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AUTHOR'S OVERVIEW OF PHD DISSERTATION

COL (titular) JÓZSEF AMBRUSZ

Elimination of the consequences of disasters and the possible solutions of the command and control and engineering tasks of rehabilitation and reconstruction

Author's overview and official reviews of the above PhD dissertation

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SETTING THE SCIENTIFIC PROBLEM

Since its emergence, mankind has constantly been transforming its environment and striving to create a stable, secure environment, not only to protect its already acquired goods, but also to meet the growth-based needs. It strives to protect and reduce the impacts of dangerous natural processes, and avoid vulnerability. During its development process, it tried to create a safe built environment with increasingly sophisticated technological and technical solutions.

In the course of history, the state-consciously organized and regulated system and the disaster management system has gradually evolved in different ways, according to era and society.

In Hungary, as a result of recurring natural disasters in the past twenty years - mostly floods and inland waters, hurricane-like windstorms, heavy rainfalls, the homes of thousands of families have been destroyed or damaged. Creating the basic conditions of housing has often exceeded the possibilities of the victims and local communities. The governments of Hungary, following the most severe, widespread natural disasters, have often provided occasional support to local governments to support local residents who had suffered damage. The method of compensation and the support system had been previously regulated by individual government decisions and individual government decrees.

The decade devoted to this problem was characterized by a very active international professional and policy activity on natural disasters and related environmental and technological disasters. There are a number of international trends in the consequences of disasters that focus primarily on the impacts on health, the economy, society, and the built environment and nature.

One of the common features of international programs is that disasters do not provide a more unified opportunity for a comprehensive interpretation and methodology of disaster relief after disasters.

The processes of rehabilitation in Hungary can be considered as a structured system, as specific and unique processes in their evolution and method. They have been structured in a way that almost all the tasks of the sectoral ministries emerge, being specific to the response to the consequences of different natural and industrial disasters and being unique in bringing them to the legal level.

One major deficiency of scientific disciplines is that there are no chronological summaries of the consequences of the disaster recovery, their characteristics and results, which could be utilized in the different fields of science.

We can still count with natural disasters, with their increasingly significant impacts, so that massive damages may be caused in the foreseeable future, and it will require the state to be involved in creating the basic housing conditions for those without shelter.

Government Decree 234/2011 (XI. 10.) on the implementation of Act CXXVIII of 2011 on Disaster Management and on the Amendment of Relevant Certain Acts, adopted in 2011, expands the system of national protection, the tasks of the periods of preparation for, the response to and the recovery after disasters.

It is therefore a regulation filling up a gap, with regard to the framework-specific provisions that have been adapted to the specific incidents that have replaced the individual decision-making practice so far. The technical solution supporting damage assessment, which defines the basis for compensation, has not yet been studied, the lack of this technical solution may slow down the pace of granting aid and the preparation of decisions. The reason for the different procedural protocols following incidents is often complicated by the related conceptual definitions.

The lessons learnt from the recent years of rehabilitation and reconstruction are available, which, based on evaluations, identify the following scientific issues in the field of methodological research and development of procedures to improve the effectiveness of disaster management:

1. Examining and standardizing the consequences of disasters, the legal and institutional system of rehabilitation.
2. The systematic summary of post-disaster rehabilitation.
3. Optimizing the technical support of damage assessment that determines the basis for compensation.

Research objectives, hypotheses and scientific achievements can be formulated along the three scientific problems below.

RESEARCH OBJECTIVES

The research objectives can be formulated in the three research subfields, already mentioned in the determination of the scientific problems:

1. In the field of investigating and standardizing the consequences of disasters, the legal, institutional and instrumental system of rehabilitation:

To review and analyze the consequences of disaster recovery, command and control and organization in the vertical and horizontal system of rehabilitation, to formulate suggestions for optimizing recovery processes, because the structure of rehabilitation tasks can be established, its research makes the use of the established regulation more complete.

2. In the field of systematic summary of disaster recovery:

To review, analyze and organize, case-by-case, the scenarios and operational models of severe natural and man-made damages in Hungary in order to develop a uniform use of law in the light of current regulations.

3. In the field of optimizing the technical support of damage assessment, determining the basis of mitigation:

To develop a basic framework for a large-scale data capture and data processing subsystem in order to optimize faster, more accurate and more consistent damage assessment, and to formulate a solution proposal for coordinating the scattered damages across large areas.

RESEACRH HYPOTHESES

1. In the author's opinion, the order of operation of the complete rehabilitation can be determined by the operational order of the emergency and disaster risk. The involvement of a professional disaster management organization in the recovery tasks has been strengthened, giving the organization a significant role in the coordination and enforcement tasks. Emergency planning frameworks can be used to manage the elements of the preventive intervention and rehabilitation processes in a unified system.

2. In the author's opinion, the application of the rehabilitation methods and technical solutions used so far, their lessons learnt, the results and the conclusions that can be drawn from them can be incorporated into the system, and the lessons learned from them can be utilized in solving practical anomalies in later methodologies.

3. The author's view is that the process of assessing damages that had been used to compensate for the damages occurred since then can be optimized with IT and GIS solutions, which, at the same time can provide a solution for the use of an integrated data capture and processing subsystem that would optimize the damage assessment of buildings.

RESEARCH METHODS

In order to achieve the set goals, the author has studied the relevant international and domestic regulations and literature. The research and development of the topic and the processing of the literature have used general research methods such as analysis, synthesis, induction and deduction.

The following specific research methods were used in the development of content chapters according to the research plan:

- a) Preparation of partial summary studies to evaluate and optimize the legal, institutional, procedural and tooling system of rehabilitation.
- b) Evaluation of domestic and international publications, legal regulations, documents of operation, legal documents.
- c) Comparison in the field of rehabilitation and technical testing to optimize the assessment of damages.
- d) International, regional, data reporting and other documents, records, databases, methodological guidelines issued in the context of disaster relief.
- e) Reports and protection plans, results, internal disaster management regulations, methodological aids, databases, prepared by the Ministry of the Interior (MOI) and the National Directorate General for Disaster Management, MOI.
- f) Relevant international and domestic military technical literature and studies, with particular reference to scientific publications on the subject.

THE CONCISE DESCRIPTION OF THE INVESTIGATIONS CHAPTER BY CHAPTER

In **chapter I**, the author reviewed and analyzed the competencies, command and control tasks, and the system of relationships of those who are in the vertical and horizontal system of disaster management and coordinating the rehabilitation efforts. He investigated the relationship between rehabilitation and reconstruction, mapping the tasks of the recovery periods. He structured the

damaging impacts to buildings and contrasted them with typical building damages.

The main objective of **chapter II** of the dissertation was to review, analyze and organize the case-by-case processes and operational models of the major natural and man-made damages in Hungary in order to develop a uniform use of law in the light of the current regulations. In order to achieve this goal, the author mapped the methods and tools used to eliminate the consequences of disasters. In doing so, he has systematized the actions and methods applied to harmful incidents.

In **chapter III** of the dissertation, the author reviewed the requirements for the assessment of damages and, as a technical solution, elaborated the basic framework for data capture and data processing applications for damage assessment.

SUMMARIZED CONCLUSIONS

I. To investigate, unify and develop the legal and instrumental system for rehabilitation of the consequences of disasters

1. The author stated that the regulation of rehabilitation and reconstruction provides a more transparent basis for mitigating damages than before, but besides the more correct regulation, self-care and increased responsibility of the population should also be encouraged.
2. Due to today's building-licensing procedures, more resilient residential buildings are built, but the composition of the housing infrastructure in Hungary is extremely diverse, and experience shows that there are a large number of inadequate or inadequately stable or solid residential buildings. Designers and construction companies involved in central repairs have built more resilient buildings against disasters;
3. Taking into account the practical experience of the past years, the author has determined that in the case of individual rehabilitations, the determination of the accelerated procedure deadlines avails of a full opportunity. Conducting the official procedures necessary for the commencement and continuation of construction activities, non-demolition licensing, commissioning and demolition procedures, with accelerated procedure deadlines, should be given more governmental coordination.
4. In the author's view, disaster impacts should continue to be taken into account, so mass damages can be caused in the foreseeable future, justifying the state's role in establishing the housing conditions for those without shelter.

5. The author stated that the completely new and detailed regulation is a new division of tasks between state and local government actors - with the new actors in the reform of public administration, government offices - but it is important to state that there has not been such a natural disaster that would have given a way to try the new legal and jurisdictional instruments.

6. On the basis of the author's assessment, the impact of construction needs, due to the devastation by major disasters in the architecture, is also related to the consequences of fundamental social transformations. As long as a new social group with a new role develops a new style by its construction, it can create massive post-disaster construction efforts to spread styles and trends. So, in the normal period, the change in the needs of many people triggers large-scale constructions to be carried out within a relatively short period of time, and there more needs to build after a disaster, as old buildings would be damaged or destroyed. The governments of Hungary had preferred high-technology buildings, adapted to the Hungarian architectural image, which are not be replaced by other materials or technologies or building standards.

7. Taking into account the damages compensated by insurance was a logical and justified decision in order to avoid duplicate support, but, at the same time, the owners with insurance had received less favorable support due to the possible misinterpretation by the local governments. This can adversely affect the insurance willingness of the population and the potential victims. Remarkable solutions have been chosen to partially resolve the resulting tensions by municipalities that provided the difference between the actual recovery cost and the amount paid by the insurance company to the insured only as a non-refundable subsidy, while the non-insured have to be reimbursed at a rate of 50-50% non-refundable housing support.

II. In the field of systematic summary of post-disaster recovery operations

1. The author, based on chronological order, systematized the recovery events requiring government decision in Hungary, and the precedents of the incidents that triggered the rehabilitation tasks by defining the situation and the elements of investigation of the measures taken. He found that the disaster management organization has been playing an increasingly important role since 2000 in the elimination of incidents that have occurred and in the process of rehabilitation.

2. The author found that in Hungary, in the two decades examined, there were basically three types of rehabilitation and reconstruction methods. In terms of applied human, business and technical solutions, on the one hand, construction was carried out centrally organized and, on the other hand, supported by local governments, and on a case-by-case basis in the decision-making

competence of local governments, based on the procedure conducted by the notary. In the elimination of the consequences of disasters, the Hungarian system of rehabilitation and reconstruction - in all three forms - proved to be successful. In the course of the activities, an organizational system has been established that is able to coordinate the state - municipal - social resources.

3. The processes that induce rehabilitation were the preventive impacts and the factors that triggered a disaster - with the exception of an incident - during the course of one study - due to the impacts of the forces of Mother Nature. So, because of the extremities of climate change, international cooperation, including regional cooperation, needs to be strengthened. This may be relevant for rehabilitation in the case of possible EU grants.

4. From the time of the incidents in 1999, but also during the relief of the owners of residential properties built in 2002 with the use of Martin slag following the Cserehát extreme rainfalls, it was already possible to witness a lack of resources for the management of the additional costs of rehabilitation for the municipalities of the small settlements concerned. The work of local governments was hampered by the lack of legal and technical conditions. This shortage occurred both in the organization of damage assessment and in the organization and control of rehabilitation - mainly in small settlements - due to the lack of trained professionals (construction specialist, notary), which was compensated by the help of the experts of county level organizations involved in commission work.

5. As a result of incidents, it has become justified and accepted that the compensation may only cover, on a case-by-case basis, municipal properties serving the purpose of residence or fulfilling mandatory tasks. The financial support provided by the state did not cover the rehabilitation of non-residential buildings.

6. The author stated that the emphasis should not have been on financing rehabilitation and reconstruction, as costs often increased the value of the necessary preventive investments by nearly 70%. Restitution could not be unilaterally emphasized from a system of prevention - intervention – recovery, based on each other. Complex solutions could only be developed by taking into account all inputs and by examining the impact of funding each element compared to all other elements. By preferring prevention protection and recovery costs can be reduced.

7. Effective and lawful use of public funds requires a continuous comparison of recovery and support databases in order to avoid paying back grants from two or more sources.

III. In the field of optimizing the engineering support of damage assessment that determines the basis of mitigation

1. Based on the experience of previous damage assessments, the author found that the assessments of scattered damages over large areas were implemented in a differentiated manner. One of the typical reasons for this was that the time period of the damage assessment was also different in several cases. For a more uniform application of the law, he has developed a solution proposal to better coordinate the organizational tasks of surveys, using the framework of a solution already in practice.
2. On the basis of the author's examination, no information sub-system has been used in the past to immediately assess buildings and to handle damage data in a uniform manner, and these data had been processed several times, thus giving rise to more errors.
3. The theoretical framework of the data subsystem for data capture and data processing for large scale damages has been elaborated by the author, which provides a faster, more accurate and uniform application that can increase efficiency.

NEW SCIENTIFIC ACHIEVEMENTS

Based on the hypotheses and the objectives of the dissertation, the author **proposed to accept the following new scientific results:**

1. **I have elaborated** a specific proposal for system development through the critical analysis and evaluation of disaster consequences and the critical analysis and assessment of the legal, institutional and instrumental systems of rehabilitation and reconstruction, and as part of this, to determine the exact amount of support needed for non-centralized rehabilitation and reconstruction.
2. Based on the identification of the methods and tools used in disaster relief and the systematization of the measures and methods used in the event of harmful events, **I have proved** that disaster incidents and the lessons learned from them are also the starting points for an action on the social, economic, law enforcement components of security and content elements of programs. These components also cover the safety and security of engineering facilities to determine the vulnerability associated with the topic.
3. After analyzing and evaluating the legal and technical tools for disaster damage assessment, **I have elaborated a** theoretical **proposal** for an effective application of the decision-support IT subsystem, called the Single Notification and Labeling System, together with the GIS

solutions for accurate mapping of the consequences of disasters in Hungary and the recovery period.

RECOMMENDATIONS OF THE DISSERTATION

1. The investigation, unification and development of the consequences of disaster management and the legal and institutional system related to rehabilitation can be utilized in the law enforcement activities of professional disaster management organizations. The operational sequence of recovery can be integrated into emergency planning. Systemizing the damages can be improved to reduce the impacts of disasters.
2. The analysis and systematic summary of the rehabilitation of severe natural and man-made incidents in Hungary can play a significant role in the legal and technical solutions of future damage mitigations, as a basis for the development of legal regulation.
3. The implementation and development of the technical support of damage assessment that determines the basis of compensation or mitigation can be an innovative solution in the damage assessment process. The principles of assessing the mass damages caused by disasters can be used to optimize the distribution of damage assessment teams in the case of large scale damage assessments.

PRACTICAL USE OF RESEARCH ACHIEVEMENTS

1. Investigation, unification and development of the consequences of disasters, the legal and institutional system of rehabilitation, the optimization of the technical support of damage assessment, which determines the basis of the compensation or mitigation, the compensation of private property owners, the organization of rehabilitation tasks, the disaster management and civil protection tasks.
2. The systematic summary of post-disaster recovery, some conclusions and results of the dissertation can be used to determine the direction of future research and development.
3. The different parts of my dissertation can be used in the preparation of disaster management and civil protection notes, educational aids, professional descriptions in higher education institutions, and in the training system of professional disaster management bodies.
4. After restructuring, my dissertation can be used as notes and as educational aids at the Disaster Management Institute of the National University of Public Service, the Disaster

Management Training Center and other higher education institutions, as well as at other professional disaster management education institutions.

LIST OF PUBLICATIONS

REVIEWED BOOKS, TENDERS, NOTES (ONLINE AS WELL)

In foreign language periodicals abroad

- [1] Ambrusz, József: The system of recovery (rehabilitation) in Hungary following natural disasters. In: Andrea Peterkova (edited) Riešenie krízových situácií v špecifickom prostredí: 19. medzinárodná vedecká konferencia, 21.-22. máj (2014) Žilina: zborník 1. časť. p. 264 ISBN 978-80-554-0872-9
- [2] Ambrusz, József: An overview of disaster preparedness training in Hungary, with special regard to public administration leaders. In: Konferencia Szervezőbizottsága (edited), 11th International Conference on "Environmental Legislation, Safety Engineering and Disaster Management" Elsedima: Building Disaster Resilience in a Changing World (Book of abstracts). p. 199 p. Place and time of the conference: Kolozsvár (Cluj Napoca), Romania, 26-28 May 2016, Kolozsvár (Cluj Napoca): Babes-Bolyai University, Faculty of Environmental Science and Engineering, 2016, p. 11. ISBN 978-606-93873-1-3

In Hungarian language relevant periodicals in English

- [3] Ambrusz, József: The Hungarian System of Reconstruction and Recovery Tasks Following Natural Disasters. In: NISPAcee (edited) Government vs. Governance in Central and Eastern Europe: From Pre-Weberianism to Neo-Weberianism? Presented Papers from the 22nd NISPAcee Annual Conference. The place and time of the conference: Budapest, Hungary, 22-24 May 2014, Pozsony (Bratislava): NISPAcee, 2014, pp. 1-19. ISBN 978-80-89013-72-2

In Hungarian language relevant periodicals in Hungarian

- [4] Ambrusz, József, Muhoray, Árpád: A 2001. évi beregi árvíz következményeinek felszámolása, a kistérség rehabilitációjának megszervezése. VÉDELEMTUDOMÁNY: KATASZTRÓFAVÉDELMI ONLINE TUDOMÁNYOS FOLYÓIRAT I: (1) pp. 108-125. (2016) ISSN 2498-6194
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- [6] Ambrusz, József, Muhoray, Árpád: A vörösiszap-katasztrófa következményeinek felszámolása, a keletkezett károk helyreállítása. BOLYAI SZEMLE XXIV: (4) pp. 67-85. (2015) ISSN 15888789

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- [8] Ambrusz, József: A természeti csapásokat követő helyreállítás rendészeti aspektusai. In: Gaál, Gyula, Hautzinger, Zoltán (edited) *Modernkori veszélyek rendészeti aspektusai.* p. 380, Pécs: Magyar Hadtudományi Társaság Határőr Szakosztály Pécsi Szakcsoport, 2015, pp. 97-103. *PÉCSI HATÁRŐR TUDOMÁNYOS KÖZLEMÉNYEK;* 16. (2015) ISBN:978-963-12-3927-0
- [9] Ambrusz, József, Endrődi, István, Pellérdi, Rezső: A katasztrófák következményei felszámolásának vezetés-irányítási rendszere, *HADMÉRNÖK XI:* (1) pp. 64-78. (2016)
- [10] Kiss, Alida, Ambrusz, József: A vörösiszap következményeinek felszámolása, a keletkezett károk helyreállítása. In: Takácsné, György Katalin (edited) *Innovációs kihívások és lehetőségek 2014-2020 között: XV. Nemzetközi Tudományos Napok.* p. 1704, Place and time of the conference: Gyöngyös, Hungary, 30-31 March 2016, Gyöngyös: Károly Róbert College, (2016) pp. 845-853. ISBN:978-963-9941-92-2

Foreign language presentations

- [11] Ambrusz, József: The Hungarian System of Reconstruction and Recovery Tasks Following Natural Disasters In: NISPAcee (edited) *Government vs. Governance in Central and Eastern Europe: From Pre-Weberianism to Neo-Weberianism? Presented Papers from the 22nd NISPAcee Annual Conference.* The place and time of the conference: Budapest, Hungary, 22-24 May 2014, Pozsony (Bratislava): NISPAcee, 2014, pp. 1-19. ISBN 978-80-89013-72-2

Hungarian language presentations

- [12] A természeti csapásokat követő helyreállítás magyarországi rendszere In: Kiss, Dávid, Orbók, Ákos (edited) *“A HAZA SZOLGÁLATÁBAN” 2014 konferencia rezümékötete.* p. 170. The place and time of the conference: Budapest, Hungary, 31 Oct 2014, Budapest: National University of Public Service, 2014, pp. 56-57, (ISBN:978-615-5491--88-7)
- [13] Ambrusz, József: A természeti csapásokat követő helyreállítás katasztrófavédelmi aspektusai. Hungary, “A HAZA SZOLGÁLATÁBAN” konferencia, 06 Nov 2015.

PROFESSIONAL-SCIENTIFIC CV OF THE DOCTORANDUS

Name: József Ambrusz

Place and time of birth: Gyöngyös, 13 October 1969

Formal studies:

Higher education: He graduated from the Kossuth Lajos Military Academy with Border Guard Specialty in 1993, where he obtained Border Guard Officer and Boarding School Teacher.

In 1997, he obtained human manager degree at the Budapest University of Economics.

Between 2012 and 2014, he studied at NUPS, MSc Defense/Protection Administration and graduated with a Defense/Protection Administration Leader degree, on the disaster management branch.

Between 2014 and 2017, he studied at the Military Technical Doctoral School of NUPS.

Languages: advanced degree in Russian, basic degree in English, both oral and written language examination certificates.

Career:

Since 1993, commissioned officer. Different posts fulfilled at the Hungarian Border Guards and National Directorate General for Disaster Management (NDGDM) and at its legal predecessor. Served as a trainer officer between 1994 and 1999 at the Border Guard Department of the Kossuth Lajos Military Academy, where, in 1998, he obtained the title “assistant professor”.

Between 2000 and 2002, served as a senior desk officer at the Legal and Administration Department, NDGDM.

In 2002 and 2003, he was the deputy head of the Department for Coordination and the head of Section for Rehabilitation and Reconstruction, NDGDM.

Between 2003 and 2006, he was the deputy head of the Department for Local Governments and Rehabilitation and the head of the Section for Public Awareness.

Between 2006 and 2010, he was the head of the Department for Local Governments and Rehabilitation, NDGDM.

In 2010 and 2011, he was the head of the Department for Communication, NDGDM.

In 2011, he was the deputy head of the Department for Organization, Inspectorate General for Civil Protection, NDGDM.

Since 2012, university instructor at the Disaster Management Institute of NUPS.

Awards: Service Sign to recognize his 10 years of service and successful achievements as a commissioned disaster management officer. In 2010, he was awarded the title of Civil Protection Counselor.

In recognition of his successful professional work in the field of internal affairs and as an instructor, he has received numerous honors.

Budapest, 12 May 2019

József Ambrusz