DEVELOPMENT OF HUNGARIAN SYSTEM FOR PROTECTION AGAINTS INDUSTRIAL ACCIDENTS

Lajos KÁTAI-URBÁN [1], Gyula VASS [2]

ABSTRACT
This paper introduces the system and the measures of accident prevention; mitigation of consequences, response, and population protection in case of industrial accidents involving dangerous substances, which is based upon the regulation of the Seveso II Directive. The main part of the presentation is about the application of mobile and fix monitoring systems for dangerous substances and the public information & early warning systems applied for the protection of the population, which is followed by the Hungarian practice of establishing and operating a special Chemical Monitoring, Early Warning and Information System around our major Seveso chemical sites.

Key words:
Industrial safety, dangerous establishments, emergency planning, chemical monitoring, Seveso II. Directive

ABSTRAKT
Tento dokument predstavuje systém a opatrenia prevencie havárií, zmiernenie následkov, reakcie a ochrany obyvateľstva v prípade havárií s prítomnosťou nebezpečných látok, ktorá je založená na regulácií smernice Seveso II. Hlavná časť článku je o používaní mobilných a korekcií monitorovacích systémov pre nebezpečné látky a informovanie verejnosti a systémy včasného varovania a vyrozumenia uplatňujúcich k ochrany obyvateľstva, ktorý je nasledovaný maďarskou praxou spočívajúcej vo vytváraní a prevádzkovaní špeciálneho monitorovania chemických látok, včasného varovania a informačného systému okolo našich hlavných chemických lokalít Seveso.

[1] KÁTAI-URBÁN, Lajos PhD; National University of Public Service, H 1101 Budapest, Hungária krt. 9-11., katai.lajos@uni-nke.hu
[2] VASS, Gyula PhD; National Directorate General for Disaster Management, Ministry of the Interior; H 1149 Budapest, Mogyoródi út 43., gyula.vass@katved.gov.hu

Kľúčové slová:
Priemyselná bezpečnosť, nebezpečné zariadenia, havarijné plánovanie, monitorovanie chemických látok, smernica Seveso II.

1. INTERNATIONAL AND NATIONAL LEGAL REGULATION OF THE PREVENTION OF MAJOR ACCIDENTS IN HUNGARY

In our days it is especially important and a complex task at the same time to protect the public on high level. Industrial safety embraces four special fields in Hungary: the supervision of dangerous establishments, the control of the transportation of dangerous goods, the protection of critical infrastructure and the prevention of nuclear accidents.

The community-level integration of the prevention of industrial accidents looks back to a history of more than two decades, the Seveso directive undergoes smaller or bigger modifications and getting stricter and stricter every five years. In line with the European integration activity and the international obligations of the country the Hungarian Parliament and government has prepared the regulations about the prevention of major industrial accidents. The effective date of the Hungarian regulation is January 1, 2002 and has been modified significantly two times (2006 and 2012). [1]

Our country undertook as of January 1, 2002 to integrate the Seveso II. Directive into the legal regulations of Hungary and to implement the provisions specified in the same until the date of the EU accession. The directive (2003) took effect in 2006 in Hungary with the objective of the prevention of major industrial accidents involving dangerous substances, to mitigate its effects on man and environment, and to ensure a high-level of protection in a consequent and efficient way on the territory of the European Community .[2] The UN ECE Industrial Accidents Convention introduced simultaneously with the Seveso regulation handles also the transboundary effects and consequences of industrial accidents potentially occurring in upper tier establishment using dangerous substances identified according to the Seveso II. Directive.

One of the triggers of the changes in legal regulations between 2010-2011 serving for the improvement and development of the disaster management system was the strengthening and establishment of more efficient protection against major accidents involving dangerous substances. Recent events, like the industrial catastrophe caused by the damburst of the mining waste reservoir in the outskirts of Ajka on October 4, 2010 or major accidents that happened in establishments processing dangerous wastes, in meat processing establishments, in establishments using chlorine and in establishments handling pyrotechnic products have contributed to the changes of the disaster management regulations concerning the legal field of industrial safety.

Act 2011 CXXVIII. on disaster management and on the amendment of individual, related acts (disaster management act) and the regulation 219/2011 (X. 20.) on the

protection against major accidents involving dangerous substances (hereinafter: implementation regulation) - in line with the Seveso II. Directive - clearly define the scope of activities covered by the regulations, the tasks of the authorities related to the activities, the tasks of the operators of dangerous establishments, of the government and municipalities related to the prevention of and preparation for major accidents, and to the emergency management of the same and also the obligations related to the information to the public.

There are new tasks and competences of industrial safety specified in the disaster management act and in the implementing regulations listed below:

- Extension of the rights of the disaster management authorities (licensing, supervision, inspection) over establishments below the lower threshold level,
- Introduction of new legal institutions (emergency management fine, administration service fee);
- Disaster management tasks of the protection of critical infrastructure;
- Making the authority activities and procedures more simple and efficient;
- Extension of the controlling and fining authorisations of the disaster management authority with regard to the transportation of dangerous goods by rail, air and inland waterways. [3]

These new tasks and competences and their efficient and successful implementation requires the extension of the previously operated structure of industrial safety and the establishment of an organisation for industrial safety and code of procedure.

2. EMERGENCY MANAGEMENT PLANNING SYSTEM OF DANGEROUS ESTABLISHMENTS

The paramount goal of emergency management planning in Hungary is to create a standardized system of documents by means of the identification and analysis of various endangering factors, containing disaster management tasks and actions with the allocated human resources, finances and technical means. The rules of the preparation of the plans, those obliged to prepare emergency plans, the content of the plans and the order of approval are described in the Government Decree 234/2011 (XI. 10.) on disaster management and on the execution of act CXXVIII. of 2011 on the amendment of related individual acts (Act on Disaster Management).

Emergency management planning helps in every case minimize consequences, where an accident causing serious damage to the environment or to the public can occur. It integrates the order, implementation of disaster management tasks and actions into a standard system, by allocating the necessary human resources, funds and technical means.

The levels of emergency management planning are:
a) settlement emergency plan,

b) workplace emergency plan,
c) the summarized plan of the local organisation of the official emergency management organisation,
d) regional (county or capital) emergency management plan,
e) central (national level) emergency management plan.

In the plans first of all the conditions of emergency management in the course of the dangerous situation and the actions to be taken within a short time after the accident and the key decisions that can significantly influence the success of the mitigating actions. On this basis it is clear that the deep understanding of the probable scenario of the events and of the counter-actions is very useful for those who can play a role in the emergency response and damage control.

In the sense of the IV-th chapter of the Disaster Management Act. the operator of the establishment dealing with dangerous substances prepares an internal emergency plan in order to eliminate the consequences of the dangers described in the safety report (upper tier site) or in the safety analysis (lower tier site).

The provisions of the safety analysis and safety report regarding the prevention and control of major accidents related to dangerous substances shall be elaborated in such a way as to ensure the high-level protection of human health and the environment. To this end it has to cover also the concept regarding the resources and tools, organisation and management system required for an efficient emergency management system.

The safety documentation that includes the internal emergency plan as well, is revised and if necessary modified by the operator in case of an establishment dealing with dangerous substances in the cases stipulated in the execution regulations (government decrees), but at least every five years. The operator sends the result of the revision and the modified safety analysis or report to the disaster management authority. The authority decides on the basis of the safety report or analysis received about the extension of the permit or about requiring prevention or consequence mitigation measures. [4]

3. EXPERIENCES ON CONTROL OF DANGEROUS ESTABLISHMENTS

The new legal regulations impose requirements in addition to current regulations on those operators as well whose industrial sites are used for the simultaneous storage of dangerous materials which exceed one fourth of the lower tier limits but do not reach the lower tier limits set forth by the applicable legal provisions. Moreover it also concerns the operators of so called “high supervision priority establishments”. These dangerous establishment operators include those commercial sites where chlorine or ammonia are present in the quantity of at least 1000 KGs, those that deal with the neutralization of dangerous wastes by combustion, furthermore the

establishments that involve the transportation of dangerous substances and dangerous waste materials by pipelines located outside of their industrial sites.

From amongst the group of operators newly introduced to official supervision by the authority those spa and bath establishments and waterworks sites that utilize chlorine may be highlighted as a result of their increased hazard threat, aside with the food processing industries commercial organizations using large amounts of ammonia gas. In the case of this new group of operators the significant developments achieved in operations safety culture as a result of disaster management official supervision has created a sufficient basis for the protection of residents living in the direct surroundings of the establishments.

The number of lower and upper tier establishments utilizing dangerous substances falling under the previous regulation scheme as a result of the implementation of the new regulations has increased by 37 % from 169 to a total of 231 (including 138 lower tier and 93 upper tier establishments). An additional 537 below tier establishments have been placed under the new regulation scheme, as a consequence of which presently 758 dangerous establishments in Hungary fall within the scope of the disaster management law provisions and the government decree dedicated to its implementation.

The Disaster Management Directorates as first degree authorities can pose a requirement on any commercial organization for providing information to ascertain whether the specific establishment falls within the scope of the disaster management law, and the authorities may conduct an on-site supervisory inspection. Disaster Management Directorates have been devoting great attention to the inspection of commercial organizations not showing an acceptable behavior in implementing the legal provisions as required, for which the Directorates may employ the available and legally instituted instruments of on-site official inspections, intermittent inspections, inspections regarding internal safety plan exercises, supervisory inspections, and official inspections subsequent to dangerous events.

The authorities have initiated more than 1400 identification procedures for establishments in accordance with the new regulations mandates in the year 2012. Throughout these procedures the disaster management authorities have conducted an on-site inspection in all cases, and if it has been ascertained that the operator did not provide an adequate amount of information to the authorities with regards to the applied dangerous substances and processes, the operator was sent a notification of discrepancy, whereby the operator has been obliged under an additional requirement to supply sufficient information.

The disaster management authority makes a decision on granting the disaster management license on the basis of the demonstrated facts in the safety documentation and in the so called “major incident management plan”, or if the situation so requires a decision is made on the limitation or suspension of the dangerous activities.

In the course of the licensing procedure the authority conducts inspections on the site of each of the establishments and examines the accuracy of information describer in the safety documentations, such as the safety reports, the safety analyses or the major incident management plans.

The safety documentation must include the analyses of the establishments' dangerous effects, the prevention and response measures, as well as the deployment and implementation orders and conditions of actions taken towards the mitigation of the adverse effects of major accidents involving dangerous substances. Based on the identification and in-depth analysis of major accident hazards regarding dangerous substances within the documentation the operator determines the possibilities and adverse impacts of the release of dangerous substances into the environment. Along with this the dispersion of the dangerous substances or their physical effects and the damage impact indicators on persons, material assets and the environment are defined as well. Operators are also required to demonstrate the establishments' management and safety equipment systems dedicated to the prevention and management of major accidents involving dangerous substances and their effects which will ensure a high level of protection for health and the environment. [5]
The group of operators falling under the scope of the Seveso II Directive henceforward is proved to be cooperating well with the authorities and has prepared their safety documentations with adequate content. In the cases of the below tier dangerous establishments the professionalism standards of major accident management plans are not always satisfactory, nevertheless a continuous development has been achieved in the aspects of cooperating with the authorities and in creating the proper safety culture for the establishments as well.

The Disaster Management Directorates – in pre-determined time intervals (once a year in the case of upper-tier establishments, once every two years for lower tier establishments and once in every three years for below tier establishments) – control by on-site inspections whether the operation of dangerous activities falls within the specified framework of the disaster management regulations. With respect to high risk installations the authorities may perform more frequent inspections, and an out-of-schedule immediate priority inspection is performed for operational disruptions or after an incidents. On the basis of experience gathered in the course of the inspections the regional disaster management authority may require that the operator be under obligation to revise the safety documentation, furthermore if the operator is in a more serious breach of safety regulations even a penalty may be instituted or the operator's activities may be put under the threshold quantity level.

In the year 2012 regional authorities have detected maintenance systems problems and issues with the organized training for internal emergency plans on several occasions. Increased number of official inspections and authority revisions of the establishment' safety management systems have significantly contributed to the minimization of hazard threats in respect of these establishments. Simultaneously with the periodic inspections performed in dangerous establishments usually fire prevention and dangerous goods transport control actions are also performed.

Moreover, the Disaster Management Directorates had experienced a new task, namely the on-site evaluation of the internal emergency plan exercise performed in lower and upper tier dangerous establishments. It has happened even during the course of the previous year that the authority had to disrupt the exercise and require that the operator shall be under obligation to organize a new exercise due to inadequate preparedness as well as for example the lack of use of individual protective equipment. The authority has dedicated special attention to the fact that the performance and repetition of the internal emergency plan exercise be within the framework of the regulations. In case of an event the personnel detecting and/or responding, or even those responsible for the management of the on-site non-establishment personnel must solely carry out actions that have been specified in the safety documentation and that are suitable for ensuring effective response. The authority makes notice of useful experiences gathered on the occasion of emergency plan exercises and disseminates them amongst the operators of other establishments operating similar activities as well. [5]

The performance of major industrial safety' (supervisory) authority tasks have called for a reconsidered scope of cooperation with associate authorities. As a result of the implementation of these tasks - during the course of the past year - over 100 industrial safety inspections have been conducted jointly with the associate authorities which aided in a broad spectrum control of the establishments concerned. Upon such inspection visits the competent in their sphere of scope associate authorities conduct a joint and all encompassing, efficient examination lead by disaster management authorities. In the course of the past year the disaster management authorities have acted on 69 occasions within the framework of supervisory inspections, out of which the proceeding cooperating authorities have issued an authority notification on 56 occasions, in 2 instances the operations of the dangerous establishment have been fully suspended, and in 7 cases operations partially limited.

The disaster management authority has created and operates an Industrial Supervision Database for the purpose of preventing major accidents involving dangerous substances in connection with making the dangerous activities disaster-, fire- and civil protection supervisory operations more efficient. The associate authorities have been granted access to this industrial supervision database.

The appearance of legal provisions for disaster management penalties has further strengthened the role of disaster management authority control. Disaster management authorities have instituted a total of over 35 million HUF in penalties on 18 occasions for reasons such as breaching any of the following: the obligation to identify a dangerous establishment, the requirement to notify emergency incidents as they occur in dangerous establishments, the non-compliance with technical, process safety improvements as required by the decision of the disaster management authority, or the operating of dangerous activities without a valid license.

It is a requirement for the operators also that a major accident or emergency incident involving dangerous substances shall be reported by written declaration within 24 hours of the occurrence or its acknowledged appearance to the disaster management

authority. The authority may issue a disaster management penalty for the operator in the case of the omission of reporting or for reporting the major accident or emergency incident not in the manner specified by the obligatory regulations. Subsequent to already occurred major accidents and in the case of repeating events the competent disaster management authority may – apart from issuing a penalty – even limit the operation of dangerous activity or may suspend the dangerous activity as well altogether.

On a few occasions in the former period (33 emergency incidents and 2 major accidents in year 2012) non-expected events have occurred at a few dangerous establishments whereupon the disaster management authorities have investigated the incidents in depth and learned the lessons from the consequences and moreover have taken measures for the prevention of similar emergency incidents. A vast majority of these events occurred due to the failure of an element of the establishments safety management systems such as the disregarding of required process maintenance intervals or discrepancies in the quality and quantity of training conducted. [6]

4. MOBIL AND STABILE DEVICES APPLIED FOR CHEMICAL MONITORING

For investigation of harmful effects of major-accidents involving dangerous substances are in first instance the Disaster Management Mobil Laboratories (DMML) are designated. In Hungary there are 19 DMML-s operating, which tasks are the estimation of zones endangered, collecting and forwarding of data and information about hazards, co-operation in quick alarm of the public, co-operation with other operative bodies, furthermore at site polluted with chemical or radioactive substances with co-operation in giving professional advise for first aid.

The vehicles of DMML-s are equipped with chemical detectors and automatic gas-detectors, micro meteorological measuring station, scavenger materials and personal protective equipments.

„The meteorological and chemical monitoring, civilian alarming system (further MoLaRi) to be established in the range of dangerous establishments" will assure the timely signalling of dangerous substances released during the accidental major accidents, the determination of dispersion data, the presentation of data for decision-makers, the early alarming of the public and activisation of external emergency plan.

The MoLaRi system consists of three main system elements: meteorological and chemical monitoring system, civilian alarming and information system and communication and informatical data transmission system. The construction of MoLaRi system will be realised in the vicinity of 20 dangerous industrial establishments. The system at the moment covers nine Hungarian counties and the capital.

The system built in three levels:
a) Local (community level). The monitoring subsystem. The monitoring system built on the site of dangerous industrial establishments (in directions of hazards) and in the direct vicinity of localities endangered. The measured data of monitoring system's detectors are registered continuously in the collection centre (local centre) of a dangerous industrial establishment, which is processed in the national centre, from where the information is forwarded to the relevant county (capital) disaster protection (civil protection) directorate's office in charge. After exceeding the dangerous concentration – after consultation with the dangerous industrial establishment – the local public will be alarmed. The placing of monitoring end-points in dangerous industrial establishment and appropriate setting of alarming thresholds assures that only in case of real major accident there is alarming signal.

The measuring detectors of the monitoring subsystem installed on residential area signal at the plank of the dangerous industrial establishment the appearance, dilution of gaseous cloud already signalled by the system earlier in residential area. Its main task is to support data for the introduction of civil protection measures on time.

Public alarming and information subsystem. The alarming system means installation of hooter system for alarming the public. The control centres authorized to order the alarm are placed to the county (capital) directorate's office in charge, the end-points would be started by free group-forming. The alarming system will be activated by alarm signal of the monitoring system.

b) County (regional) level. The data processing and decision preparation is done in the office in charge of county (capital) directorate for disaster management (civil protection). In case of reaching the dangerous limit an alarm is generated, effecting the manual alarming of the public – in accordance with the decision-making (action) plan defined in the external emergency plan – using the end-points of public alarming system (electronic hooters suitable also for speech emission). The control centres assuring the alarming will be placed to the relevant county (capital) directorate's office in charge, the end-points would be started by free group-forming.

c) National level. The national level assures the supervision of the centralized system. The access to the measured data via the WEB is assured in the National Directorate for Disaster Management, in the relevant office in charge of county directorates for disaster management, in the professional fire-fighting department's offices of the relevant locality.

In the MoLaRi system the data is transferred via data transmission ways which apply appropriate data protection procedures and which are in line with high safety standards and are working with high availability and redundancy. The system is planned to establish to be expandable in order to assure the reception of signals from other monitoring systems and/or in case of installation of new plants the integration of those.

Before the handing-over/taking-over there will be a test run. The internal and external emergency plans has to be modified before the start of the system and/or the personnel involved in the operation of the system has to be trained as part of the annual training program.

5. CONCLUSIONS

In the field of the prevention of major accidents involving dangerous substances another important element besides prevention is the introduction of measures for preparedness for and response to accidents. A key element in the efficiency of such measurements is the interlocking of internal and external emergency plans. Additionally successful cooperation has to be worked out between the dangerous establishment and the organizations responsible for response and intervention through the preparation and training of the internal and external emergency plans.

Regarding the effective and quick response and intervention of accidents involving dangerous substances and the minimizing of their consequences early detection of such accidents, calculation and monitoring of their possible effects and informing the decision makers are of high importance. This aim can be reached by implementing developed stable and mobile monitoring systems for dangerous substances at the dangerous establishments.

The most important element of measurements for the protection of the public is the operation of the emergency information system in case of dangerous industrial accidents, which includes the warning of the public and informing them about the behavioral rules to be followed. Informing the public could be carried out by the use of complex chemical monitoring and public warning systems at the dangerous establishments during which the interacting internal and external emergency plans are activated and worked within satisfactory conditions.

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