THE AUTHOR'S SUMMARY OF HIS DOCTORAL (PHD) DISSERTATION

Doctoral Council
UNIVERSITY OF PUBLIC SERVICE

ANDRÁS TÓTH, LIEUTENANT COLONEL

The author's summary of his doctoral (PhD) dissertation

A study of incidents related to hydrocarbon processing from a disaster management aspect; investigating sophisticated strategies and up-to-date options to prevent such incidents

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DOCTORAL SCHOOL
FACULTY OF MILITARY SCIENCES AND OFFICER TRAINING
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A study of incidents related to hydrocarbon processing from a disaster management aspect; investigating sophisticated strategies and up-to-date options to prevent such incidents

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THE DEFINITION OF THE SCIENTIFIC PROBLEM

Based on my previous experience and research, examining the causes of industrial accidents, I found that the human factor also played a role in a large percentage of cases. To formulate the exact scientific problem, I built on my authoritative and fire investigation knowledge, my practical experience in various fields and my IT knowledge. I studied the technologies and methods used in hydrocarbon operations on a scientific basis. I found that an even higher level of control of oxygen displacement technological processes and the need to increase the efficiency of safety management systems (hereinafter: BIR) are needed. The safety of future hydrocarbon activities can be achieved by using the sophisticated achievements of the 21st century and by preventing hazardous, accident-causing conditions due to human negligence. I analyzed the periodic industrial safety regulatory investigations and BIR in terms of their ability to prevent accidents on their own. After a scientific elaboration of foreign literature, I came to the conclusion that the causal relationships of the hydrocarbon industry accidents are not the same.

Efficient practical experience should be tested and, if in compliance, be made suitable for utilization in order to make hydrocarbon processing in Hungary safer. I consider it necessary to focus on the prevention of incidents at thousands of closed and hundreds of still operating and dangerous oil and gas wells due to the new challenges of the hydrocarbon industry in the future, and on even more effective fire investigations of accidents taken place.

The development of fire investigation procedures is closely related to the development of industrial safety incident site investigations, as both activities take place at the same time and place, but due to the shifted time planes used so far, participants (client, witness) faced issues conducting multiple and time consuming investigations.

Based on my resolution, it would be expedient to develop an online interface, where the onsite investigations of industrial and hydrocarbon industries would be carried out jointly by the personnel of the disaster management experts in order to implement more effective detection. An extended multi-member committee can increase the efficiency of investigations and greatly reduce the time for primary onsite investigations. During the management of hydrocarbon industry incidents, those performing service at the County Disaster Management Main Duty Office Section (Head of the Duty Office, senior duty officer, operations controller) must have adequate professional knowledge, routine and aptitude to be able to alert the firefighting vehicles and response personnel, the cooperating services and experts appropriate to the given incident to manage the incident and mitigate the aftermaths thereof as soon as possible

The decision support of those involved in the disaster management operations control can be enhanced by creating a Hungarian and later international database of hydrocarbon incidents and by digitally mapping their data, interlinked to their currently used online operational map. I believe

that by knowing the causes of the incidents shown on the map, more accurate and better decisions can be taken, so, that one can prepare more efficiently for future disasters. There is currently no online system between hydrocarbon plants and the disaster management to warn of plant malfunctions, thereby increasing public safety, the creation of which I consider to be justified.

A plant's BIR can be used to increase safety, and incident management could be started immediately with an alarm signal sent to the disaster management system on the malfunction. At the international level, the development of the Hungarian fire investigation system lags slightly behind the countries that possess and apply the latest technical achievements. Improving the efficiency of the disaster management fire investigation system in relation to industry, including the hydrocarbon industry, is timely due to the rapid development of information technology. The personnel of the disaster management operations service performing fire investigations (hereinafter referred to as KMSZ) should be given the opportunity to apply the same technical innovations and achievements of the Internet of Things (IoT) that are already used on a daily basis in more developed countries. They should become acquainted with the tools, expand their knowledge in this field as well, so, that in addition to investigating simple fires, they can also use their knowledge to discover the cause of accidents in the hydrocarbon industry.

With regard to hazardous plants, the industrial safety field of the Hungarian disaster management system examines the hazards, impacts, the compliance of internal emergency plans and external emergency plans (hereinafter: KVT), based on Act CXXVIII of 2011 on disaster management and the amendment of certain acts in relation and on Government Decree 234/2011 (XI. 10.) issued on the implementation of the provisions of Act CXXVIII of 2011 on disaster management and the amendment of certain acts in relation. That is why it is important to develop and update technological instructions and an up-to-date inventory of hazardous substances used and processed. It is important that the mayors of municipalities regularly exercise KVTs under the supervision of civil protection, preparing the population for the hazards associated with industrial and hydrocarbon plants.

To sum up, the basis of the scientific problem is that we know a part of the dangers of hydrocarbon activities. To ensure safe operation, the possibilities for accident prevention must be increased. Reliable incident management can be based on learning about past incidents and how they came about. The effectiveness of fire and industrial safety onsite investigations can be increased by linking the investigations. I am convinced that an effective way to prevent accidents is to work together with disaster management and the hydrocarbon industry, using modern IoT, GIS, laser scanning, and virtual reality (VR) and mixed reality (MR).

RESEARCH HYPOTHESES

1. **I hypothesize** that hydrocarbon industry and processing activities can be made safer by scientifically proving the causes fires during the processes. The prevention of the formation of pyrophoric phenomena can be prevented by removing one of the elements of the fire tetrahedron, the fusion leading to annealing can be ruled out
2. **I assume** that the hydrocarbon industry and processing incidents can make disaster prevention and operational intervention more effective once they are listed in a database. By displaying the individual incidents in the GIS system, the decision support of the specialized fields can be improved and safety improvements can be initiated.
3. **I assume** that the development of hydrocarbon fire investigations can incur and significantly influence fire investigations, as well as related and parallel industrial safety incident onsite investigations.
4. Based on my **assumption**, the accident-free operation of disaster management and partner authorities, as well as the hydrocarbon industry and processing plants requires that they have appropriate IT tools, programs and technological descriptions. Interconnecting their IT systems and using new, more advanced applications can reduce the risk of human error.

RESEARCH OBJECTIVES

1. **I examine** the Hungarian and international legal environment regulating the field.
2. **I review** the publications of Hungarian and international researchers, I examine the possibility of transferring international successful lessons learnt to the Hungarian system.
3. **I explore** the causes of explosions and fires that occur during hydrocarbon processing, I study the possibilities of their prevention, I describe the procedure that prevents their formation.
4. **I collect** the data related to the incidents of the hydrocarbon processing in a planned way, then I process, analyze and publish the results in the form of publications in accordance with the established system of rules, and I present the results.
5. **I demonstrate** the possibilities of the development of the fire investigation system of disaster management related to hydrocarbon processing, in this connection I assess the competencies of the KMSZ fire investigators related to professional and fire investigation equipment.
6. **I study** the complex and multifaceted fire, industrial safety, and civil protection guidelines for hydrocarbon processing, as well as the usability of external and internal protection plans for hydrocarbon plants.

7. As a decision support option, **I create** a database related to the Online Operational Map - micro-region, the narrower and wider Hungarian region, later the incidents of foreign hydrocarbon processing - and **I prove** its usability and necessity.
8. **I examine** the basics of the online interconnection of the safety management system of the hydrocarbon processing activity and the disaster management systems along the possible safety risks and data protection principles.
9. **I analyze** with an online questionnaire survey the thoughts of the special fields of disaster management and those working in the hydrocarbon industry, as well as the personnel of the partner authority, on the prevention of accidents in the hydrocarbon industry.
10. **I investigate** the impacts of all three waves of the Covid-19 virus on the safety of the hydrocarbon industry and processing, especially the loss of human resources, and the interaction of the decrease in the number of investigations on the disaster management system.
11. **I study** the basics of the industrial safety accident onsite investigation together with the fire onsite fire investigation, the possibility of supplementing the fire investigation committee with an industrial safety specialist in the case of industrial and hydrocarbon incidents.

RESEARCH METHODS

1. **I investigated** the hydrocarbon formation, mining, transportation, storage, processing chain. After getting to know the perspectives of the hydrocarbon industry, I analyzed the related chemical and petrochemical processes in order to better understand the relationships.
2. **I processed** the significant Hungarian incidents, after the disaster management approach investigation **I evaluated** them from the aspect of fire investigation, technical safety and industrial safety, then **I drew conclusions** with an inductive method.
3. **I researched** the relevant Hungarian and international legislation, legal organization regulatory instruments, guidelines, the related discussion materials, and I was acquainted with the arguments from different aspects.
4. **I studied** many Hungarian and foreign literature, regulations, measures, instructions related to disaster management and the hydrocarbon industry.
5. **I collected** the experience of individuals in the form of empirical polls, electronic and online questionnaires. I examined and analyzed the answers of the questionnaires from the scientific approach of the analysis-synthesis system, and then I drew my conclusions using the method of deduction.

6. **I involved** Hungarian and foreign operators of the hydrocarbon industry, those working in the fields of disaster management, and the experts of the Measurement and Safety Department of the County Government Offices (hereinafter: MKMBO) in my research work.
7. Based on the professional knowledge of the **empirical research**, I used my observations related to the fire safety and industrial safety official investigations, technical safety installations and the professional examination carried out in the hydrocarbon industry plants.
8. **I interviewed** the relevant experts of the hydrocarbon industry, the experts related to the topic in various ways (in person, electronically), I conducted a structured interview with the Deputy Head of the Eruption Protection Group of the Hungarian Oil and Gas Public Limited Company. (Hereinafter: MOL Plc.)
9. Applying **disclosure**, I presented my research results in the form of Hungarian and foreign publications, conference presentations, research reports.
10. In order to **exchange views between researchers**, I also participated in online scientific conferences in Hungary and abroad. I used Google Scholar, Mendeley, Academia.edu, and other research community networks to study new publications related to my topic and to share my own results.
11. **Taking advantage of the "pre-announcement" opportunity**, I have previously presented my publications on the Research Gate research community network in order to receive feedback, criticism, and ideas from my fellow researchers about what has been described before publication.

BRIEF DESCRIPTION OF THE PERFORMED STUDY CHAPTER BY CHAPTER

1. Investigation of hydrocarbon incidents

In Chapter 1, as an introduction to the investigation of incidents, I presented the structure of disaster management. The formation and characterization of the physical properties of organic hydrocarbons introduced the causes of explosions and fires in storage tanks. Based on the formation of pyrophoric phenomena and the chemistry of explosions, I prepared an improved version of the classical fire triangle to present the fires of hydrocarbon processing. I supplemented the fire tetrahedron previously described with the help of mathematical models with a flaming sphere in it to better illustrate the pyrophoric phenomena. At the end of the chapter, I made an international outlook, examining the damage cases based on the most important foreign literature.

2. Hydrocarbon Incident Database

In Chapter 2, I presented the development of the Hungarian hydrocarbon industry. I examined the guidelines for managing emergencies and preventing accidents. I processed the incidents of hydrocarbon mining, well eruptions and their elimination, and I systematized the possibilities of the protection and development of well eruptions. In my research, I created a database of hydrocarbon incidents, uploaded it, and displayed it in a GIS. At the end of the chapter, I analyzed the possibility of developing a decision support system for disaster management.

3. Development opportunities for fire investigation in the hydrocarbon industry and processing

In Chapter 3, I presented the fire investigation system of Hungary, the evaluation and development of fire investigations with the help of a questionnaire survey method. In the next part of the chapter, I proposed the modernization of fire protection education and training, and then I presented the possibilities of modernizing fire investigation tools and equipment. I continued with the description of the electronic protocols and the prepared fire generation table. I presented the possibility of designing and fire investigation of hydrocarbon facilities with 3D devices. Finally, I explored the benefits of using VR in firefighting and fire investigation training.

4. Evaluation and presentation of the questionnaire survey

In Chapter 4, with the involvement of Hungarian and foreign, as well as disaster management personnel, I examined the possibility of developing and making safer accident prevention with the help of a questionnaire survey method.

From the results after processing, I concluded that I have received confirmatory answers to my assumptions. The online questionnaires were well structured and worked well. The English and Slovak questions were understood by foreign responders with the exception of one question. Based on the answers of the responders, I concluded that IoT devices, which have become part of disaster management and operate in the hydrocarbon industry, are components of everyday life, their further development and interconnection promotes safe operation.

SUMMARY CONCLUSIONS

1. Incidents related to the hydrocarbon industry and processing have highlighted the importance of prevention and the accidents that occur to date due to human error in technological processes. From an industrial safety point aspects, despite the regulation of technological processes and the appropriate working methods, damage caused by unexpected processes can occur at any time as a result of low-probability events (HILPs). Various specialized fields of disaster management conducted investigations, revealed the possible causes of accidents and injuries, which in turn arose from certain deficiency.

2. When examining tank explosions, with regard to the residual oxygen content of the air space of the equipment and tanks, it can be stated that the amount of oxygen reduced to less than 3% by volume in the closed spaces of the tanks can promote pyrophoric iron sulfide formation, which can lead to explosions. Bitumen with a high sulfur content is more likely to react. The two free radicals of the oxygen molecule want to be linked to reach a stable state. I supplemented the 3D fire tetrahedron previously described using mathematical models with a flaming sphere in its center to better illustrate pyrophoric phenomena.

3. Fire investigation of hydrocarbon industries and processing plants requires higher quality and skilled work. Support for fire investigation teams with no architectural knowledge is required, with the involvement of suitably qualified official administrators, in the dynamic phase of the investigation and at a later stage of the fire investigation, in order to improve efficiency and accuracy. When investigating the fires of hydrocarbon plants and processors, the head of the investigation committee should be the fire engineer, chemist, mechanical engineer who has previously conducted research and gained experience in this field.

4. Fire investigation activity is an important part of a complex system of disaster management. I state that in order to share the knowledge of the fire investigation results of the regional bodies online, as well as to develop the competence, it would be expedient to create a Fire Investigation Experience Database to study the fires and get to know the practical experience. Following the GIS display of the locations, it is also suitable for detecting correlations with a series of arson involving several counties or a technically defective product causing a fire, based on the circumstances, time and characteristic data of the fire.

5. During the fire investigations, I proposed to include the use of a Fire Table in the e-investigation application, which, in my opinion and professional experience, would help the work of fire investigators, further develop fire investigation activities and provide national statistics to the experts participating in the investigation.

6. I presented the achievements of the Fourth Industrial Revolution and 3D technologies, in particular the possibility of involving VR and AR, spectacles and gloves, MR technologies, and MI for fire investigation of hydrocarbon industry and processing incidents.

7. The research of the disasters of the hydrocarbon industry and processing in Hungary, organizing them into a database, and organizing the events seemed like a task to fill the gap for me. After studying the incidents, it became easier to understand the causes. Disaster management concepts make it easier to prepare for prevention and easier to deal with incidents. It is a novelty that I was the first to create a database from the collected hydrocarbon industry and processing incidents in Hungary, in which it is now possible to search and systematize, and the processed data are suitable for further research.

8. From the detailed description of the events arranged in the database, the errors of the past can be learned and analyzed. From the lessons learned from the causes of accidents, the likelihood and impact of subsequent accidents can be further reduced, laying the foundations for a safer hydrocarbon industry of the future. Damages can be queried and displayed on the GIS interface of disaster management. The GIS map of disaster management can be expanded with additional layers, it can be presented after processing and retrieving the database of natural and industrial disasters discovered in the earlier stage of my research, as well as the local database of recently completed water damages. The total disaster risk of Hungary could be displayed in the GIS due to the richness of the database.

9. The basics of fire and industrial safety investigations are the same, they are carried out in one place in space and time, in the area of the hazardous industrial plant affected by the incident. Their purpose is similar; both subject to further investigation of the damage and the circumstances in which it occurred after the findings of the onsite visit were recorded. In the initial phase of the investigation, fire investigators and special field supervisors (firefighting, industrial safety) could form a more effective joint investigation by forming a four-member committee.

10. After evaluating the questionnaire survey on Covid-19 virus, I concluded that disaster management, co-authority, law enforcement capabilities, and the Hungarian and foreign hydrocarbon industry and processing have been and will be affected by this global viral situation. The waves of infection generated by different variants of the virus precede control strategies, cause many human casualties and financial burdens for the economy of Hungary, Europe and the world, and also have a negative impact on the hydrocarbon industry.

NEW SCIENTIFIC RESULTS AND THESIS

1. Starting from the investigations, I highlighted and deduced the development of pyrophoric phenomena occurring during bitumen processing and the possible ways of their prevention among the most typical causes of fire. I proved the dangers of pyrophoric phenomena and the causal relationships of the resulting explosions and fires during the investigated hydrocarbon processing.

2. Based on the research, I created an online Hungarian database of hydrocarbon industry incidents, which I displayed on the GIS interface of disaster management in order to facilitate decision support. The database can become a tool for individual development with a full presentation of incidents. According to the needs of the specialized fields, the creation of additional new databases for each type of disaster can be used to display industrial accidents, natural disasters and water damages. To illustrate the steps required to achieve the highest operational safety of industrial and hydrocarbon facilities, I have prepared a circular arrow diagram to make the hydrocarbon industry and processing safer.

3. Following the analysis of the specialized field, I prepared the methodological, tool and IT development of the hydrocarbon fire investigations, as well as the concept of fire engineer training. By connecting the fire investigation and industrial safety onsite investigations to the e-investigation application, a significant increase in performance can be achieved, it is also important to implement the possibility of offline use. In order to increase the efficiency of the detection of the causes of fire, I used a Fire Table, and I established that a qualitative and quantitative improvement could be expected by integrating the e-investigation into the application. Online sharing of fire investigation results can be used not only to demonstrate experience, but also to filter out a series of arson and defective fire-causing products.

4. Based on the evaluation of the questionnaire survey, I proved the necessity and development needs of the industrial application of BIR and IoT devices. I supported the advantages of the development, operation and connection of industrial and hydrocarbon industry incidents and the control system free from human errors and decisions, as well as the processes planned and controlled by the error avoidance system. I pointed out the dangers of aging the hydrocarbon industry professionals and the waves of the Covid virus.

RECOMMENDATIONS

In my dissertation, I presented the past and the present of the Hungarian hydrocarbon industry and processing and outlined its future. I investigated the connections between mining, transportation, processing and storage from the perspective of physics and chemistry, looking for a solution for the effective prevention of hydrocarbon incidents. I collected, systematized, and later recorded the incidents in Hungary in a database, in order to provide lessons for the professionals of the future. I did all this through the filter of the complex system of disaster management, with the fire, industrial safety and civil protection, authoritative approach to the processing of incidents.

By integrating the completed hydrocarbon industry database into the GIS of disaster management, I created an online interface that is more advanced than the European and US incident database, with a visual map display and a description of the incidents. The interface is available to disaster management professionals, I recommend using it in their daily work.

Apart from the unexpected events, the common failure of the preparation and prevention were the incidents, I examined them under the auspices of science, I presented the competencies of the county fire investigators, the possibilities of their development, the applicability of a Fire Table, the possibility of accident prevention, I supported the need to link the development of IT tools and programs, VR and MR, the rise of artificial intelligence, the benefits of laser scanning of plants as the forefront of industry 4.0.

Based on the above, I recommend the dissertation to my disaster management personnel, to the experts of hydrocarbon plants and processors, as well as hazardous plants, to the professors and students of the National University Public Service, the Disaster Management Institute and the Disaster Management Training Center of the Ministry of the Interior (hereinafter BM KOK). In order to get to know the processes of the hydrocarbon industry and to prevent the resulting accidents, I believe that the partial results of the research chapters can provide useful help for administrators with less professional skills and little fieldwork experience to carry out their preparatory and prevention tasks. I recommend the contents of Chapters 3 and 4 to them.

PRACTICAL APPLICATION OF RESEARCH RESULTS

1. It is advisable to replace the technological pipeline system of the hydrocarbon industry and processors and the carbon steel tools and equipment affected by pyrophoric effects with the much more expensive but safer chrome steel equipment. With chrome steel fittings, safety can be increased and the formation of pyrophoric phenomena can be almost ruled out.

2. Getting to know the accidents of the past can in many cases prevent future disasters. The databases of incidents of the established hydrocarbon industry and processing can be studied by the specialized fields in the course of their work. The incidents that can be viewed on the GIS interface can facilitate the work of the specialized fields nationwide by creating additional databases. Following the compilation of the database on industrial accidents and natural disasters, as well as the flood and inland water risk classification, almost the entire disaster vulnerability of Hungary can be displayed. In the future, the aim is to create an internet GIS interface with the possibility of wide-ranging use of databases, recording and researchability of incidents collected by international researchers after online registration.

3. In order to increase the fire investigation efficiency, including those of the hydrocarbon industry and processing plants, it is recommended to integrate a Fire Table into the e-investigation application. In order to share knowledge and develop competencies, a Fire Investigation Experience Database can be created, which will increase the efficiency of fire investigations. The database can also be expanded with a GIS display, making it suitable for filtering out a series of arson and technically defective products involving several counties.

4. The results of the questionnaire survey confirmed the need for closer cooperation between hydrocarbon and processing plants and the authorities. Connecting the BIR system of the plants and the IT network of the disaster management is an effective solution for better monitoring and faster response. In order to make the production processes safe, it is necessary to develop control systems free of human errors and decisions, as well as to create processes designed and controlled by the error avoidance system. Responders anticipate the negative impact of the Covid virus pandemic on the hydrocarbon industry. The change is expected primarily in the reduction of the number of employees and the emigration and downsizing of the experienced workforce.

LIST OF PUBLICATIONS OF THE DOCTORAL CANDIDATE ON THE TOPIC

In an authoritative journal in Hungarian (categories A, B, C, D according to the Hungarian Academy of Sciences)

1. TÓTH, András, SIPOSNÉ, Kecskeméthy Klára: Természeti és civilizációs katasztrófák Ausztráliában, a megelőzés lehetőségei
   MŰSZAKI KATONAI KÖZLÖNY year 26 (2016) No. 3. pp. 23–43
2. TÓTH, András: Az első régiós irányítótörzs kríziskommunikációja a tapasztalatok tükrében
   BOLYAI SZEMLE year 26 (2017) No. 1. pp. 86–95
3. TÓTH, András, SIPOSNÉ, Kecskeméthy Klára: Magyarország legjelentősebb természeti katasztrófái – online disaster map
   MŰSZAKI KATONAI KÖZLÖNY year 27 (2017) No. 4. pp. 148–169
4. TÓTH, András: A bitumenfeldolgozás során történt tartályrobbanások és tűzesetek vizsgálata – part I
   HADMÉRNÖK year 13. (2018) No. 1. pp. 217–229 ISSN 1788-1919
5. TÓTH, András: A bitumenfeldolgozás során történt tartályrobbanások és tűzesetek vizsgálata – part II
   HADMÉRNÖK year 14 (2019) No. 1 pp. 220–230 ISSN 1788-1919
6. TÓTH, András, ENDRŐDI, István: A katasztrófavédelem komplex feladatrendszere fold alatti gáztároló üzemek esetén
   HADMÉRNÖK year 14 (2019) No. 2. pp. 143–156 ISSN 1788-1919
7. TÓTH, András, MUHORAY, Árpád, PELLÉRDI, Rezső: Magyarország jelentősebb ipari katasztrófái a veszélyhelyzet-tervezés és -kezelés szempontjából
   MŰSZAKI KATONAI KÖZLÖNY year 29 (2019) No. 2 pp. 21–39
8. TÓTH, András, BLESZITY, János, RESTÁS, Ágoston: A szénhidrogén-feldolgozás káreseményeihez kapcsolódó tűzvizsgálati tevékenység fejlesztési lehetőségei – part I
   MŰSZAKI KATONAI KÖZLÖNY year 30 (2020) No. 1 pp. 83–98
9. TÓTH, András, BLESZITY, János, RESTÁS, Ágoston: A szénhidrogén-feldolgozás káreseményeihez kapcsolódó tűzvizsgálati tevékenység fejlesztési lehetőségei – part II
   MŰSZAKI KATONAI KÖZLÖNY year 30 (2020) No. 2 pp. 97–116
10. TÓTH, András, SIPOSNÉ, Kecskeméthy Klára, ENDRŐDI, István: A magyar szénhidrogén-iparban előfordult katasztrófák, azok tanulságai és a megelőzés módozatai – part I HADMÉRNÖK year 15 (2020) No. 4 pp. 119–140 ISSN 1788-1919
11. TÓTH, András, SIPOSNÉ, Kecskeméthy Klára, ENDRŐDI, István: A magyar szénhidrogén-iparban előfordult katasztrófák, azok tanulságai és a megelőzés módozatai – part II HADMÉRNÖK year 16 (2021) No. 1 pp. 129–144 ISSN 1788-1919

Peer-reviewed professional journal article in a foreign language journal

12. András TÓTH: Analysis of the Hungarian hydrocarbon industry's accidents and their demonstration with GIS, REVISTA ACADEMIEI FORTELOR TERESTRE/LAND FORCES ACADEMY REVIEW (2247-840X 1582-6384): Vol. XXV. No. 3 (99) pp. 267–274 (2020) in English, MHTB: IXGJO HTB [1901-] B

A peer-reviewed presentation in a foreign language, published in an international professional conference publication

13. András TÓTH: Hungary's most significant industrial disasters from the viewpoints of safety challenges, risks and disaster management. "National and International Security 2018" Conference proceedings 9th International Scientific Conference 25-26 October 2018, pp. 450–460 Editor: Michal HRNČIAR. Zborník príspevkov z 9. medznínárodnej vedeckej konferencie. (2018) ISBN: 9788080405687 (Armed Forces Academy of General Milan Ratislav Stefánik)

Participation in a Hungarian scientific conference

14. TÓTH, András: A szénhidrogén-feldolgozás káresetek tűzoltói beavatkozásának fejlesztése tűzoltó robotokkal KONFERENCIAKIADVÁNY, "Tűzoltó Szakmai Nap 2018" Scientific Conference, Budapest, 18 April 2018, pp. 120–123 ISBN 978-615-80429-6-3
15. TÓTH, András: "Kihívások – lehetőségek – megoldások a katonai műszaki tudományok területén", Scientific Conference, lecturer Time: 23 May 2018. Venue: Zrínyi Miklós Barracks and University Campus (H-1101 Budapest, Hungária körút 9–11. IMO Conference Room)
16. TÓTH, András: "A szénhidrogén-feldolgozás során történt tartályrobbanások és tűzesetek vizsgálata", poster, KATASZTRÓFAVÉDELEM 2018. VESZÉLYES TEVÉKENYSÉGEK BIZTONSÁGA KONFERENCIAKIADVÁNY, "International Scientific Conference on Industrial Safety, 15 November 2018." Posters, p. 346 ISBN 978-615-80429-7-0
17. "DOKTORANDUSZOK A TUDOMÁNY SZOLGÁLATÁBAN", Scientific Conference, Disaster Management Section, peer reviewer. Time: 13 November 2019, Venue: Zrínyi Miklós Barracks and University Campus (H-1101 Budapest, Hungária körút 9–11. IMO Conference Room)

OTHER SCIENTIFIC ACTIVITIES

2016 Lecture at the Researchers' Night on the Natural and Human-triggered Disasters in Australia, Options for Prevention.

2016 At the Institutional Scientific Student Conference of the National University of Public Service, first place in the Rescue Fire Protection Section and a Special Award by Major General Zoltán Góra, PhD, Director of the National Directorate General for Disaster Management, as well as the publication of the project as a publication based on the proposal of the jury.

2017 First place and special award with the work presented at the Fire Protection and Rescue Control Branch of Military Science and Law Enforcement Section of the 23rd National Scientific Student Conference.

2017 Collection and exploration of the literature related to the research topic.

2019 Research Report prepared and approved for the Complex Exam.

2020 Member of the Disaster Management and Civil Protection Section of the Hungarian Military Science Society

2021 Member of the Disaster Management Section of the Hungarian Law Enforcement Society.

PROFESSIONAL-SCIENTIFIC CURRICULUM VITAE OF THE DOCTORAL CANDIDATE

András Tóth was born on 19 October 1969 in Zalaegerszeg. From 1992, he worked as an IT specialist at the Zalaegerszeg Border Guard Directorate, Ministry of the Interior, and from 1995, he was the IT and bank security commissioner of Budapest Bank Rt.

In 2004, he started his career as a subordinate firefighter at the Lenti Town Fire Brigade, after obtaining a firefighting qualification and a firefighting equipment operator qualification. In 2005, after obtaining the qualification of disaster management and fire protection organizer (officer), he became the deputy service commander of group "A" of the Zalaegerszeg Fire Brigade. From 2006, he was a senior desk officer in the field of fire prevention. In 2006, he completed the BM KOK fire investigation course, then the onsite investigation module of the National Police Headquarters advanced firefighting training course.

From 2010, he was a senior desk officer for fire prevention of the Zala County Disaster Management Directorate, later the senior desk officer for fire investigation and deployment analysis, then the County Chief Fire Investigator, and completed the Mobile Disaster Management Laboratory course. In 2012, during the fulfilment of the periodic KMSZ chief officer service, he received a disaster management memorabilia for his outstanding performance in extinguishing the fire at the MOL Plc. Zala County Refinery.

From 2013, he was the head of the authoritative section of the Zalaegerszeg Disaster Management Branch Office, while completing the law enforcement examination and training course for law enforcement managers of the Directorate General for Education, Training and Science Organization, Ministry of the Interior, as well as the dangerous goods administrator (ADR), dangerous goods inspector (RID), advance KML-ADR vehicle course and the Dangerous Goods Air Transport Disaster Management Inspector (ICAO) course, the extended radiation protection course and has fire safety specialized exams in nearly 10 occupations.

From 2020, he was the civil protection inspector of the Zalaegerszeg Disaster Management Branch Office, and since June 2021, he has been the county civil protection inspector general of the Zala County Disaster Management Directorate.

He obtained his higher education degree as an IT engineer, and in 2004, he received a degree in technical management from the Gábor Dénes Technical Information Technology College. His university qualification is a certified head of protection administration. In 2017, he completed a master's degree in protection administration at the Faculty of Military Science and Officer Training of the National University of Public Service. In 2017, he was admitted to the Doctoral School of Military Engineering at the National University of Public Service. His supervisors are Dr. habil. István Endrődi, colonel (ret.), PhD and Prof. Dr. Klára Kecskeméthy, Mrs. Sipos, colonel, CSc. His head of research is Dr. habil. Lajos Kátai-Urbán, colonel, PhD, Chief Counsel. In the field of disaster management research, the incident that occurred at the Zala Oil Refinery in 2012 served as the basis for the doctoral candidate's scientific research, which he supplemented with his extensive experience. He completed the complex exam of the study phase and the required credits as well as the publication scores with surplus. He did not have a passive semester.

He is the father of three smart and intelligent boys, András, Zolta and Nimród.

Zalaegerszeg, 31 August 2021

LTC András Tóth