Műszaki Katonai Közlöny

XXVII. évfolyam, 2017. 3. szám

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# ANALYSIS OF THE PRESENCE OF DANGEROUS MATERIALS FROM THE VIEWPOINS OF INDUSTRIAL SAFETY

# (VESZÉLYES ANYAGOK JELENLÉTÉNEK IPARBIZTONSÁGI SZEMPONTÚ ELEMZÉSE)

*Nowadays disasters can occur anywhere, anytime and can cause deaths or destruction of material goods or invaluable assets. Protection against disasters has been present since humanity exists. In our rapidly developing world the presence of dangerous materials is natural since today we are not able to find any tools or objects that is possible to be produced without using chemicals. The risk of major accidents is greatly increased by dangerous activities, in particular the production, storage and use of dangerous substances. The author presents a general view on the presence of dangerous materials and its legal regulation.*

***Keywords:*** *disaster, dangerous materials, chemical industry, legal regulation*

*Katasztrófa napjainkban bárhol, bármikor bekövetkezhet, emberéleteket, anyagi javak és felbecsülhetetlen értékek pusztulását okozhatja. A katasztrófák elleni védekezés jelen van, mióta az emberiség létezik. A rohamosan fejlődő világunkban a veszélyes anyagok jelenléte mindennapos, hiszen a mai világban már nem találunk olyan eszközt, tárgyat, aminek az elkészítéséhez nem szükséges vegyi anyag használata. A súlyos balesetek kockázatát nagymértékben növelik a veszélyes tevékenységek, nevezetesen a veszélyes anyagok gyártása, tárolása és felhasználása. A szerző egy általános képet ad a veszélyes anyagok jelenlétéről és a jogi szabályozásról.*

***Kulcsszavak:*** *katasztrófa, veszélyes anyag, vegyipar, jogi szabályozás*

## INTRODUCTION

In our rapidly developing world, the presence of dangerous materials is a common phenomenon, as we can't find any devices or tools whose preparation would not require chemicals. Medicines, plastics, and other synthetic materials are also produced from chemical substances. This also indicates that nowadays one of the most dynamically developing sectors of economy is the chemical industry. Even if we follow the safety protocol, the transport, storage, production and the use of any dangerous materials are not secure.

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## LAW OF DISASTER MANAGEMENT

The Law of disaster management that came into effect on the first of January, 2012 puts a great emphasis on the prevention of serious dangerous material related accidents and on the preparation of reducing the consequences of the possible accidents. The regulation applied until the first of January, 2002 gives place to chapter IV of the Disaster Management Act.

The law widens the circle of such industrial corporations that handle dangerous materials with increased magisterial supervision, and arranges public information, authorization, checking and the possibilities of defensive planning. Furthermore, this law introduced the possibility of imposing a disaster recovery fine in order to make the supervision of industries that handle dangerous chemicals more efficiently by the authority.

The regulation, which includes the protection against serious accidents, determines those materials which are qualified as dangerous according to the chapter IV of the Disaster Management Act, and also their threshold value; the range of industrial activities and plants below the threshold value; the planning system, and the consequences of the protection against dangerous substance related serious accidents; the order of the official authorization and supervision of disaster management; the obligations of the operators; the aim of the safety report; the safety analysis, the plan of preventing serious impairment, the requirements of the content and format and those people who are obliged to create it; requirements related to the information of the public and the insurance of publicity; the regulations of official coordination concerning the industries that deal with hazardous materials.[1]

The regulation of Act CXXVIII of the year 2011, chapter IV about the disaster management and the modification of some of the disaster recovery - related rules is extended to such industries that are concerned with hazardous materials, institutions concerned with hazardous materials, industries with values below threshold, and the prevention of serious accidents related to hazardous materials, administrative and economical organs, local governments, and everyday people involved in the protection.

The operation of the law's chapter 4 does not cover:

- activities, entitlements and obligations that were determined in connection with the application of nuclear energy
- the transportation of hazardous substances beyond the factory by road, rail, air or water
- activities of underground, surface or drill hole mining in connection with exploration, production and processing of mineral resources, except the chemical and thermal processing, and the storage of mineral resources, if so much hazardous material is present as it is reaching the threshold during the processing.
- landfills, apart from the institutions that process waste materials that originate from the production of mineral raw materials, where hazardous material is present which exceeds the threshold value, especially in that case, if the process includes the thermal and chemical processing of the waste.

- Institutions and factories dealing with hazardous material that are run for military purpose. [2]

## DANGEROUS MATERIAL, DANGEROUS WASTE, THE INRODUCTION OF DANGEROUS PLANTS

Thanks to the rapid thriving of the chemical industry from the beginning of the 20th century, we were able to learn the problems and dangers regarding the dangerous substances. Dangerous substance – related incidents can be divided in two forms. The localization of the hazardous substance regarding the storage and the processing, or in other words, the preparation of the intervention and the community-defense plans do not cause huge problems to the interveners, because the premade spreading models, arrangements related to community-defense, the constant amount and type of the hazardous substance, and the plannability of the work of the authorities makes the work of the interveners easier. This cannot be said about the transportation of the hazardous substance, the amount is never constant, the different types of the hazardous substances and the ever-changing locality renders the plans to be premade and so the interveners' work more difficult.
So, in some cases, the intervening and community-defending tasks may be different. Some of the measures and professional materials contain the concept of hazardous substances, and one segment of them takes the professional, while the other one takes the viewpoint of application into consideration. The transportation and storage of some substances and objects are risky to a greater extent. Among these materials and objects, the ones, which are harmful to people's and animals' lives, health, natural environment, and material resources in the course of production, packaging, loading, transportation, storing and consumption, are regarded as dangerous substances.[3]
The occurrence of dangerous substances:

- plants that produce dangerous substances (accidental course of events, intervention can be planned)
- plants that use dangerous substances (accidental course of events, intervention can be planned)
- Transportation of dangerous goods from the location of production to the location of utilization (cannot be planned)

Physical-chemical features:

- 1.1. explosion-hazard
- 1.2. inducing combustion, oxidizing
- 1.3. inflammable to a great extent
- 1.4. inflammable
- 1.5. less inflammable
- 1.6. other factors

Toxicological features:

- 2.1. Very poisonous
- 2.2. Poisonous
- 2.3. Harmful

- 2.4. Acrid
- 2.5. Irritating
- 2.6. Causing hyper-allergy (allergy, sensibility)
- 2.7. Specifications that impair health
- 2.8. Specific effects on organs or organ systems causing virulent, half-virulent or chronic poisoning, or following that they may be serious or not, or reversible or not.
- 2.9. Carcinogenic
- 2.10. Mutagenic
- 2.11. Impairing reproduction
- 2.11.1. Impairing fertilization (ability to concept)
- 2.11.2. Impairing the offspring
- 2.11.3. Impairing generation
- 2.11.4. Other effects that impair reproduction
- 2.12. Other typical features
- 2.12.1. Absorbing through the skin
- 2.12.2. Agglomerating
- 2.12.3. Others (temporary or permanent ineffective storage of the skin) [4]

The occurrence of dangerous substance inside the plant

- Store-houses
- Tankparks
- Loading and unloading stations (rail, road, trail)
- Industrial cargo railroads
- Pumping establishments
- Substance-receiver and -poster stations
- Industrial devices, and pipelines

We are acquainted with more branches of transportation of the dangerous substances: ADR road transport – the European agreement on the transportation of hazardous materials by road transport – railway transport RID – the convention concerning international carriage of dangerous goods by rail – inland waterways transportation ADN – the European agreement concerning the international carriage of dangerous goods by inland waterways - the carriage by pipelines and the air transport (IACAO TI), the safe transport of dangerous goods by air.

The dangers of the road transportation of dangerous substances cause serious problems not only for Hungary, but also for the whole world regarding the community and the interveners, who participate in the windup of the possible accidents. The problems are not caused by the unacceptable preparation of the cargo, the shortcomings by stabilizing the supplies or the laxity of the supplier, but by the inappropriate documentation of the cargo, the intentional deception concerning the content of the supply, and the violation of the discipline of road transportation and shipping, in many cases.
Nowadays, we get in touch with a lot of dangerous materials day by day, as a part of the household wastes may also count as dangerous substance. Those substances can be called as hazardous, whose origin, concentration, and compound may contribute to the risking of health

and environment. The presence of dangerous waste implies a potential source of environmental pollution. Basic requirements of activities involving dangerous waste are related to its production, prevention and reduction of risks entailed and to avoiding environmental pollution and health damage. In the case of dangerous waste, in addition to supervisory tasks, disaster management organs perform independent inspections and licencing activities The hazardous wastes possess those hazardous features, which are denoted by Act CLXXXV in 2012 about the Waste.

Permission is required for the handling and carriage of wastes qualified as dangerous, and its provenance and compound must be named and denoted in documents. [5] The owner of the dangerous waste is obliged to prevent it from impairing or contaminating the environment by getting into the soil, surface water, under surface water and the air. The owner of the hazardous waste is obliged to take care of the gathering of hazardous wastes up until the moment, when the owner passes over the hazardous waste to the tender.

By dealing with the dangerous wastes, the most effective solution and technology have to be used. There is a great risk factor for industrial accidents during the storage, the preparation and the utilization, they can be very dangerous for the environment and for the human life as well.

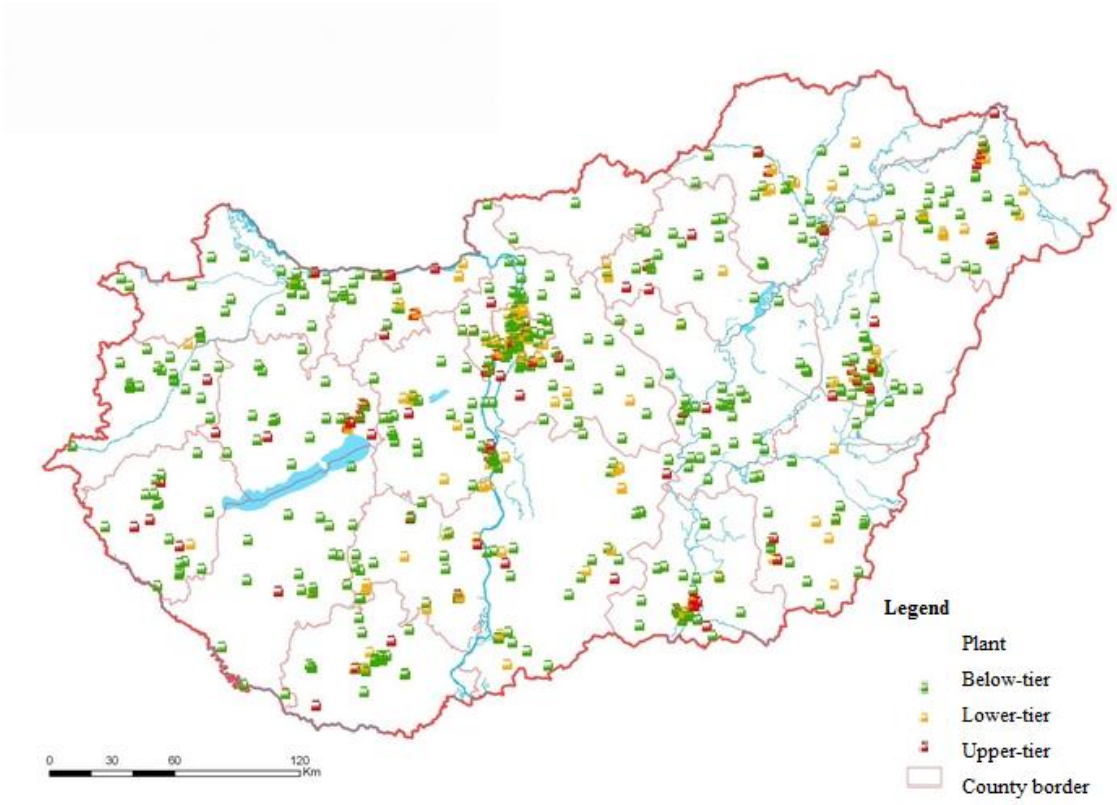


**Figure 1. Dangerous industrial establishment sin Hungary [6]**

Establishments dealing with dangerous substances: a territory, which is isolated for technological and production organization reasons, in a region dealing with hazardous materials, where one or more machineries handle preparation, storage, utilization and transportation of dangerous substances.

Plants dealing with dangerous substances: The whole of a given territory supervised by a given operator, where one or more machineries deal with hazardous substances in an amount, which reaches threshold value determined by the rule for law-enforcement. [7]

Plants dealing with dangerous substances with lower threshold value: Where the amount of the dangerous substances reaches or exceeds the lower threshold value, but do not reach the upper threshold value, determined by the Annex 1 of Government Decree 219/2011.

Plants dealing with dangerous substances with upper threshold value: Where the amount of the dangerous substances reaches or exceeds the upper threshold value, determined by Annex 1 of Government Decree 219/2011.

Plants below the threshold value: A territory, supervised by a given operator, where dangerous substance is present in an amount that exceeds the quarter of the lower threshold value, but does not reach the lower threshold value, determined by the rule for law enforcement, and facilities, which are to be given priority. [7]

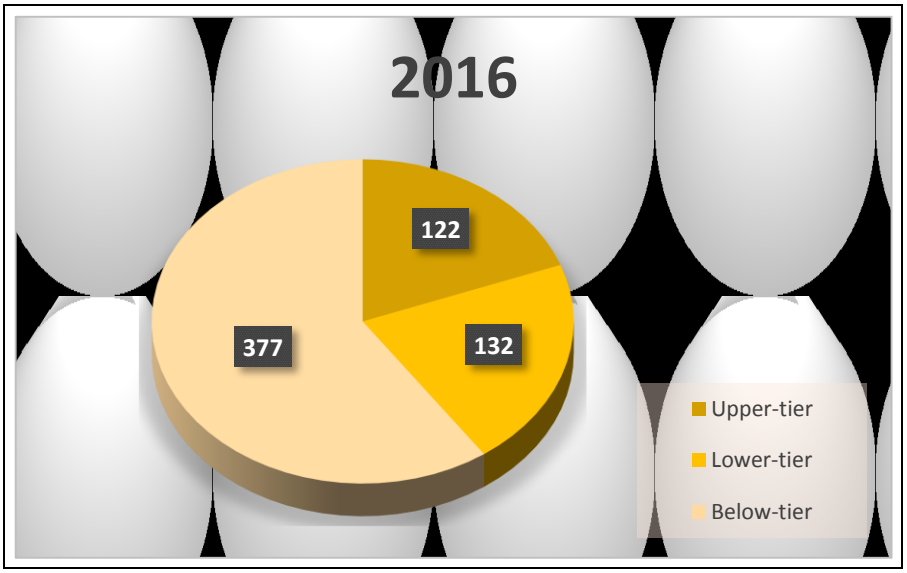


**Figure 2. The number of dangerous plants supervised by the authority in Hungary in 2016. Created by the author [8]**

In 2016, based on the Hungarian legislation on the protection against major accidents involving dangerous materials, the professional disaster management organs carried out the supervision of 122 upper-tier, 132 lower-tier and 377 below-tier dangerous establishments. [8] In the European Union, the Seveso Directive was developed as the uniform regulation on the prevention of dangerous industrial accidents and the mitigation of their effects, which was later revised as a result of certain industrial disasters.

Currently, the introduction of the new CLP system (Regulation EC 1272/2008 on classification, labelling and packaging of substances and mixtures) has made it necessary to synchronise the Directive with this system, so Seveso III Directive was created and adopted. Seveso III Directive was adapted in the national regulations in 2015.

# THE EVALUATION OF LEGAL REGULATION IN CONNECTION WITH THE EVENTS DURING THE TRANSPORTATION OF DANGEROUS GOODS

Transportation is one of the most important fields regarding activities in the presence of dangerous substances. Hungary's geographical position is rather favourable, it plays an important role in the transports to and from eastern and southern countries. As a result, in addition to the domestic transportation, the proportion of transit shipments is also significant, so the transport infrastructure has an essential role in our country. [9] Transportation is necessary by all means considering the preparation, application, and utilization of dangerous substances. We have to pay attention to the transportation, because these chemical substances possess dangerous features. The security conditions of the transportation have to be ensured by paying attention to the risks and the hazard factors. It is important to determine the precise danger factor of the substances in order to be able to define the safety conditions.

In Hungary, the special safety conditions in regards with the transportation of hazardous substances are secured by legal rules. The railway, inland waterways, sea and air transportation have independent regulations over the transportation of dangerous goods. The regulations of international agreement regarding the sectors of transportations have been put through with the help of legal devices in Europe.

a) "European Agreement concerning the International Carriage of Dangerous Goods by Road" was made in 30 September, 1957 in Geneva, and later, it has been modified.
b) "Regulations concerning the International Carriage of Dangerous Goods by Rail" RID, which constitutes the supplement of the Convention concerning International Carriage by Rail (COTIF), and which was made on 3 January, 1999, in Vilnius, and later, it has been modified.
c) "The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways" ADN, which was made on 26 May, 2000, in Geneva, and later, it has been modified.
d) Annex 18 of the International Civil Aviation Organization, The Safe Transport of Dangerous Goods by Air (ICAO TI). The agreement was statutory rule 25 in 1971, in Hungary. Its annexes were declared by the 20/1997. (X.21) KHVM decree.
e) Part A of chapter 18 of the international "Safety of Life at Sea" (SOLAS) agreement is the "International Maritime Dangerous Goods Codex" (IMDG Codex). [1]

One of the most dangerous activities in the world is traffic, especially road transport, as most of the accidents occur here. The risk of transport further increases with the transport of dangerous goods. The dangers of transporting dangerous goods by road, rail, water and air are a major concern for the population and the organs and professionals involved in the response to a potential accident. Nowadays, the prevention of dangerous goods transport accidents and in case of their occurrence, the quick and professional response to them pose new challenges in order to minimize their negative impact on the population and the environment. [10]

## SUMMARY

The Hungarian chemical industry has progressed a lot in the last few decades, with its dynamics, it has became one of the key sectors of the industry. In Hungary, the carriage of dangerous goods takes place on the air-, water-, railways, and on the public roads day by day. It is understood that one of the most dangerous sectors, where most of the accidents and death happen, is the transportation on roads. The dangers of the transportation of dangerous materials on roads seem to be causing serious problems to the community and also to those participating in the elimination of the accidents, not only in Hungary, but all over the world.

With the entry into force of the Disaster Management Act on 1 January, 2012, a single industrial safety authority within the disaster management system was established, which carries out strict official supervision of establishments producing, storing, distributing or using dangerous materials as a form of prevention. It is important to note that the authority of the disaster management also covers the inspection of dangerous goods transport by rail, air and water and the supervision of critical infrastructure in addition to the roadside and onsite checks of dangerous goods transport by road.
The development of Hungarian system for industrial safety has a 15-year history. Beyond the supervision of dangerous activities and the carriage of dangerous goods appeared the disaster management tasks of the authorities linked with the critical infrastructure elements.

At present, SEVESO III has been in effect since 1 June 2015. The creation of a new directive and its placing on new foundations was justified primarily by the changes in the classification of dangerous materials and its harmonisation with the European regulation on classification, labelling and packaging of substances and mixtures. The purpose of the European regulations is to create a unified system based on the dangerous properties of dangerous substances and mixtures as regards their classification, packaging and labelling. Its objectives include ensuring a high level of protection of human health and the environment and facilitating the free movement and trade of chemicals.

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