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GLOBAL PARTNERSHIP FOR CHEMICAL SAFETY

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ABSTRACT: *Chemical plants play a key role in modern industrial society, producing and processing essential chemicals for many industries. However, these plants also face potential threats to the environment and human health, which they must address through appropriate safety measures. Chemical safety is a priority in terms of accident prevention, environmental protection, and public information. This is the only way to ensure the sustainable operation of chemical plants and the effective reduction of environmental risks, which are essential to protect the public and promote sustainable development. Developing and enforcing appropriate chemical safety measures and regulations is key to protecting not only the plants but also communities and the environment. This will ensure harmonious coexistence and a sustainable future for the chemical industry and the surrounding social environment.*

KEYWORDS: *chemical safety, database, threat, protection, security, safety, population*

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INTRODUCTION

The challenge of public security is increasingly at the heart of social and economic stability, as natural and man-made threats grow in number and complexity. Advances and innovations in information technology in the forecasting, prevention, and management of such disasters offer new opportunities to develop more effective measures and responses. Online platforms and systems are increasingly becoming central elements of disaster management, allowing for rapid and efficient monitoring of events, analysis of case studies, data sharing, and collaboration between disaster management professionals and organisations. They also enable communities affected by disasters to participate in preparedness and response and to share their experiences and information with others.

However, to use these online tools and platforms effectively, it is important to be aware of their strengths and limitations. Each platform has different characteristics and capabilities,

and disaster management professionals and decision-makers need to carefully assess these aspects in order to work effectively with the platforms.

In this context, it is worth comparing and evaluating these platforms to identify their strengths, challenges, and possible recommendations for their improvement. Such comparative analysis can help disaster management professionals and organisations make the best decisions in preventing and managing disasters and promote social and economic stability. Despite the increasingly stringent legislation on hazardous substances (such as REACH, GHS and CLP), there have been many incidents and accidents involving hazardous substances over the past decade. The REACH[1] Regulation (Registration, Evaluation, Authorisation and Restriction of Chemicals) is a European Union regulation (EC 197/2006) introduced in 2007 to promote the safe management of chemicals to protect human health and the environment, while supporting the competitiveness of the chemical industry. The regulation requires companies to register the chemicals they produce or import, assess their risk, and ensure their safe use. If risks cannot be managed, the use of substances can be restricted or banned. The legislation covers manufacturers, importers, and downstream users within the EU, while obligations for non-EU companies are taken over by EU importers or designated representatives.

The GHS[2] (Globally Harmonized System of Classification and Labelling of Chemicals) is a globally harmonised system for the classification and labelling of chemicals developed by the United Nations. Its aim is to provide users with clear and easy-to-understand information on the hazards of substances, whether in the workplace, for consumer use, or environmental protection. The GHS has introduced standardised pictograms, warning phrases, and warning words. The CLP Regulation (1272/2008) is the European Union regulation that standardises the classification, labelling, and packaging of chemicals and mixtures in line with the United Nations Globally Harmonised System (GHS). The CLP[3] regulation, which entered into force in 2009, aims to identify hazardous substances and inform users of the risk to health and the environment. CLP has gradually replaced the previous directives on dangerous substances (67/548/EEC) and preparations (1999/45/EC), which expired in 2015, thus ensuring a consistent EU approach to the management of chemicals. So, the GHS is the global standard developed by the UN that unifies the classification and labelling of hazardous chemicals, while the CLP regulation (EC 1272/2008), which closely follows the GHS directives, applies in the European Union and covers the classification, labelling, and packaging of chemicals within the EU. These regulations play an important role in minimising the risk of accidents involving chemicals, yet the accident in Beirut on 4 August 2020, involving the explosion of 2,750 tonnes of dangerous ammonium nitrate, killed nearly 150 people, injured thousands, left 300,000 homeless, and severely damaged hundreds of historic buildings. The explosion created a crater of 140–200 meters in diameter filled with seawater. This accident proved that following the rules is key to avoiding disasters.[4]

A similar disruption was caused by the rupture of the 800 mm diameter high-pressure gas pipeline between Hajdúszoboszló and Endrőd in the Püspökladány area a few minutes

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1 REACH: https://echa.europa.eu/hu/regulations/reach/understanding-reach (Accessed: 11 November 2024).

2 GHS: https://unece.org/ghs-rev8-2019 (Accessed: 11 November 2024).

3 CLP: https://osha.europa.eu/hu/themes/dangerous-substances/clp-classification-labelling-and-packaging-of-substances-and-mixtures (Accessed: 11 November 2024).

4 Polish International Assistance Centre (PCPM) 2020.

before 3 a.m. on 18 November 2019, which resulted in significant heat radiation within several hundred metres. There were no casualties as the affected section of the pipeline was located outside residential areas as a result of the settlement plan.[5]

INTERNATIONAL ALLIANCE/COALITION FOR CHEMICAL SAFETY

Globally Harmonised System (GHS) for the Classification and Labelling of Chemicals and the international relevance of the International Labour Organization (ILO)

During the 1950s, the international community began to work together on the classification and labelling of chemicals to improve the safety of the transport and use of hazardous substances. During this period, ILO and ECOSOC[6] played an important role in the development and implementation of classification and labelling systems. In the late 1950s and early 1960s, the UN and other international and regional organisations, such as IMO[7] and ICAO,[8] widely applied the UN RTDG[9] recommendations on the safety of the transport of dangerous goods.

At the end of the 1980s and the beginning of the 1990s, resolutions adopted by ILO further strengthened the steps towards international harmonisation, particularly regarding safety at work and the use of hazardous chemicals in the workplace. Furthermore, the expert consultation organised by ILO in 1991 was of particular importance for the harmonisation of classification systems, resulting in an update of the harmonisation exercise in 1992.[10]

OECD[11] joined the international harmonisation activities in 1991 and established a joint information centre for the harmonisation of classification criteria. The Coordination Group for Harmonisation of Chemical Classification Systems (CG/HCCS), initiated by ILO, was established in 1992 within the framework of the IPCS, as a result of close cooperation among ILO, WHO,[12] UNEP,[13] UN CETDG,[14] and OECD. The decisions of the 1992

[5] VG: VilágGazdaság 2019.

[6] ECOSOC: the United Nations Economic and Social Council serves as the central forum for discussing international economic and social issues, and formulating policy recommendations addressed to member states.

[7] IMO: the International Maritime Organization is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships.

[8] ICAO: the International Civil Aviation Organization is a United Nations agency that helps 193 countries to cooperate and share their skies to their mutual benefit

[9] UN RTDG: the UN Recommendations on the Transport of Dangerous Goods covers the transport of dangerous goods by all modes of transport except by bulk tanker.

[10] See more: ILO Website: https://www.ilo.org/static/english/protection/safework/ghs/back.htm.

[11] OECD: the Organisation for Economic Co-operation and Development is an international organisation that works to build better policies for better lives. Hungary has been a member of the Paris-based international economic organisation since 1996.

[12] WHO: the World Health Organization is a specialized agency of the UN responsible for international public health.

[13] UNEP: United Nations Environment Programme.

[14] UN CETDG: United Nations Committee of Experts on the Transport of Dangerous Goods.

UNCED Conference were key to harmonising the classification and labelling of chemicals and promoting the sound management of chemicals.

The establishment of the International Commission of Control and Supervision (ICCS) in 1994 confirmed the priorities and the work to be done for classification and labelling harmonisation at the global level. In the mid-1990s, six intergovernmental organisations created the International Online Medical Council (IOMC), which coordinated cooperation in the field of chemical safety. IOCC coordinates chemical safety activities within IOMC, ensuring concerted action and effective harmonisation.

The acknowledged central role of the CG/HCCS and its oversight of the harmonisation work, recognised by UNCED[15] and ICCS, have given further impetus to the global harmonisation of the classification and labelling of chemicals. In order to move forward, the forum called for action plans to be developed to implement the harmonisation work at the national level.

Table 1 *Areas of harmonisation (edited from the Focal Point list* by the authors)*

AREAS OF HARMONISATION	
HEALTH HAZARDS AND DANGER TO THE ENVIRONMENT	**Focal point: OECD/AG-HCL**
Hazardous to the Aquatic Environment	AG-HCL Working Group
Hazardous to the Terrestrial Environment	
Acute Toxicity	
Irritation/Corrosion of Biological Tissue	Germany/USA
Sensitization	Sweden/Germany
Reproductive Toxicity	Australia/UK
Germ Cell Mutagenicity	Netherlands/UK/Germany
Carcinogenicity	Norway/Netherlands
Long-term Systemic Toxicity	Belgium/USA
Neurotoxicity and Immunotoxicity	
METHODOLOGY	**Focal point: OECD**
Classification of mixtures/preparations	Lead country: Canada
PHYSICAL HAZARDS	**Focal points: UN CETDG, ILO**
Reactivity	Working Group chaired by the UK
Flammability	Working Group chaired by Germany
Related Tests and Criteria	UN CETDG
HAZARD COMMUNICATION	Focal point: ILO/CIS
Labelling: minimum data element requirements; graphic hazard symbols (pictograms, colours, frames); comprehensibility of written and graphic hazard warnings; method for the selection of proper hazard symbols and risk and safety phrases. Chemical safety data sheets: format; data elements; harmonization of phraseology; phraseology comprehensibility; means of dissemination on a worldwide basis. Training in hazard communication: (workplace, transport, consumers); harmonization of principles for the elaboration of training packages for compilers and users.	

* Focal Point: https://webapps.ilo.org/static/english/protection/safework/ghs/areasof.htm (Accessed: 29 March 2024).

[15] UNCED: United Nations Conference on Environment and Development.

International Labour Organization

Table 1 shows that the areas of harmonisation relating to health and environmental hazards cover a wide range and play a key role in protecting workers and the environment. OECD/AG-HCL focuses on the classification of health hazards and environmental hazards and deals in detail with, for example, substances hazardous to the aquatic and terrestrial environment, acute toxicity, and reproductive toxicity.

Irritation of biological tissues, hypersensitivity, carcinogenicity, and other hazards play an important role in health protection, and many countries, such as Germany, the USA, or the Netherlands, pay particular attention to these.

In the methodological field, the OECD plays a leading role in the classification of mixtures and preparations, while physical hazards, reactivity, and flammability are the focus of attention of the UN CETDG and ILO. In these areas, country-led working groups are helping to develop common principles and criteria.

In the field of hazard communication, ILO and CIS provide support in the area of labelling and chemical safety data sheets. This includes the definition of minimum requirements for data elements, the use of graphic hazard symbols, and clear phraseology. It is also important to develop hazard communication training for workplaces, transport, and consumers, and to harmonise training packages for translators and users. The application of harmonised methods and principles worldwide will contribute to safer workplaces and environments and help to minimise hazards and harm.

As shown in *Table 2–3*, participation in the IOMC CG/HCCS (Inter-Organization Programme for the Sound Management of Chemicals – Chemicals Management Programme – Coordinating Group of the Harmonization of Chemical Classification Systems) is characterized by the participation of states, international organizations, regional bodies, and non-governmental organisations working together to ensure the safe management of chemicals.

Some of the countries involved include Australia, Brazil, Canada, China, India, Japan, New Zealand, Russia, the United Kingdom, South Africa, Sweden, and the United States of America, which participate through various ministries or authorities (health, environment, or labour).

Among the international organisations, there are important institutions such as WHO, ILO, FAO, UNEP, IMO, ICAO, UN CETDG, and OECD, which are extensively involved in the development of international standards and guidelines on chemicals.

Regional bodies include the Commission of the European Union (CEU), which is responsible for coordinating EU legislation on chemicals. NGOs include important players such as IOE, ICME, ICFTU, ISSA, IOCU, and WWF, representing the interests of industry, workers, consumers, and environmentalists.

The focus of the programme includes the management of health and environmental hazards, physical hazards, reactivity and flammability, and hazard communication. The secretariat of the programme is provided by the ILO Occupational Safety and Health (OSH) Branch. Cooperation among participants aims at safer management of chemicals and harmonisation of standards at the global level.

As can be seen from *Table 4*, the collection of links to information on chemical management available on the Internet is broken down into a detailed list of available resources by international organisation, country, region, and non-governmental organisation (NGO).

Table 2 *Participation in IOMC, part 1 (edited from the SafeWork list* by the authors)*

PARTICIPATION IN THE IOMC CG/HCCS			
COUNTRIES		**COUNTRIES**	
Australia	Worksafe Australia	New Zealand	Ministry of Environment
Brazil	Ministry of Labour	Russian Federation	Ministry of Health
Canada	Human Resources Development Canada – Labour Program	South Africa	Ministry of Labour
China	Ministry of Labour	Sweden	National Chemicals Inspectorate (KEMI)
India	Ministry of Environment and Forests	United Kingdom	Health and Safety Executive
Japan	Ministries of Health, Environment, Labour and Industry	United States of America	Occupational Safety and Health Administration
INTERNATIONAL ORGANIZATIONS/PROGRAMMES			
World Health Organization (WHO)			
International Labour Office (ILO)			
Food and Agriculture Organization of the UN (FAO)			
United Nations Environment Programme (UNEP)			
International Maritime Organization (IMO)			
International Civil Aviation Organization (ICAO)			
UN ECE Committee of Experts on Transport of Dangerous Goods (UN CETDG)			
Organization for Economic Co-operation and Development (OECD)			
REGIONAL BODIES			
Commission of the European Union (CEU)			

* SafeWork: https://webapps.ilo.org/static/english/protection/safework/ghs/particip.htm (Accessed: 29 March 2024).

Table 3 *Participation in IOMC, part 2 (edited from the SafeWork list* by the authors)*

PARTICIPATION IN THE IOMC CG/HCCS
NON-GOVERNMENTAL ORGANIZATIONS
International Organization of Employers (IOE)
International Council of Chemical Associations (Japan, Canada, USA, Australia, Europe)
International Council on Metals and the Environment (ICME)
Hazardous Materials Advisory Council (HMAC, USA)
International Frozen Foods Association (IFFA)
International Federation of Pharmaceutical Manufacturers Association (IFPMA)
International Confederation of Free Trade Unions (ICFTU)
International Federation of Chemical, Energy, Mines and General Workers' Union (ICEM)
World Wide Fund for Nature (WWF)
International Organization of Consumers Unions (IOCU)
International Social Security Association (ISSA)
FOCAL POINTS
OECD Health hazards and danger to the environment
UN CETDG/ILO Physical hazards (reactive and flammable materials)
ILO Hazard communication
SECRETARIAT
International Labour Office, Occupational Safety and Health Branch

* SafeWork: https://webapps.ilo.org/static/english/protection/safework/ghs/particip.htm (Accessed: 29 March 2024).

Table 4 *Participation in IOMC, part 3 (edited from the SafeWork list* by the authors)*

PARTICIPATION IN THE IOMC (COUNTRIES / REGIONS)	
AUSTRALIA	**UNITED STATES OF AMERICA (USA)**
Worksafe Australia	Environmental Protection Agency – EPA
CANADA	Centers for Disease Control and Prevention – CDC
Canadian Centre for Occupational Health and Safety – CCOHS	National Institute of Environmental Health Sciences – NIEHS
La Commission de la santé et de la sécurité du travail – CSST	US EPA Office of Prevention, Pesticides and Toxic Substances
International Development Research Centre	California, Environmental Protection Agency
FINLAND	Chemical Industry Institute of Technology – CIIT
Finnish Institute of Occupational Health	Consumer Product Safety Commission – CPSC
JAPAN	National Toxicology Program – NTP
National Institute of Health Sciences – NIHS	Federal Emergency Management Agency – FEMA
National Institute of Health – NIH	Food and Drug Administration – FDA
National Cancer Center – NCC	Agency for Toxic Substances and Disease Registry
National Institute of Industrial Safety	National Institutes of Health – NIH
National Institute of Industrial Health	National Technical Information Service – NTIS
Tokyo Metropolitan Res. Lab. of Public Health	Environmental Monitoring and Assessment Program – EMAP
Japan Industrial Safety and Health Association – JISHA	ACGIH – American Conference of Governmental Industrial Hygienists
UNITED KINGDOM (UK)	Occupational Safety and Health Administration
UK Department of Health	U.S. Department of Health and Human Services
Institute for Environment and Health – IEH	Other Government Information Servers
Communicable Disease Surveillance Centre	U.S. Federal Government Agencies
Physical & Theoretical Chemistry Laboratory, Oxford University	National Institute for Occupational Safety and Health – NIOSH
Cambridge University Chemical Laboratory	Association of Official Analytical Chemists
EUROPE	CMA – The Chemical Manufacturers Association
United Nations Economic Commission for Europe – UN-ECE	Draft of ACGIH – American Conference of Governmental Industrial Hygienists
UN-ECE: Industry and Technology Division	
UN-ECE: Chemical Industry	
European Chemical Industry Council	

* SafeWork: https://webapps.ilo.org/static/english/protection/safework/ghs/particip.htm (Accessed: 29 March 2024).

The international organisations include important institutions such as FAO, IAEA,[16] ILO, ISO, OECD, UNDP, UNEP, WHO, and WTO.[17] These organisations offer various programmes and databases for information on chemicals.

Some of those countries and regions include Australia, Canada, Europe, Japan, and the United States. These countries provide data, research, and guidelines on chemical management through their governmental and institutional sites.

NGOs include environmental organisations such as EcoNet and Greenpeace, as well as other organisations such as WWF, which also provide relevant information and campaigns on the environmental and health impacts of chemicals.

The organisation also operates several expert groups and advisory bodies, listed in *Table 4,* which aim to develop international guidelines on the use of chemicals in the workplace and to improve the safety of their use.

The International Labour Organisation plays a key role in promoting the safe management of chemicals in the workplace and in communicating risks effectively. To this end, it has produced a number of background materials and documents on the subject.[18] These include a 1996 report on responses to chemical risks. In addition, their 1998 publication analyses the scientific background to communicating chemicals relevant to health and safety. They also considered it important to produce an updated bibliography on communicating chemical hazards and a study on comprehensibility, particularly in Southern African countries.

In addition to the ILO, other organisations are also involved in this effort. IOMC and OECD are also important partners in this field. The IOMC Coordination Group and the documents of the 10th Consultation on the HCCS are also available on the ILO website.

The uploaded documents and background materials provide a reference for countries and organisations in the development and implementation of chemical safety measures, thus contributing to the protection of workers and the environment.

INCHEM

INCHEM is an electronic database created in 1997 as a result of a collaboration between the International Programme on Chemical Safety (IPCS) and the Canadian Centre for Occupational Health and Safety (CCOHS). This database contains a variety of chemical safety-related publications and database entries. INCHEM offers more than 8,000 chemical and chemical risk-related documents, providing quick and free access to their proper management. These documents are peer-reviewed and come from different exposure scenarios, including occupational exposure.[19]

The IPCS INCHEM is directly aligned with the priorities of the Intergovernmental Forum on Chemical Safety (IFCS), which aims to promote public access to the latest internationally recognised publications and databases on chemical safety from international organisations.

[16] IEAE: International Atomic Energy Agency.
[17] WTO: World Trade Organization.
[18] See more: https://www.ilo.org/static/english/protection/safework/ghs/ghsdocs/index.htm.
[19] Graczyk 2024, 525–526.

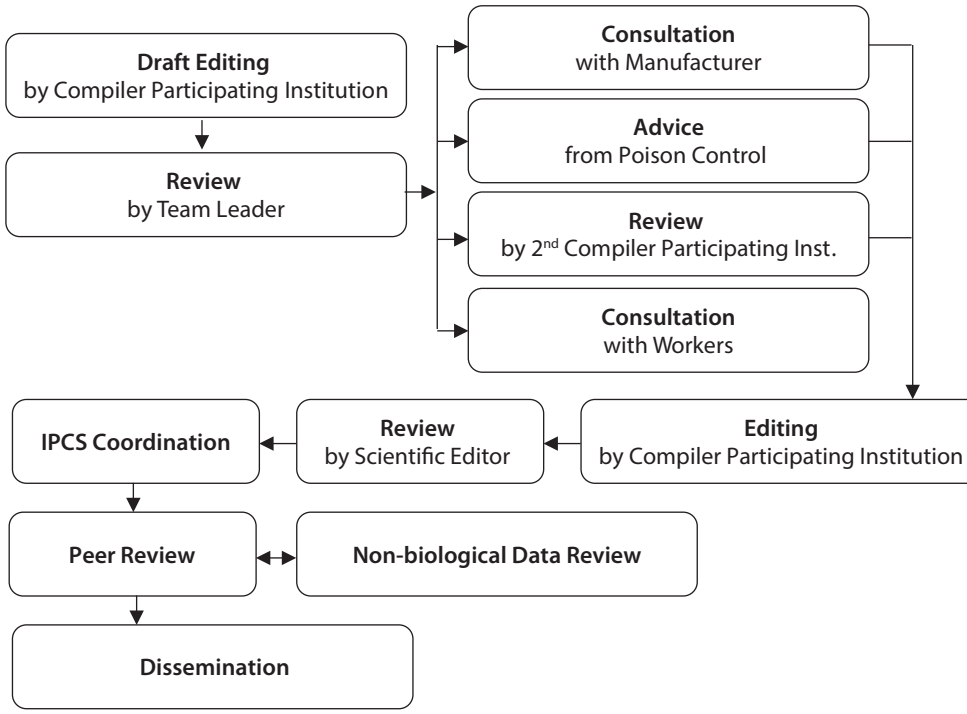

Figure 1 *ICSC flow diagram (Niemeier – Obadia, 2001, edited by the authors)*

IPCS INCHEM is an indispensable tool for professionals involved in chemical safety and the proper management of chemicals. Key features and information offered by INCHEM:

– International Chemical Safety Cards (ICSCs) are short, condensed documents containing information on the health, safety, and environmental risks of chemicals.[20] These cards provide quick access to key information, including hazards, exposure pathways, health effects, and handling guidelines.[21]
– Concise International Chemical Assessment Documents (CICADS) are short, concise documents that summarise the potential health and environmental effects of chemicals. These assessments are carried out by international experts and are based on international or regional assessments or existing Environmental Health Criteria (EHC) documents. The risks to human health and the environment are determined by the type and extent of exposure and can vary considerably depending on the exposure. The CICADs are intended to provide critical information for characterizing the risk of chemicals, but readers are encouraged to consult identified source documents as well.
– The INCHEM also includes toxicological data on chemicals, hazard assessment, exposure pathways, and guidelines for managing health emergencies. It also includes priority documents and manuals on chemical accident management, chemical hazard assessment, and chemical safety in the workplace.

[20] See more: https://inchem.org/pages/about.html.
[21] Niemeier – Obadia 2001, 107–115.

INCHEM has its own website,[22] which is free of charge and provides a wide range of information for chemical safety and health professionals, decision-makers, and the general public.

eCHEMPORTAL

The eChemPortal website is a free web portal where information on the safety of chemicals, including identification, chemical properties, effects, and classifications, is easily accessible. Users can find direct links to various websites that offer detailed information on chemical hazards, risks, and exposure, as well as information related to international chemical programmes.[23] Classification results according to national/regional hazard classification systems or the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) are available. The eChemPortal also provides exposure and useful information on chemicals.

Valid information that can be obtained from the portal includes:
- Physical chemical properties;
- Ecotoxicity;
- Toxicity;
- Environmental fate and behaviour;
- Classification and labelling;
- Exposure and use.

Direct data access is provided on the portal, where databases such as the EU REACH List of registered substances,[24] Candidate List of Substances of Very High Concern (SVHC),[25] or the Registry of Intentions (SVHC, harmonised classification and labelling, restrictions)[26] can be found.

Perhaps what makes the portal unique is that it provides access to Australian, Canadian, New Zealand, and American direct access databases. All of these access points have absolutely valid and open, official source information, which in this case can be of paramount importance to a researcher or defence professional.

eMARS

The European Commission operates a reporting system and database, the Major Accident Reporting System (MARS), for the purpose of reporting the experience of major accidents involving dangerous substances.[27]

[22] See more: https://inchem.org/#/.

[23] De Marcellus 2023, 1017–1029.

[24] List of registered substances: https://echa.europa.eu/en/web/guest/information-on-chemicals/registered-substances (Accessed: 30 March 2024).

[25] Candidate List of Substances of Very High Concern: https://echa.europa.eu/web/guest/candidate-list-table (Accessed: 30 March 2024).

[26] Registry of Intentions: https://echa.europa.eu/information-on-chemicals (Accessed: 5 April 2024).

[27] European Commission website: https://emars.jrc.ec.europa.eu/EN/emars/content (Accessed: 30 March 2024).

The eMARS (European Major Accident Reporting System) is an online platform operated by the European Commission's Joint Research Centre (JRC). eMARS, the major accident reporting system, was originally developed in 1982 under the EU's Seveso Directive 82/501/EEC. The aim of the directive was to regulate and prevent major chemical accidents in establishments that use or store dangerous substances, facilitate the exchange of lessons learned from accidents involving dangerous substances in order to avoid chemical accidents and their possible consequences, and keep the database operational and ensure that credible data are recorded in the system; anonymity is encouraged in the interest of companies. The name, location, and confidential information of the undertaking are not included in the system. The database is public and the public is allowed to consult it. The eMARS database provides accurate data going back 2–3 years, as the investigation and closure of accidents often take years, after which the data are made public. Access to the database and data extraction can be done at any time according to the request of the searcher.

However, the scheme is relevant not only in the EU but also in the countries of the European Economic Area (EEA), the OECD, and the United Nations Economic Commission for Europe (UNECE).

The European Major Accident Reporting System is extremely useful for international cooperation and data sharing, as the most important analyses of chemical accidents are available on this platform. Unfortunately, language barriers and different national data protection regimes do not make it easy to share information. In order to facilitate data access, it is recommended to consider multilingual posting and of course the introduction of more transparent data protection rules and measures.

SEARCH ACCIDENT REPORTS – RESULTS – "1207 ACCIDENT REPORTS"

EU Member States are obliged to notify eMARS of the incidents if the accident involves a Seveso establishment and complies with the requirements of the Seveso III Directive. However, for OECD and UNECE countries outside the EU, accident reporting is voluntary. The eMARS data are regularly updated and maintained by the Major Accident Hazards Bureau (MAHB) and the English translation of the reports is carried out by the European Commission's POETRY service. This ensures that the system is up-to-date and effective in dealing with accidents involving dangerous substances and mitigating their consequences.[28]

eMARS allows disaster management authorities and professionals to easily access information and case studies on chemical accidents, thus helping prevention and mitigation. It ensures learning and lessons can be drawn from accidents. It will support cooperation and data sharing on chemical accident information between EU Member States and other international organisations, which can greatly contribute to the development of safety standards and procedures. Another advantage of eMARS is that the publicly available platform is a user-friendly interface where accident reports can be easily searched and browsed. The system presents accidents by year, country, and category in a transparent way. In addition, eMARS allows data to be downloaded and further analysed for the development of disaster management measures and strategies. However, the downside and difficulty of eMARS is that it needs to protect the confidentiality of data and sensitive information,

[28] European Commission website: https://emars.jrc.ec.europa.eu/en/emars/content (Accessed: 30 March 2024).

which raises complex issues of privacy and data management. It is mainly available in English, which may limit those who do not speak this language. As it is a complex system, it requires considerable resources and expertise to manage and maintain.

Delays in the reporting and analysis processes can reduce the timeliness and relevance of the data. eMARS is an important tool in the field of disaster management, allowing for the collection and sharing of information on chemical accidents at the European and international levels.

The further development of the eMARS system and the strengthening of international cooperation can help to develop even more effective and efficient preventive measures to reduce accidents involving dangerous substances.

Several different data on chemical accidents can be viewed through the eMARS platform: the description of the accidents, time, location, and chemicals involved; the size of the area affected by the incident and the number of people living in the vicinity; the number of people injured as a result of the accident and the type and extent of the damage caused; measures taken following the incident and their effectiveness; names and contact details of the authorities reporting and managing the incident. These data will allow users to understand in detail the circumstances of the various chemical accidents and use them to develop preventive measures and responses.

Based on data from the eMARS platform over the past year, chemical accident rates can vary according to factors such as the type of accident, the type of chemical, and the population of the affected area. However, in general, rates can be assessed by the following criteria:

- There may be differences in rates between different types of chemical accidents – rates of malfunctions, spills, explosions, or fires.
- The type of chemicals involved in accidents may also affect the rates. Certain hazardous substances may cause accidents more often or have more serious consequences.
- Rates are affected by the population of the affected area and its environmental sensitivity. Accidents in an area with a larger population may have a greater impact on people and the environment.

However, to accurately determine Search Accident Reports,[29] detailed data and analysis are needed and can be accessed through the eMARS platform.

CONCLUSION

In our comparative analysis, we have carefully examined the advantages and disadvantages of each platform and highlighted the importance of the recommendations. Through this, we have assessed which development opportunities offer advantages for Hungary and in which areas the practices of other countries should be taken into account when adopting them.

Every chemical database has its advantages and disadvantages, so the following suggestions have been made for Hungary's location and potential.

In terms of proposals, the arguments in favour of adopting eMARS include highlighting the benefits of EU-wide cooperation and data sharing. The eMARS system offers the possibility for Hungary to actively participate in the international chemical security network,

[29] European Commission website: https://emars.jrc.ec.europa.eu/en/emars/accident/search (Accessed: 30 March 2024).

allowing for the exchange of data and best practices with other European countries and EU institutions. This will allow Hungary to access up-to-date information, learn from the experiences of other countries, and work with other member states to prevent and manage chemical incidents.

However, the language barriers of the eMARS system may make it difficult for other countries to access it. It is therefore recommended to introduce multilingualism on the eMARS platform to make it more accessible to other countries. This could include support for the Hungarian language in addition to English and other European languages to make data and information easier to understand for Hungarians.

The establishment of a Hungarian database would also be an important step in the field of chemical safety, allowing Hungary to collect and manage data specifically tailored to its domestic conditions and needs in the management of chemical accidents and disasters. Such a Hungarian database could help disaster management authorities to respond faster and more efficiently to incidents of this kind, and could also help in forecasting and prevention.

It is important to note, however, that a Hungarian database of its own should be in line with European and international standards and practices, with the aim of enabling Hungary to cooperate effectively with other countries in data sharing and collaboration. In addition, the database should be detailed and up-to-date, and disaster management authorities and other relevant organisations should be actively involved in collecting and updating the data.

Overall, the adoption of eMARS combined with the creation of a Hungarian database would be the most appropriate solution for Hungary in the field of chemical safety. eMARS allows EU-wide cooperation and data sharing, while a Hungarian database would help to address specific Hungarian needs and circumstances. This would enable Hungary to respond effectively to chemical threats and incidents while working with other European and international partners to share data and best practices and improve disaster management systems.

Hungary should pay more attention to linguistic multilingualism and developing interactivity to improve the accessibility and usability of disaster management information. It would also be worthwhile to study and apply European and international practices in order to identify and implement best practices.

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