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## **THE APPEARANCE OF EXPLOSION PROTECTION IN THE HUNGARIAN LEGAL SYSTEM AND IN THE EDUCATION**

### **Abstract**

Science and technology are constantly changing in the world of technology. Throughout our history, many useful technical innovations have been discovered that make our everyday lives easier. However, these innovations can in some cases also lead to explosions that endanger the human life and material goods. In the industrial sector, there has been a development need for explosion protection in coal mines, mainly due to the presence of coal dust and methane. As electricity was a huge benefit and help, its use began to become more widespread. However, this also involved dangers such as an explosion, so research activities have begun to prevent it. In the paper, the author deals with the situation of explosion protection in Hungary, with special regard to the legislation related to the topic and the appearance of it in education system.

**Keywords:** explosion protection, ATEX directive, education

## **A ROBBANÁSVÉDELEM MEGJELENÉSE A MAGYAR JOGRENDSZERBEN ÉS AZ OKTATÁSBAN**

### **Absztrakt**

A tudomány és a technika állandó változásokon megy keresztül a műszaki világban. Történelmünk során számos olyan hasznos technikai újítás került felfedezésre, amelyek megkönnyítik a mindennapjainkat. Ezek az újítások azonban bizonyos esetben robbanásokat eredményezhetnek, amelyek veszélyeztetik az emberi életet és az anyagi javakat. Az iparban elsősorban a szénpor és a metán jelenléte miatt a szénbányákban fellépett egy fejlesztési igény a robbanásvédelem tekintetében. Mivel a villamosság óriási előnyt és segítséget jelentett, alkalmazása egyre szélesebb körben kezdett elterjedni. Ez azonban olyan veszélyeket is rejtett



magában, mint a robbanás, ezért megkezdődött az ennek megelőzésére irányuló kutatási tevékenység. A cikkben a szerző a robbanásvédelem magyarországi helyzetével foglalkozik, különös tekintettel, a témával kapcsolatos jogszabályokra és a téma megjelenésére az oktatásban.

**Kulcsszavak:** robbanásvédelem, ATEX direktíva, oktatás

## 1. INTRODUCTION

The research field of the disaster management contains a wide range of topics. Out of these, 3 main research directions can be mentioned such as disaster management operations, industrial safety and fire protection and rescue operations management. In the topic of the disaster management operations we can find publications about recovery system after natural disasters [1] [2], about the climate change [3] and about the possibilities for development [4]. In the field of the industrial safety papers deal with hazardous activities [5] fire protection of hazardous industrial plants [6] and major chemical accidents [7]. In the topic of firefighting lot of papers analyse the wildfire situation in Hungary [8] and abroad [9], and the technical rescue operations on land [10] and water [11]. However, less research has been done on the risk of explosion so far. These focused primarily on the explosive work environment [12] and legislation background [13].

## 2. ANALYSIS OF THE LEGISLATION

The first European regulation of explosion protection was implemented in 1957 within the framework of a Council Directive [14]. Subsequently, Directive 94/9 / EC was issued in 1994, which is used by the common language as the ATEX Directive [15]. The Hungarian Act XCIII/1993 on Occupational Safety and Health regulates the requirements for work that does not endanger the health and the safety work. 30§ of the Act sets out the explosion protection requirement in case of electrical fittings [16]. The connection between explosion protection and



fire protection also appears in the Hungarian legislation system such as the Act XXXI of 1996 on the Protection Against Fire, Rescue Work and the Fire-Service (referred to as Act on Fire Protection) [17] and the Decree No 54/2014 of 5 December of the Ministry of Interior on the National Fire Protection Regulations [18]. In the Act on Fire Protection appears the implementation of safety measures in case of fire and explosion hazard is one of the tasks of the fire departments. Of these legislations, I would like to highlight the ATEX directive, because this describes the best my topic.

## **ATEX rule changes HU**

The Directive 99/92/EC (also known as 'ATEX 137' or the 'ATEX Workplace Directive') on minimum requirements for improving the health and safety protection of workers potentially at risk from explosive atmospheres. The text of the Directive and the supporting EU produced guidelines are available on the EU-website. The Directive 94/9/EC (also known as 'ATEX 95' or 'the ATEX Equipment Directive') on the approximation of the laws of Members States concerning equipment and protective systems intended for use in potentially explosive atmospheres. The text of the Directive and EU produced supporting guidelines are available on the EU website.

## ***Selection of equipment and protective systems***

Areas classified into zones must be protected from sources of ignition. Equipment and protective systems intended to be used in zoned areas should be selected to meet the requirements of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996. Equipment already in use before July 2003 can continue to be used indefinitely provided a risk assessment shows it is safe to do so.

## ***Identifying areas where explosive atmospheres may occur***

Where necessary, the entry points to areas classified into zones must be marked with a specified 'EX' sign

## ***Providing anti-static clothing***

Employers must provide workers who work in zoned areas with appropriate clothing that does not create the risk of an electrostatic discharge igniting the explosive atmosphere, for example



anti-static footwear. The clothing provided depends on the level of risk identified in the risk assessment.

### *Equipment and protective systems intended for use in explosive atmospheres*

The aim of Directive 94/9/EC is to allow the free trade of 'ATEX' equipment and protective systems within the EU by removing the need for separate testing and documentation for each Member State.

The Regulations apply to all equipment intended for use in explosive atmospheres, whether electrical or mechanical, and also to protective systems.

Manufacturers/suppliers (or importers, if the manufacturers are outside the EU) must ensure that their products meet essential health and safety requirements and undergo appropriate conformity procedures. This usually involves testing and certification by a 'third-party' certification body (known as a Notified Body) but manufacturers/suppliers can 'self-certify' equipment intended to be used in less hazardous explosive atmospheres. Once certified, the equipment is marked by the 'EX' symbol to identify it as such.

Certification ensures that the equipment or protective system is fit for its intended purpose and that adequate information is supplied with it to ensure that it can be used safely.

## **3. CONTRADICTIONS IN THE HUNGARIAN LEGISLATIVE SYSTEM**

The Hungarian regulation of explosion protection currently affects several authorities. In the following, I would like to present these contradictions. Explosion protection and fire protection are related in the Hungarian legislations, such as the Act on Fire Protection and the National Fire Protection Regulations. In the following, I would like to describe the contradictions between the Act on Occupational Safety and Health [16], the Act on Fire Protection [17], the act on Disaster Management [19] and the act on Environmental Protection [20] and its implementing regulations.

The Act on Fire Protection mentions the



- Fire Prevention Certificate of Compliance
- Flammable and explosive device
- Fire safety requirement
- flammable and explosive technology
- declaration of compliance [17]

In the latter case, reference is already made to other legislation (Decree 22/2009 ÖM). In addition, a distinction must be made between the risk of explosion and the requirements of the Act on Occupational Safety and Health / Act on Fire Protection. Energy, pipe, utilities and explosion safety requirements appear in the Act on Occupational Safety and Health [16]. In addition, Section 87 of the Act determines that an establishment, equipment, material, work process, technology where the health, physical integrity and safety of employees may be exposed to harmful effects in the absence of appropriate protection. One of the most important objectives of the Act on Occupational Safety and Health is to ensure the primary protection for those who do the work or are in the surroundings of the workplace. This is due to the lack of appropriate protection, which can thus primarily serve to identify the hazard [16]. However, the law should not aim to identify hazardous technologies in case of materials, mixtures, machines or equipment. However, it is important to note that the legislation links each legal framework to the identification of hazard. In this case, a reference is also made to the drafting on the risk of explosion in the Act of Fire Protection. Of course, it is not about the need for many specifications, but about discussing the identified properties. I conclude from this that there is no need for occupational safety expert activity in order to prepare the provisions of the implementing regulation of the Act on Occupational Safety and Health. However, it is important to emphasize that the Implementing Regulation of the act is not just about the explosive workplaces [21].

I also examined the Act on Environmental Protection [20]. As a result, I determined that the environmental legal system consistently considers obligations related to explosion safety techniques. In the following, I present the environmental legal connection points with the help of Table 1.



Name of legislation	Connection point
Act LIII of 1995 on the General Rules of Environmental Protection	28. §
Governmental Decree No. 57/2013. (II.27.)	Annex No. 2
Governmental Decree No. 132/2010. (IV.21.)	
Governmental Decree No. 136/2008. (V. 16.)	
Governmental Decree No. 106/1995.	8. §, Annex No. 1
Governmental Decree No. 219/2004. (VII.21.)	Annex No. 1, Annex No. 13
Decree 6/2009. (IV.14.)	Annexes 1-3.
Governmental Decree No. 90/2007. (IV.26.)	3. §, Annex 1-2
Act CLXXXV of 2012 on waste	Annex No. 1
Governmental Decree No. 225/2015. (VIII. 7.)	
Governmental Decree No. 309/2014. (XII. 11.)	
Governmental Decree No. 246/2014. (IX. 29.)	
Governmental Decree No. 445/2012. (XII. 29.)	
Decree 72/2013. (VIII. 27.)	
Decree 145/2012. (XII. 27.)	
Decree 14/2008. (IV. 3.)	
Governmental Decree No. 306/2010. (XII. 23.)	
Governmental Decree No. 25/2006. (II. 3.)	
Decree 6/2011. (I. 14.)	
Decree 4/2011. (I. 14.)	
Joint regulation GKM–KvVM 75/2005. (IX. 29.)	



Joint regulation GKM–KvVM 7/2003. (V.16.)	
KTM decree 32/1993. (XII. 23.)	
Act No. LIII. of 1996 on Nature Conservation	
Decree 118/2011. (XII. 15.)	
Governmental Decree No. 284/2007. (X. 29.)	
Governmental Decree No. 280/2004. (X.20.)	
Joint regulation KvVM-EüM 27/2008. (XII. 3.)	
KvVM decree 93/2007. (XII. 18.)	
Joint regulation KöM-GM 29/2001. (XII. 23.)	

From an analysis of the legislations above and from Table 1, I conclude that the system of legislation related to explosion protection can only be described in an extremely complex way. In addition, it lacks the appropriate presence of authority and control framework [21]. As a result of the legal contradictions, I determine that the Hungarian regulators can be grouped into two parts within the field of the explosion protection. I classify the Act on Fire Protection, the National Fire Protection Regulations and the relevant Fire Protection Technical Guidelines into one group. These legislations deal primarily with fire and explosive technologies, but they also refer to the tasks of the fire authority. The other group includes the Act on Occupational Safety and Health and 3/2003. (Mar. 11.) Joint Decree of the Ministry of Health and Family Affairs and the Ministry of Employment and Labour on the minimum requirements for improving the safety of workers potentially at risk from explosive atmosphere [22]. These legislations already write about the subject in a different way. These primarily include potentially hazardous risks. They write about potential risks, without more serious specifics.



## 4. EXPLOSION PROTECTION IN EDUCATION

The education in the field of engineering is extensive. The curriculum in the higher education institutions meet to some extent each other. I examined the curriculum of the universities and I came to the conclusion that during their studies, the students do not come into contact with the topic of the explosion protection. Although the firefighter training mentions the prevention of explosions and the firefighting tactic in case of an explosion, but the deeper knowledge is still incomplete in the topic [23] [24]. The curriculum does not contain how to deal with explosion protection. The knowledge is limited only to the flammable approach of the topic. Students can also gain in-depth knowledge in the field of combustion and extinguishing theory, among other things, but explosion protection is not sufficiently reflected here either. The knowledge taught does not cover the chemical industry and its certain areas, as well as the risks of the materials used there. So I assume the educational background of my topic to be incomplete.

This shortcoming has also been noticed by the experts working in the field of education. As a result, a one-year postgraduate training will start in explosion protection engineering in Miskolc, which can serve as a supplement to the fire protection engineering course. In addition, it is important to mention the specialized training courses for blasting engineers and specialists at the Donát Bánki Faculty of Mechanical and Safety Engineering at the Óbuda University.

Here, there is an opportunity for special trainings in the field of explosion technology (for non-engineers) and for further training for blasting engineers (only for engineers). In this case the curriculum of the course focuses specifically on the explosion protection. Students can master the topics of subjects such as for example: explosion physics, advanced industrial and military blasting explosives and their use, methods and possibilities of blast shock wave modelling and investigation of their propagation in complex terrain and risk analysis of explosive incidents [25].

The scientific evaluation of education [26] and training [27] experience is continuous. After my examination of the courses of various higher education institutions, I conclude that the teaching in the field of explosion protection knowledge is incomplete. In Hungary, we can find higher education institutions, whose educational curriculum covers the explosion protection, but these do not go into detail in the topic. In the future, in connection with the new fire protection-based



trainings, I propose to include the topic of the explosion protection in more detail in the given curriculum. It would also contribute to the protection of human life and material goods.

## 5. SUMMARY

In the paper, I provided an overview of the situation of the explosion protection in Hungary. In the framework of it I analysed the most important legislations in the topic. Of these, I separately examined the ATEX directive rule changes in the Hungarian regulator system. I presented the Selection of equipment and protective systems, the identifying areas where explosive atmospheres may occur, the providing anti-static clothing and the equipment and protective systems intended for use in explosive atmospheres. After that I examined the contradictions in the Hungarian legislative system. I conclude that the system of legislation related to explosion protection can only be described in an extremely complex way. As a result of the legal contradictions, I determine that the Hungarian regulators can be grouped into two parts within the field of the explosion protection. At the end of the paper, I highlighted that explosion protection does not appear adequately in the Hungarian education. I examined the curriculum of the universities and I came to the conclusion that during their studies, the students do not come into contact enough with the topic of the explosion protection. I found some courses in connection with the explosion protection but overall, I find the processing of the topic incomplete within education.

## REFERENCES

- [1] Ambrusz József: A természeti csapásokat követő helyreállítás magyarországi rendszere. *Társadalom és Honvédelem*, XIX. 2. (2015), pp. 73-82.
- [2] Ambrusz József: *The System of Disaster Preparedness in Hungary*. In: Saba Senses-Ozyurt - Sándor Klein - Zsolt Nemeskéri (szerk.): *Educating for Democratic Governance and*



Global Citizenship. San Diego (CA), Amerikai Egyesült Államok: World Council for Curriculum and Instruction (2016) 523 p. pp. 231-235. , 5 p.

[3] Kersák József - Teknős László: *Disaster Management Aspects of Climate Change*. In: Bujdosó Zoltán - Dinya László - Csernák József (szerk.): XVII. Nemzetközi Tudományos Napok - Abstract Book: 17th International Scientific Days - Abstract Book Gyöngyös, Magyarország: EKE Líceum Kiadó (2020) 245 p. pp. 127-127.

[4] Nováky Mónika - Kátai-Urbán Lajos: Development of civil protection in Hungary. POZHARY I CHREZVYCHAJNYE SITUACII: PREDOTVRASHENIE LIKVIDACIA 2018: 1 pp. 89-95. , 7 p. (2018).

[5] Német Alexandra - Kátai-Urbán Lajos - Vass, Gyula: Veszélyes tevékenységek biztonsága a fenntarthatóság jegyében. *Védelem Tudomány*, V. 1. (2020), p. 137-152

[6] Érces Gergő - Vass Gyula: Veszélyes ipari üzemek tűzvédelme ipari üzemek fenntartható tűzbiztonságának fejlesztési lehetőségei a komplex tűzvédelem tekintetében. *Műszaki Katonai Közlöny*, XXVIII. 4. (2018), pp. 2-22.

[7] Dobor József: Major Chemical Accidents in the 21st Century Europe and its Lessons Learned in Higher Education. *AARMS*, XVI. 3. (2017), pp. 93-108.

[8] Bodnár László - Komjáthy László: Erdőtűz megelőzési módszerek erdészeti megoldásai *Hadmérnök*, XIII. 2. (2018), pp. 117-125.

[9] Siviwe Shwababa - Agoston Restas: Veld fire mitigation strategy: a vision for an innovative and integrated approach to managing risks in land reform farms, a case of land reform beneficiaries in South Africa. In: Domingos, Xavier Viegas (szerk.) In: Viegas, Domingos Xavier (ed.): *Advances in forest fire research 2018*. Imprensa da Universidade de Coimbra, (2018) pp. 183-191.

[10] Bodnár László - Pántya Péter: The Threat of Forest and Vegetation Fires and the Possibilities of Intervention in Hungary. *Academic and Applied Research in Military and Public Management Science*, XVIII. (2019), 3. pp. 21-31.

[11] Pántya Péter – Rácz Sándor: Vízben végrehajtott mentés oktatása és annak tapasztalatai a Katasztrófavédelmi Oktatási Központban, valamint a Nemzeti Közszolgálati Egyetemen. *Bolyai Szemle*, XXIII. 3. (2014), pp. 51-61



- [12] Király Lajos –Restás Ágoston: Some Issue Relating to the Industrial Safety Focusing on Explosive Work Environment. In: 11th International Conference on "Environmental Legislation, Safety Engineering and Disaster Management" Elsedima: Building Disaster Resilience in a Changing World Cluj-Napoca, Romania: Babes-Bolyai University, Faculty of Environmental Science and Engineering (2016), 199 p. pp. 104-104.
- [13] Király Lajos - Restás Ágoston - Cimer Zsolt: Robbanásvédelem szabályozási javaslata Magyarországon. *Védelem Tudomány*, III. 3. (2018), pp. 50-64.
- [14] *Council Directive 76/117/EEC of 18. December 1975 on the approximation of the laws of the Member States concerning electrical equipment for use in potentially explosive atmospheres EU Law and publications*
- [15] *Az Európai Parlament és a Tanács 94/9/EK irányelve (1994. március 23.) robbanásveszélyes légkörben való használatra szánt felszerelésekre és védelmi rendszerekre vonatkozó tagállami jogszabályok közelítéséről.*
- [16] *Act XCIII/1993 on Occupational Safety and Health*
- [17] *Act XXXI of 1996 on the Protection Against Fire, Rescue Work and the Fire-Service.*
- [18] *Decree No 54/2014 of 5 December of the Ministry of Interior on the National Fire Protection Regulations.*
- [19] *Act No. CXXVIII of 2011 concerning disaster management and amending certain related acts.*
- [20] *Act LIII of 1995 on the General Rules of Environmental Protection*
- [21] Király Lajos: Robbanásveszélyes zóna besorolásának szabályai - esettanulmány. *Védelem Tudomány*, II. 1. (2017), pp. 102-116
- [22] *3/2003. (Mar. 11.) Joint Decree of the Ministry of Health and Family Affairs and the Ministry of Employment and Labour on the minimum requirements for improving the safety of workers potentially at risk from explosive atmosphere.*
- [23] Bleszity János – Grósz Zoltán – Krizsán Zoltán – Restás Ágoston: New Training for Disaster Management at University Level in Hungary; NISPAcee, Budapest, 2014.05.22-24. ISBN: 978-80-89013-72-2



[24] Restás Ágoston: *Alkalmazott tűzoltás*. Nemzeti Közszerzői Egyetem. Budapest. 2015. (Egyetemi jegyzet).

[25] Óbudai Egyetem: Robbantástechnikai szakmérnök és szakember és szakirányú továbbképzési szakok.

<https://bgk.uni-obuda.hu/hu/kepzesek/tovabbkepzesek/robbantastechnikai-szakember-es-szakmernok-szakiranyu-tovabbkepzesi-szak> Download: 01.03.2020.

[26] Restás Ágoston - Pántya Péter - Horváth Lajos - Rácz Sándor - Hesz, József: *A tűzvédelem komplexitása a korszerű megelőzéstől a hatékony beavatkozásig*. In: Restás Ágoston – Urbán Anett (szerk.): *Katasztrófavédelem 2015*. Budapest, Hungary: BM Országos Katasztrófavédelmi Főigazgatóság (2015) 192 p. pp. 161-165.

[27] Endrődi István - Muhoray Árpád - Cimer Zsolt - Varga János: *A Nemzeti Közszerzői Egyetem Közös Közszerzői Gyakorlat Katasztrófavédelmi Intézet és a Víz tudományi Kar részletes és kiegészítő feladatai: A Katasztrófavédelmi Intézet részletes és kiegészítő feladatai*. Budapest, Nemzeti Közszerzői Egyetem. 2018.

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