COMMUNICATION ABOUT RISKS RESULTING FROM OPERATION OF CHEMICAL PLANTS

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Abstract

The presented text focuses on effective communication concerning the risks arising from operating chemical plants in the Czech Republic. In terms of substantive solutions to the problems, the conclusion of the article identifies and describes examples of good practice, defines proposition of effective communication and formulates a basis for communication concerning risks arising from the operation of chemical plants.

Given the need to depict an initial description of the topic, strategy of qualitative research was adopted. In the presented article the authors used explanatory and interpretative methods. The methods used for exploring the issue, in terms of explanatory methods, are the methods of analytic-synthetic and synchronous comparison. From the perspective of interpretive methods, hermeneutic approach was applied.

Key words
Risk communication; risk management; communication related with chemical accidents.

1 INTRODUCTION

Systematic approach to risk communication is an integral part of a comprehensive public preparedness to deal with emergencies and one of the important aspects of major accidents prevention.

Informing about risks related to the operation of chemical plants is based on the general public's right to this information. In the Czech Republic is that right guaranteed by the regulations.[1] This issue is more developed in accordance with the principles of implementation of so-called *Aarhus Convention*.[2]

Topicality is confirmed by opinion polls conducted within the Eurobarometer [1], according to which industrial accidents together with floods and extreme weather phenomena, considered by the population of the European Union as the most serious. Intensely is this threat perceived mainly in Western Europe and in the Scandinavian countries. The survey showed that higher awareness of these incidents is achieved at the national level - compared with information on the level of the European Union, which points out the role of national authorities, usually public authorities. Nevertheless, international organizations in this field make efforts focused primarily on defining the basic standards and unification of processes through legislative texts and methodological materials, which are then elaborated at the national level.

In addition to the mentioned "centralized" approach, where public authorities meet a key role in informing the public, it is also possible to identify "decentralized" approaches. This is a direct communication between operators of hazardous facilities and population in question.

Regarding to stated facts, this text presents approach to addressing the issue of the effectiveness of communication about risks arising from the operation of chemical plants. The goal is “To establish conditions framework for the Czech Republic basis of effective communication on the risks arising from the operation of chemical plants based on examples of good practice.”

The designation "good practice" in a general sense means proven effective approaches to implementation of the process. The outcome of the research examples of good practice is assessment of these approaches and design of identified application knowledge into concrete terms. [2] In this case this is an assessment of ways to share information about the risks arising from the operation of chemical plants and formulation of relevant measures.

To assist the initial exploration of the issue and because of low frequency of cases usable for research in this area has, within the present study, a qualitative research strategy been applied.

2 METHODOLOGY

To meet objectives is following procedure defined:

A) Identification of good practice examples

For identifying examples of good practice, are determined criteria listed in the table 1.

Table 1
Criteria of identification of good practice example

CRITERIA	CRITERIA SPECIFICATION
K1	Practice is currently being implemented or have already been proven.
K2	Practice involves the interaction at least two of following actors in risk communication, when one is always a representative of the public and also: • representative of the operator, • representative of public administrations, • NGO representatives.

B) Description of good practice examples

Taking into account the different availability of information on individual examples of good practice are implicitly monitored following indicators:

- **general conditions of good practice**
  The indicator includes a description of legal environment.
- **good practice in practice**
  The indicator includes a description of each actor of communication and their interactions. Possible interactions between the various actors:
  – public – operator;
  – public – the non-profit organization;
  – public – public administration;
  – operator – non-profit organizations;
  – operator – public administration;
  – non-profit organizations – public administration.
- **procedures used within good practice**
  The indicator includes a description of applied communication strategies - approaches to the application of methods and forms of communication. This is the application of organizational processes (strategy of direct action) and material means of communication (strategy indirect effects).

C) Definition of effective communication thesis

It's based on partial assessment of descriptions of monitored indicators of individual examples of good practice.

Within the implementation of this procedure were explanatory methods, particularly analysis, synthesis, induction, analogy and comparison applied.

3 RESULTS

3.1 Examples of good practice

On the basis of criteria laid down for identifying examples of good practice were approaches generally presented in table 2 analysed**.**

Table 2
Identification of good practice examples

EXAMPLE OF GOOD PRACTICE	COUNTRY/ REGION	SPECIFICATION K1	SPECIFICATION K2
1	Great Britain/ -	Practice carried out since 1974 to 2008	public representative representatives of operator representative of public administration
2	Netherlands/ Rijnmond	Practice carried out since 1998 to the present	public representative representatives of operator representative of public administration NGO representatives
3	Canada/Zentral Alberta	Practice carried out since 1980 to the present	public representative representative operator
4	Switzerland/ Basilej	Practice carried out to the present	public representatives representative of operator representative of public administration
5	Czech Republic/Zlín region	Practice carried out since 2003	public representative representative of operator public administration representative

With describing identified examples of good practice are following specified monitored indicators implicitly elaborated:

- general conditions of good practice,
- functioning of good practice,
- procedures used within the good practice.

3.1.1 Great Britain

As in any EU country, the subject area is specified by a law which is the transposition of Seveso directives. In case of the UK it is called "Control of Major Accident Hazards Regulations" (hereinafter "COMAH") [3]. In connection to informing the public about the risks

arising from the operation of chemical plants must the 2004 Law on Emergency Competencies be noted as well [4].

Activities of the Health and Safety Committee (hereinafter "HSE"), which performs supervision of implementation of the 1974 Law on Safety at Work under which has the Health and Safety Commission (hereinafter "HSC") been established as well, are within implementation of COMAH directives very important. HSC performed as a permanent supervisor of the involved issues and subjects such as operators, public administration and the public were represented there. [5] Mentioned subjects were consolidated in 2008 and HSE took over all agenda - the issue of participation of the affected public however is not concerned here.

General information brochure "Go in. Stay in. Tune in. ", needed in campaign "Preparing for Emergencies - What you need to know" [6] were developed within the implementation of the Law on Emergency Powers in collaboration with HSE and the relevant public authorities. This information campaign was supported by television and radio broadcasting. The booklet contains advice to the population on how to behave in case of emergencies, including chemical accidents. Gradually its Internet version was developed too and was translated into 16 languages.

In 1999, in region of Humber an initiative called Humber Chemical Focus (hereinafter "HCF") was started to intensify communication among operators within the chemical industry and to harmonize approaches to creation of relevant provisions regulating the issue. About 25 business entities [5] are involved within that initiative.

As a part of the HCF and in cooperation with relevant public authorities were information brochures in the range of 6-8 pages created for communities living near hazardous operations. Relevant information was adapted to local conditions (e.g. sites for Great Coates, Stallengborough, Immingham). Besides information brochures in terms of substantive communication means for communicating information is local newspapers used as well [5].

Within the cooperation of public administration representatives in the North East England, Yorkshire, Humber and the representatives of operators was computer game "Crucial Crew" developed. In its development were representatives of public agencies and public services (e.g. the traffic police, Fire Protection Association) participated as well. Children aged 8-11 years are the main target group of the product. The game was distributed free of charge to 3,000 primary schools. Through its version of "Crucial Crew Interactive" are children enabled to simulate the process and solutions of various emergencies. The game includes an extension for teachers. The game can also be downloaded as a mobile application. [7]

3.1.2 Netherlands

Communicating about the risks arising from the operation of chemical facilities is based on the transposition of the Seveso which is in Holland regulation "Besluit Risiciś Zware Ongevallen" (hereinafter "BRZO'99"). Then there is the so-called. "National Plan for the Environment" / "Forth National Environmental Policy Plan" (hereinafter "NEPP4"), which states improving of public awareness as one of the seven basic principles of security policy. [5]

An example of good practice is approach of SHELL Pernis applied in a densely populated region of Rijnmond – within towns of Hoogvliet, Spijkenisse, Vlaardingen, Schiedam, Pernis, and Rhoon Poortugaal. Within this largest European refinery is about 450,000 inhabitants.

In 1998, SHELL Company initiated there a formation of so-called Neighbourhood Council / Burenraad. It is a platform for exchange of information utilized by Shell as a source of information within development of brochures, posters, web sites, press releases processing (data for media), radio and television. Its members are representatives of sites endangered by mentioned operation. These are representatives of civil society initiatives, usually independent

associations, trade unions and also relevant environment departments of the Rijnmond region and representatives of Shell. Committee meets 4 times a year. [5]

Besides the above mentioned method there is so-called risk visualization which is tool of communication between public authorities and concerned public. This is a means of communication allowing unilateral action. Through mentioned Internet tool citizens can find information about threats for their location. Local government is responsible for the correctness of all information. In terms of administrative Holland is divided into a total of 12 provinces. Each province has a duty to publish this risk card. These are not related only to the issue of serious accidents prevention but there may also be mentioned for example information about behaviours during floods. [5]

3.1.3 Canada

Adjustment of above mentioned issue of communication on the risks arising from the operation of chemical plants are carried on the federal level by regulation the "Implementation Guidelines for Part 8 of the Canadian Environmental Protection Act, 1999 - Environmental Emergency Plans" [5]. It is the implementing regulation to the federal law "Environmental Emergency Regulations".

An example of good practice is the approach of Nova Chemicals, in the province of Central Alberta (Alberta Zentral), in an industrial area of Joffre Site, which is a large complex with an area of 360 ha. The company of Nova Chemicals is a signatory to the global initiative Responsible CARE®. Within the principles of this initiative is an emphasis on consistent communication with the public and informing them. Operation in the Joffre Site is one of the biggest plants for synthesis of ethylene and propylene. [5, 8]

In terms of strategies using are following forms of communication identified: [11]

- Direct action

- "Joffre Community Advisory Panel" (hereinafter "JCAP")

Through this constant communication platform is on one hand provided cooperation between representatives of chemical plants (representatives of NOVA Chemicals, INEOS, the AltaGas Company, the Glencoe company) and on the other hand, representatives of local community. JCAP is used by a Nova Chemicals for contact with public since 1980. Within the platform are following emergency preparedness topics discussed.

- "Community Open Houses"

It is a meeting of the public representatives – open days.

- "Annual Neighbour Visits"

It is a close form of cooperation, where is a chance for meeting people living within a radius of five kilometres from the industrial zone, factory representatives and employees to discuss the topic of emergency preparedness.

- Indirect effects

Indirect communication is mediated mainly via the internet, where regular information sheets are issued three times a year. Information, what changes are prepared, are in the operation and production information in the factory. Furthermore, there is the operation of emergency and information line.

3.1.4 Switzerland

Like in case of other European countries, in Switzerland are the issue regulated by a legal regulation. It is the regulation from 1991 on Protection against Major Accidents [9], which is the implementing regulation to the federal Act from 1983 on Environmental Protection and the act from 1991 on Water Protection.

Individual cantons are according to the Art. 13 of above mentioned regulation within communication about the risks obliged to inform the population about required ways of behaviour during emergencies. Federal Office for the Environment, through its branch offices spread in different cantons, informs the public about potential risks arising from the operation of hazardous facilities and about preventive measures using so-called risk registers. Risk registers contain information about organizational ensuring of serious accidents prevention and information on the nature of risks and recommended ways of behaviour.

Even if operators are not explicitly obliged to communicate with the public about the risks, it is possible to give examples of good practice with considerable creativity. This includes activities of companies Novartis, CIBA Spetzialitätenchemie, Syngenta Werk Rosental - all in the canton of Basel. Regular direct meetings of the representatives of operators with the public are most frequently used to inform the public. For this purpose, so-called neighbour groups / Nachbarschaftsgruppen are established. They then discuss among others also risks associated with the operation of given facilities. [5] Further used organizational procedures involve social events (e.g. receptions, open days) with the participation of public.

In terms of material means of communication, it is especially ensuring of all-day service of telephone information lines and issuing of regular publication "RHY Möwe". The periodical is published four times a year in an edition of 50,000 pieces and is delivered free of charge to all affected households. Here communicated information is related to reporting on events in the corresponding operation.

3.1.5 Czech Republic

Regulation of relations in the process of communication about the risks arising from the operation of chemical facilities is based on the Act of 2006 on Prevention of Major Accidents [10]. The issue of informing the public about risks is stated in the Act under the Section V. The scope and way of informing the public about potential risks associated with the operation of chemical plants is determined by regulation [11], which in its annex no. 7 further presents the content of information to the public in the emergency planning zone.

An example of good practice is related to the project which has been the subject of the implementation of the program APELL (Awareness and Preparedness for Emergencies at Local Level) in the ČEPRO company - fuel storage near villages Loukov and Osíčko. Laboratory of research and risk management at the Faculty of Safety Engineering, VSB - TUO (LABRISK) was the coordinating body for the project. The purpose of the program implementation was to improve communication among the public authorities, public and operators. [12]

The main pillars of the communication strategy were [13]:

- opinion poll,
- design of informational leaflet,
- emergency preparedness exercise.

On basis of the opinion poll, using a survey carried out in the first step, a leaflet adapted to local conditions and the results of the survey was created. Subsequently, it was organized emergency preparedness exercise which tested the cooperation of operator with representatives of public authorities (including the cooperation with the integrated rescue system).

3.2 Theses of effective communication

Theses of effective communication are defined to set the framework basis of effective communication about the risks arising from the operation of chemical plants. Theses proposal reflects a partial evaluation identified within specified examples of good practice.

Based on the analysis general expression describing examples of good practice following these are formulated:

- Communication about risks involves communication in the phase of response - crisis communication. In case of crisis communication is one-way communication effective; in the phase of prevention, preparedness and response multi-directional communication is effective.
- Multi-directional communication based on mutual exchange of information among the different parties of communication and feedback to their content and form is a prerequisite for effective risk communication.
- Effectiveness of risk communication depends on ways / forms of its realization.
- A successful communication strategy in the field of risk communication is based on a combination of organizational processes (direct impact) and material means of communication (indirect impact).
- Examples of good practice demonstrate the importance of communication platforms - professional bodies where regular working meetings of the representatives of the public, representatives of operators, representatives of non-profit institutions and representatives of public authorities take place.

4 CONCLUSIONS

For effective communication on the risks arising from the operation of chemical plants and to define key points of the communication strategy in the scope of the Czech Republic it is important to keep following conclusions:

- to combine material means of communication and organizational procedures;
- to make the use of direct meetings more intensive;
- to initiate the establishment of institutions in the form of communication platforms characterized in the result part of the study;
- to support the establishment of platforms preferentially in large industrial zones with cumulative risks;
- to make the use of material means of communication - brochures, leaflets, internet presentations, the use of social networks, the use of television and radio broadcasting – more intensive and efficient;
- the introduction of effective communication on the risks arising from the operation of chemical plants can be done without demands on extensive legal alteration;
- to create methodological material to support the implementation of communication on the risks arising from the operation of chemical plants for the conditions of the Czech Republic.

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NOTES:

[1] E.g. The Act of 13 May 1998 On the Right to Information on the Environment; The Act of 11 May 1999 on Free Access to Information.

[2] Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

References

[1] *Special Eurobarometr 383: Civil Protection* [online]. [cit. 2016-12-05]. Retrieved from: http://ec.europa.eu/echo/files/eurobarometer/reports/CP.pdf

[2] OVERMAN, E., J. BOYD. Best Practice Research & Postbureaucratic Reform [online]. *Journal of Public Administration Research & Theory*. 1994, 4(1) [cit. 2016-12-22]. ISSN 1477-980. Retrieved from: http://oied.ncsu.edu/selc/wp-content/uploads/2013/03/Best-Practice-Research-and-Postbureaucratic-Reform.pdf

[3] *Control of major accident hazards* [online]. [cit. 2016-12-06]. Retrieved from: http://www.hse.gov.uk/comah/

[4] *Civil Contingencies Act 2004* [online]. [cit. 2016-12-12]. Retrieved from: http://www.ifrc.org/docs/idrl/782EN.pdf

[5] *Bericht Risikokommunikation, Anforderungen nach Störfall-Verordnung, Praxis und Empfehlungen* [online]. [cit. 2016-12-22]. Retrieved from: http://www.sfk-taa.de/publikationen/kas/KAS_5.pdf

[6] *Preparing for Emergenicies – What you need to know* [online]. [cit. 2016-12-08]. Retrieved from: http://www.direct.gov.uk/prod_consum_dg/groups/dg_digitalassets/@dg/@en/documents/digitalasset/dg_176618.pdf

[7] *Crucial Crew* [online]. [cit. 2016-01-08]. Retrieved from: http://www.crucial-crew.org/

[8] *Nova Chemicals* [online]. [cit. 2016-12-22]. Retrieved from: http://www.novachem.com/Pages/joffre/joffre-community.aspx

[9] *Verordnungüber den Schutz vor Störfällen* [online]. [cit. 2016-12-06]. Retrieved from: http://www.admin.ch/opc/de/classified-compilation/19910033/index.html

[10] Czech Republic. Law no. 59 dated 2 2. 2006 on prevention of serious accidents caused by dangerous chemicals or chemical preparations and amending Act no. 258/2000 Coll., On protection of public health and amending certain related laws, as amended, and Act no. 320/2002 Coll., to amend and repeal certain acts in connection with the termination of district offices, as amended, the Act on prevention of serious accidents. In: *Collection of Laws of the Czech Republic*. 2006 amount 25th.

[11] Czech Republic. Ministry of the Environment. Decree no. 256 of 22. 5. 2006 on details of the serious accident prevention system for the preparation and execution of the tasks in protecting the population. In: *Collection of Laws of the Czech Republic*. 2006 amount 82nd.

[12] NEVRLÁ, P., K. KANICHOVÁ. APELL a POkR – možné přístupy při informování veřejnosti v oblasti prevence závažných havárií. In: *Mezinárodní konference Požární ochrana 2005*. Ostrava: Sdružení požárního a bezpečnostního inženýrství, 2005. ISBN 80-86634-66-3.

[13] NEVRLÁ, P. Využití programu APELL při zvyšování havarijní připravenosti. *112: odborný časopis požární ochrany, integrovaného záchranného systému a ochrany obyvatelstva*. 2006, č. 6, s. 20-21. ISSN 1213-7057.