

**MIKLÓS ZRÍNYI  
NATIONAL DEFENCE UNIVERSITY**

**ANNAMÁRIA SÁNDOR**

**Improvement possibilities of reporting and investigation system in the field of control of  
major accidents involving dangerous substances**

PhD Thesis

Budapest  
2008

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Supervisor:

**Prof. Dr. Béla Szakál**

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## **Introduction, aim of the work**

Several minor and major accidents and considerable differences existing in the countries of the European Community regarding the management and control of industrial activities have urged various international cooperation organisations to establish international legal rules for preventing and decreasing the risk of major industrial accidents. Thus the 82/501/EEC or Seveso I Directive of historical importance regarding serious risks associated with each industrial activity was created. The aim of the law-makers was to significantly decrease the risk of industrial accidents by comprehensive control and stricter inspection in dangerous establishments regarding storing, processing and producing dangerous substances and minimise potential effects by introducing safety measures. Seveso I Directive was modified based on experiences originating from the accidents in Bhopal and Basel. A comprehensive modification of the Directive regarding major accident risks involving dangerous substances was established by the Council Directive 96/82/EC so-called Seveso II Directive in 1996. Principles determined in the Directive have become a basic document in the countries of the European Community regarding the areas of industrial and environment safety and land use planning and public information. The Seveso II Directive was modified also based on experiences major accidents with serious consequences.

Operator revealed sources of hazards connected to operation of establishment and analysed risk of dangerous activity and prepared a safety management system for granting of provide performance regarding to task of prevention and protection, in addition operator determined tasks provide prevention and mitigation of effect of major accidents since the Hungarian implementation of regulation of control of major accidents.

In spite of this fact major accidents, near misses involving dangerous substances still happen today in the process industry. This fact sheds light upon that in addition to keep legal regulations learning from lessons learned from accidents, survey of the obligations of operators and the authority are needed especially the review of the industrial accident notification, reporting and investigating system.

Aim of the work is:

1. To summarize, analyse national and international obligations related to the present reporting system of accidents involving dangerous substances and to estimate the realization of requirements and tasks determined in Hungarian rules, deduce from practice;
2. To put forward proposals in order to improve effectiveness and standardize of information of industrial accidents; determine data to make reports and statistical analysis; put forward proposals to modify laws and official practice;
3. To analyse national and international references of lessons learned from industrial accidents and near misses involving dangerous substances; to introduce international accident databases to determine data can be gained from them; introduce elements of safety management system relating to accident reporting;
4. To introduce processes, methods and principle of industrial accident investigation; analyse of information reported about accidents and incidents happened in dangerous chemical establishments in Hungary; propose new investigation report form and process;
5. To determine reporting level and content of information after industrial accidents and incidents.

## **Research Methods**

I intended to achieve my goals by treating and carefully studying of the related national and international textbooks, rules, guidelines issued by European Union and other documents, and by their subsequent analysis. I studied thoroughly the guides concerning the subject issued by the European Community, and also the decrees and regulations applied by the member countries.

Additionally base of my researches was my experience gained during my previous works that I applied mostly while I applied and enforced regulations of national laws and decrees. Besides I applied the information mentioned in the various national and international conferences, their analyzing evaluations.

## **Description of the research**

**First chapter:** I surveyed and compared the national and international reporting and investigation obligations of operators and authority in case of major accident involving dangerous substances. I revealed strengths and weaknesses of the system by SWOT analysis, I drew conclusions from the present system in order to make suggestions to improve the effectiveness of present practise.

**Second chapter:** I looked over applying possibilities of lessons learned from industrial accidents, incidents. I described the results of assessment was directed towards analysis of elements (related to accident and incident reporting and investigating) of safety management system of dangerous industrial establishments. I provided an international overview on sources and types of data available on the occurrence of chemical accidents can be gained from international databases. I assessed the realization of fulfilment of national accident, incident reporting and investigating.

**Third chapter:** I presented general processes for incident investigation that ensures that the underlying as well as immediate causes of accidents and incidents are understood, taking full account of human and organisational factors. I introduced and analyzed major industrial accidents happened in Hungary since the implementation of Seveso II Directive and investigation reports relating to these accidents; I compared them with national and international reporting requirements. These facts are the basis of suggestion I made related to standardization investigation methods in the next chapter.

**Fourth chapter:** I put forward proposals on the basis of conclusions of previous chapters. I proposed method by which data collection, reporting, analyzing and investigation of accidents and incidents and fact disclosure can be done efficiently.

### **Summary**

In spite of the application of a wide variety of safeguarding measures, many accidents and incidents involving dangerous substances in the process industry still happen today. In general, during my research it was experienced that the information and data processing related to reporting and investigating accidents and incidents have not developed yet in Hungary. There is not a consistent industrial accident reporting practice which would be suitable for statistical analysis of accidents and which promote avoid the reoccurrence of incidents and mitigate its consequences. The results of recent accident investigations and lessons learnt are not able to be summarised, because the data collection is not regulated. Accident documentation helps instil public confidence that proper actions will be taken to avoid similar accidents or accidents with similar consequences, in the future.

### **Theses**

1. I have explored development policy of reporting practice by analysis and systematization of obligations relating to industrial accident information. I have proved that realization of information of data and data processing need to be improved. On the bases of explored weaknesses and strengths I have elaborated particular suggestion to the modification of national laws and official practice in order to improve the reporting system.
2. By analysing national and international law requirements I have determined the most important parameters what can be get from major industrial accidents. According to this I have worked out forms which should be filled in case of and industrial accident and near misses after its investigation and which support filling database I have suggested and analysing accident tendencies.
3. By analysing accident investigation requirements, industrial accidents and near misses involving dangerous substances happened in Hungary after the implementation of

Seveso II Directive I have worked out method by which data collection and fact disclosure can be done efficiently.

4. By determine characteristics of safety management system of dangerous industrial establishments I have suggested elements— related to accident reporting, analysing, investigating— which should be integrated into the safety management system. I have suggested as well industrial accident severity matrix by which reporting levels can be determined after accident to disseminate lessons learned from accidents.

## **Publications**

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7. Sándor A., Szakál B.: Ipari baleseti, riasztási, jelentési, vizsgálati rendszer Magyarországon, Tudományos Közlemények 2006, III. évfolyam I. szám, SZIE Ybl Miklós Műszaki Főiskolai Kar (p. 60-72.)
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## **I/2. In national journals in English**

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13. Annamária Sándor, Béla Szakál: Accident reporting of industrial accidents, Annual News 2007, Szent István University, Ybl Miklós Faculty of Building Sciences (p.143-152)

## **I/3. Book chapter**

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2. Industrial accident reporting and investigating system in Hungary, MAHB, Ispra, 2004. december 2-3., Megjelent Interneten <http://mahbsrv.jrc.it>

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