Service, Military Engineering Doctoral School (absolutorium: 28 August 2014)
2004 – 2009 Zrínyi Miklós National Defence University, Bolyai János Military Technical Faculty, Defence Administration Programme, Disaster Relief Spec.
2000 – 2004 Krúdy Gyula Grammar School

Professional experience

2013 – National Directorate General for Disaster Management, Ministry of Interior, Regulatory Coordination and Operation Analysis Department, senior desk officer

- 2012 – 2013. National Directorate General for Disaster Management, Ministry of Interior, Regulatory Coordination and Operation Analysis Department, officer
- 2011 – 2012. National Directorate General for Disaster Management, Ministry of Interior, National Civil Protection Inspectorate, officer
- 2009 – 2010. Municipality of Budapest, Office of EU Affairs, international administrator

Language skills

2007. English: advanced, combined (ARMA) military exam
2003. English: intermediate, combined (ELC) exam
2003. German: intermediate, combined (ORIGO) exam

Qualification

2012. „*Women in Law Enforcement Leadership Training Program*” leadership course
International Law Enforcement Academy

Professional Conferences

- June 2014 „*Ensuring information for the public in connection with critical infrastructures*”
IV International Symposium „Engineering Management and Competitiveness, Zrenjanin
- December 2013 „*Critical infrastructures...*”
SMART CIBER (System of Maps Assessing Risk of Terrorism against Critical Infrastructures in Big Events Rallies) Final Event, Budapest
- November 2013 „*Research questionnaire for the legal background of critical infrastructures and public information related to its protection*”
5th National Forum for PhD Students of Law Enforcement Sector, Budapest
- October 2013 „*Examination of preparing public in connection with critical infrastructures from the prospective of sectors providing essential services*”
„Serving Home Conference” – National University of Public Service, Budapest
- May 2013 „*Effects of natural phenomena in the recent months on the operation of essential utilities*”
„Security, Protection, Science” Scientific Forum – National University of Public Service, Budapest
- December 2011 „*The conceptual system, domestic and international regulation of critical infrastructure protection*”
Conference for Critical Infrastructure Protection – Police Academy, Budapest

November 2011 *„Critical infrastructure protection in the European Union - from the beginning to the present”*
3rd National Forum for PhD Students of Law Enforcement Sector,
Budapest

November 2009 *„The impact of the economic and social crisis for the security of critical information infrastructures”*
Crisis and Security scientific conference 2009. TIT HABE, Budapest

Budapest, 6 October 2014

Tünde Bonnyai