OPERATIONAL PLANS AND PROCEDURES
FOR MARITIME SEARCH AND RESCUE
IN HNS INCIDENTS
2016 - 2019

PUBLICATIONS OF THE CHEMSAR PROJECT
4:2017

CHEMICAL DATABASES AND INFORMATION ABOUT CARGO ON BOARD

Talvikki Välimaa

EU STRATEGY FOR THE BALTIC SEA REGION FLAGSHIP

Interreg Baltic Sea Region

EUROPEAN UNION EUROPEAN REGIONAL DEVELOPMENT FUND

ChemSAR

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Turku 2017

PUBLISHED BY:
ChemSAR Project
Centre for Maritime Studies
University of Turku
Joukahaisenkatu 3-5, FI- 20014 University of Turku, Finland

Turku, 2017

FOREWORD

Incidents and maritime search and rescue operations (SAR) involving hazardous and noxious substances (HNS) almost always require international coordination, clear practices and common procedures. ChemSAR project was born out of an identified need to develop preparedness to respond to these kinds of situations more efficiently in the Baltic Sea region. In addition to international coordination and operational procedures, there is a need for precise, up-to-date and easily obtainable information of chemical substances to support maritime SAR operations. For this purpose there exist numerous different chemical databases. However, problem is not the lack of information in quantity, but rather in the fragmented nature of relevant chemical information in numerous different databases. Thus at the brink of an accident obtaining relevant information on chemical substances and response measures quickly and easily becomes crucial.

Vast amount of chemical databases in itself restricts the usability of databases and hinders retrieving essential information. Some users lean on national databases. International databases are used variedly, and the knowledge of available databases or their contents is to some extent lacking. Some databases are public and open for all, while some are designed only for authorities or for commercial use. Thus one challenge for the usability of databases lies in the factors that limit potential user groups and their user rights.

As a part of the ChemSAR project, this background report offers vital information on the current situation and highlights the issues which are crucial both for retrieving information on chemical substances and for further development of maritime response measures in HNS incidents. ChemSAR project aims at providing solutions to these aforementioned problems and deficiencies by developing a chemical databank that brings together fragmented information on chemical substances and HNS response measures. In the development of the databank ChemSAR aims at solving the challenges emphasized in this report and finding a practical solution to support information retrieval of HNS substances in maritime SAR operations.

As the leader of work package 4, the Finnish Border Guard would like to thank the University of Turku Centre for Maritime Studies and other project partners for your valuable contributions.

Seppo Häkkinen, Juho Kurttio and Teemu Niemelä
Finnish Border Guard

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1 INTRODUCTION

Baltic Sea is one of the most heavily trafficked seas globally and surrounded by densely populated areas. Traffic in the Baltic Sea is increasing as well as number of different chemicals transported to the needs of the various industry sectors and for retail sale. According to the Helcom's annual report on shipping accidents (2014) approximately 100 - 150 incidents are reported per year at the Baltic Sea for mercantile ships and amount of near miss situations is many times higher. This combined with intersecting traffic, difficult waters and winter conditions increase both the probability of a largescale maritime incident and the difficulty of conducting search and rescue (SAR) operations.

This report has been written as a part of the project "Operational Plans and Procedures for Maritime Search and Rescue in HNS Incidents (ChemSAR)" that aims to create operational plans and standard operational procedures (SOPs) for cross-border SAR operations against incidents involving hazardous and noxious substances (HNS) and occurring at the Baltic Sea. Project is led by University of Turku and Finnish Border Guard and it involves partners from Finland, Estonia, Sweden, Lithuania and Germany. The project is financed by the European Union Interreg Baltic Sea Region programme.

Different rescue authorities and shipping companies need a vast amount of information on how different chemicals act and how they affect persons in an accident situation when gaseous or vaporous chemicals pose a great threat to human health. There exists large amount of hazardous and noxious substances that all have different physical properties and hazards. Chemicals react with each other and act differently in different kind of weather conditions. For this reason it is essential for rescue personnel to have an access to the sources of relevant information about cargo, chemicals and their properties as well as to get information about the best available response methods. For example, firefighting methods should be chosen carefully because some chemicals react vigorously with water.

One aim of the project ChemSAR is to gather information of existing HNS databases and response manuals that are being used among rescue authorities and shipping companies. This report concentrates on this question. In the ChemSAR project background information on the use and properties of existing chemical databases and response manuals was collected in the form of a survey addressed to authorities and shipping companies in different Baltic Sea region countries.The aim of the survey was to find out what chemical databases and response manuals are used in HNS accidents in the countries of the Baltic Sea Region and what kind of additional information would be needed. Also question about reliability and availability of the cargo information is considered in this report. The word chemical is used in this report as a general purpose language, covering pure chemicals, substances, mixtures and products classified under HNS.

This report is done in close co-operation and guidance of the Finnish Border Guard: Lieutenant Senior Grade Teemu Niemelä, Lieutenant Commander Seppo Häkkinen and advisor Juho Kurttio.

It contains selected results of two surveys that were directed to authorities and shipping companies. The other report made in the project ChemSAR is made by Johanna Yliskylä-Peuralahti (Brahea Centre at the University of Turku, Centre for Maritime Studies) and it concentrates on the questions of preparedness to maritime chemical accidents in the Baltic Sea region. These two reports were done in close co-operation and combined enquiries were produced to find out information both from preparedness to maritime HNS incidents and about usage of chemical databases and other sources of information

1.1 Methods of the survey

Two electronic (Webpropol) surveys were produced: first one for rescue authorities and the second one for shipping companies. There were two separates surveys going on at the project ChemSAR at the same time whose target groups were the same. It was anticipated that the amount of responses would be higher if one combined questionnaire would be sent to both target groups. For this reason questionnaires were combined and made and sent together with Johanna Yliskylä-Peuralahti. Chapters 1.1. and 1.2. are mostly written by Yliskylä-Peuralahti.

The aim of the first survey was to get an overview on rescue authorities' preparedness to maritime HNS accidents in different Baltic Sea region countries and to collect essential background information needed for drafting of the SOPs and chemical databases to be produced in the ChemSAR project. The survey contained 58 questions on SAR operations and existence of SOPs, different parties involved, available resources, existing international collaboration in SAR issues, requirements for SOPs, and utilization of chemical databases and response manuals. The survey included both multiple choice and free response questions. Authorities that coordinate and participate to rescue operations of a distressed vessel at sea from all Baltic Sea region countries (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden), and selected countries outside the region (France, Iceland, Norway, The Netherlands, and United Kingdom) were invited to answer to the survey. Survey to ChemSAR partner countries was addressed to project partners, and they were asked to forward it to other authorities that participate in maritime rescue operations involving HNS substances in their respective country. ChemSAR project partners themselves were an essential respondent group, since the majority of them are authorities responsible for maritime rescue operations. The contacts for the authorities in non-partner countries were received from the Finnish Border Guard.

Authorities were asked to provide a nationally coordinated answer; a single answer which summarizes the answers given by experts from national agencies. If a nationally coordinated answer could not be given, the survey was answered by individual experts. The respondents received a link to the survey via e-mail. Some respondents were also offered a possibility to give answers in MS Word format. The first invitation was sent on September 19th, 2016 and the respondents were given two weeks to respond. Three reminders were sent.

The aim of the second survey was to get an overview on shipping companies' preparedness to maritime HNS incidents, reliability of cargo information and sources of information about HNS. The second survey was addressed to shipping companies operating in the Baltic Sea region and especially to persons responsible for safety and security matters. The survey contained 43 questions on the operations of the respondents' shipping company, the reliability of the information regarding the cargo carried on-board, shipping companies' preparedness for HNS incidents and their available resources, existing collaboration with authorities in SAR issues, and utilization of chemical databases and response manuals. The first invitations were sent in October 2016, and three reminders were sent.

1.2 Respondents

In total there were eight respondents to the survey that was addressed to the authorities (table 1). Responses were received from all Baltic Sea Region countries (Finland, Estonia, Germany, Latvia, Lithuania, Poland, and Sweden) except Denmark and Russia. The United Kingdom was the only non-BSR country providing the answer. Majority of the answers were nationally coordinated, and also the non-coordinated answers represent the official stand of the respondent's organisation. One respondent had only replied to the first half of the questionnaire. For this reason there were only seven authority respondents answering to the questions related to chemical databases. For questions related to the cargo on board the amount of the respondents are 8.

Table 1. Responses to the survey addressed to authorities by country

Country	Response received	Coordinated response (x)
Denmark	0	
Estonia	1	x
Finland	1	
France	0	
Germany	1	x
Iceland	0	
Latvia	1	x
Lithuania	1	x
Netherlands	0	
Norway	0	
Poland	1	x
United Kingdom	1	
Russia	0	
Sweden	1	

The survey addressed to shipping companies was sent to 384 respondents representing shipping companies operating in the BSR countries. The respondents were picked from Centre for Maritime Studies' customer register. The contact list included several persons from the same organisation. However, responses were received from only 18 shipping companies. Majority of

the answers (8) were received from Finland (see Fig. 1.). Due to the small number of responses the results should be treated with caution, since the group of shipping companies that responded to the survey is not a representative sample of shipping companies operating in the Baltic and North Sea regions. Averages are calculated in some answers when seen informative but readers of this report are asked to be careful when interpreting the answers.

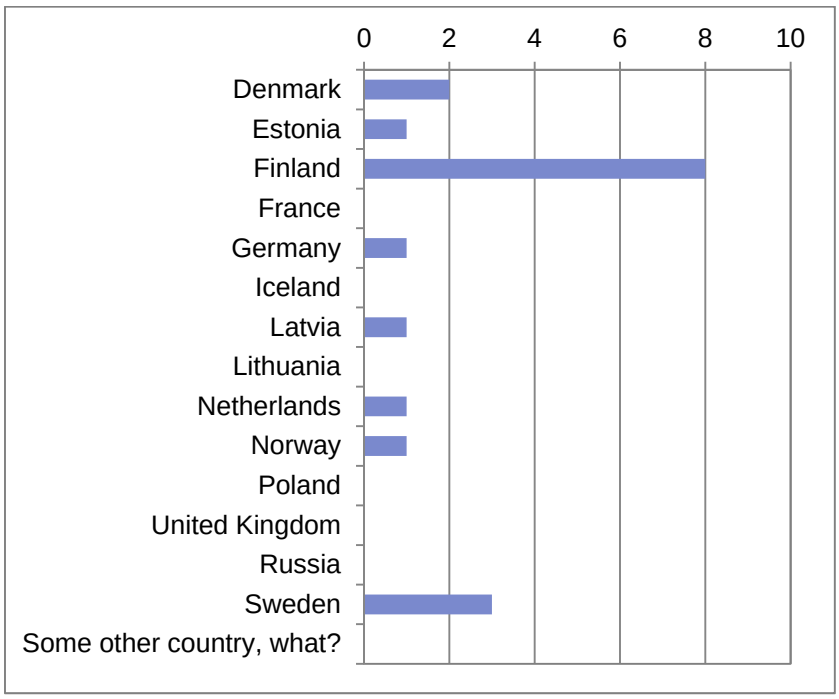


Figure 1. Shipowners' responses to the survey by country

The majority of the shipping companies that replied to the survey belong to the group "something else". They transport liquid bulk cargo such as crude oil and oil products, or other liquids in bulk. This group also includes a company that provides towage, salvage and ice-breaking services and a company that transports forestry products. The second largest responder group is shipping companies that transport both passengers and cargo (Fig. 2).

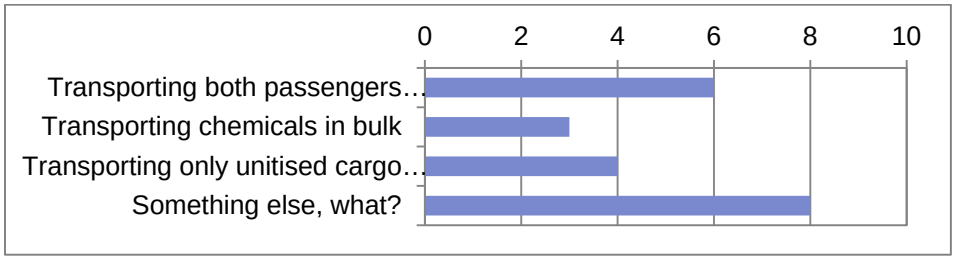


Figure 2. The main activity of respondents' shipping company

The majority of the shipping company respondents work at managerial level and are responsible for safety and security issues. Many of them are working either as Company Security Officers or

as DPAs (Designated Persons Ashore) (Fig. 3.). Please note that multiple choices were allowed in this question. Some replies were received also from persons responsible for operations, technical issues and other areas of management. The group “Something else” in Fig. 3 includes responses from a Vetting & CSO manager and a HSEQ Manager of Fleet.

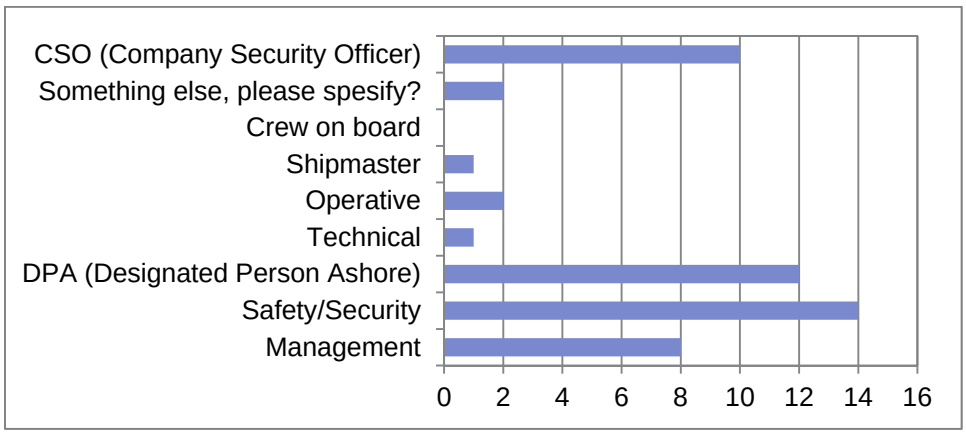


Figure 3. Respondent’s own role in the company

The majority of the rescue authority respondents represent different state authorities (Fig. 4). Two responses were received from operational units and one from a local/regional authority.

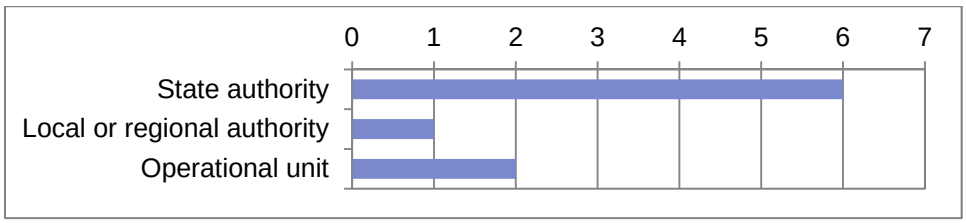


Figure 4. Authority respondents by background organisation

2 CHEMICAL DATABASES AND OTHER SOURCES OF CHEMICAL INFORMATION

2.1 The most important databases

In the survey there were two questions for respondents about the most commonly used chemical databases and response manuals. The other question included a ready-made list of proposed databases and response manuals and in the other question the respondents were asked to name three most important databases they are using in case of an HNS accident.

The most commonly used chemical databases and response manuals among rescue authorities are Safety data sheets and IMDG Code. Four responding rescue authorities out of seven are always using Safety data sheets whereas four respondents are using IMDG code either always or regularly in case of an HNS accident at sea (table 2). Both IMDG Code and Safety data sheets as well as MAR-CIS (or MAR-ICE) were also mentioned three times among top three databases of the respondents (table 3.). Also CAMEO and SafeSeaNet are considered very important in the Baltic Sea area since Polish and Estonian respondents named CAMEO among the three most important chemical databases and Swedish and Polish respondents named SafeSeaNet to the same group. SafeSeaNet was not included in the list of databases in the questionnaire. It is feasible it would have received even more mentions if it had been included on the list.

Table 2. Chemical databases and response manuals used by rescue authorities in in case of HNS accident at sea.

	Always	Regularly	Occasionally	Seldom
Safety data sheets	4	1	1	1
National databases	2	3	0	0
IMDG code	2	2	0	2
RESY (Germany)	2	0	0	0
HELCOM response manual	1	2	1	1
MAR-CIS	1	1	0	2
CAMEO	1	1	0	1
Emergency Response Guidebook 2016 (USA)	1	1	0	1
Tokeva (Finland)	1	1	0	0
OVA Safety cards on substances involved in chemical incidents (Finland)	1	0	0	0
GESAMP	1	0	3	0
RIB (Sweden)	1	0	0	0
Svenska Kustbevakningens Räddningstjensplan (Sweden)	1	0	0	0
GESTIS-Stoffdatenbank (Germany)	1	0	0	0
The CEFIC Emergency Response Intervention Cards (ERICards)	1	0	0	2
MEMPLEX (Germany)	1	0	0	0
TUIS (Germany)	1	0	0	0
Hommel (Germany)	1	0	0	0
International Chemical Safety Cards (ICSCs)	0	0	3	1
CHRIS Hazardous Chemical Data Manual	0	0	2	0
eChemPortal - The Global Portal to Information on Chemical Substances	0	0	1	0
Sveriges Kemikontors Skyddsblad	0	0	1	0
CDC: Emergency Preparedness & Response	0	0	0	3
ECHA's Classification	0	0	0	1
HSBD - Hazardous Substances Data Bank	0	0	0	1
Data bank of Environmental Properties of Chemicals – EnviChem	0	0	0	1
ESIS - European Existing Substances Information System	0	0	0	1
Millbros	0	0	0	1
CHEMS	0	0	0	1
OHM-TADS	0	0	0	1
Sax Irving	0	0	0	1
EPA's OPPT Chemical Factsheets (USA)	0	0	0	1

Which of the following chemical databases and response manuals are used in case of HNS accident? Response possibilities: always used, regularly used, occasionally used, seldom used, never used, I don't know this database. (n=7)

National Databases are among the most frequently used databases for many of the rescue authority respondents. In Finland Tokeva and OVA instructions are national databases that are used regularly and named among the top three databases. In Germany RESY and TUIS - the Chemical Industry's Transport Accident Information and Emergency Response System are

among the most important national databases but also GESTIS –Stoffendatenbank, MEMPLEX and Hommel are very important national databases since also those ones are always used in case of an HNS accident at sea. RIB – Integrated Decision Support System and Svenska Kustbevakningens Räddningstjensplan (Swedish coast guard´s rescue plan) are Swedish databases that are used in chemical accidents. It is noteworthy that some of the national databases are also used in other countries (outside the country where they were originally created). Besides Germany and Finland, German database RESY and Finnish Tokeva are also used in Estonia, and Estonian respondent listed them among the top three databases. However, Estonians actually use PÄKE which is a translated version of the Tokeva. Also Poland uses some national database but it is not among the top three databases. In total rescue authorities of the Baltic Sea region named 12 databases that belonged among the three most important databases. These databases and their features are introduced in chapter 3.

Table 3. Three most important chemical databases and response manuals used by rescue authorities of the Baltic Sea countries in case of HNS accident at sea.

Estonia	CAMEO	RESY	PÄKE (=Tokeva translated to Estonian)
Finland	Tokeva	OVA instructions	Safety data sheets
Germany	Safety data sheets	RESY	TUIS
Latvia	IMDG Code	MAR-CIS	Helcom Response Manual
Lithuania	MAR-ICE	IMDG Code	SafeSeaNet
Poland	CAMEO	IMDG Code	MAR-ICE
Sweden	RIB	SafeSeaNet	Safety data sheets

Please define three most important chemical databases (including also response manual) used in HNS accidents in your country. Please note that response guidelines for accidents on-shore are also included. You can write 3 databases in any order, no need to put the most important first. (n=7)

Half of the shipping company respondents (9 out of 18) were using chemical databases at their work. Also for shipping companies Safety data sheets and IMDG Code are among the most frequently used chemical databases (table 4). IMDG Code is mandatory for vessels sailing under the state flags that have signed the SOLAS and MARPOL conventions and shippers and product suppliers usually deliver Safety data sheets when transporting their products. Otherwise there is a great deal of variation what comes to the use of other databases listed in the survey. International Chemical Safety Cards (ICSCs), some national databases, Millbros, EPA's OPPT Chemical Factsheets and Chems are databases that some of the shipping company respondents' are always using. Other suggested databases were not important for respondents of the shipping companies.

Table 4. Chemical databases and response manuals used by shipping companies in in case of HNS accident at sea.

	Always	Regularly	Occasionally	Seldom
IMDG Code	9	0	1	0
Safety data sheets	8	1	0	1
International Chemical Safety Cards (ICSCs)	3	0	0	0
National databases	2	1	1	0
Millbros	1	0	0	1
EPA's OPPT Chemical Factsheets (USA)	1	0	0	1
CHEMS	1	0	0	1
HSBD - Hazardous Substances Data Bank	0	0	1	0
Sax Irving Handbook of Dangerous Materials	0	0	1	0
MAR-CIS	0	0	0	1
HELCOM response manual	0	0	0	2
GESAMP	0	0	0	1
ECHA's Classification	0	0	0	1
ChemID Plus	0	0	0	1
NCLASS	0	0	0	1
ECHA CHEM	0	0	0	1
Data bank of Environmental Properties of Chemicals – EnviChem	0	0	0	1
ESIS - European Existing Substances Information System	0	0	0	1
IUCLID - International Uniform Chemical Information Database	0	0	0	1
OVA Safety cards on substances involved in chemical incidents (Fin)	0	0	0	1
Information on Biodegradation and Bioconcentration of the Existing Chemical Substances in the Chemical Risk Information platform–CHRIP	0	0	0	1
eChemPortal-The Global Portal to Information on Chemical Substances	0	0	0	1
Verschueren: Handbook of environmental Data on Organic Chemicals	0	0	0	0
Health Protection Agency: Chemical Hazards and Poisons Division	0	0	0	1

Which of the following chemical databases and response manuals are used? Response possibilities: always used, regularly used, occasionally used, seldom used, never used, I don't know this database. (n=10)

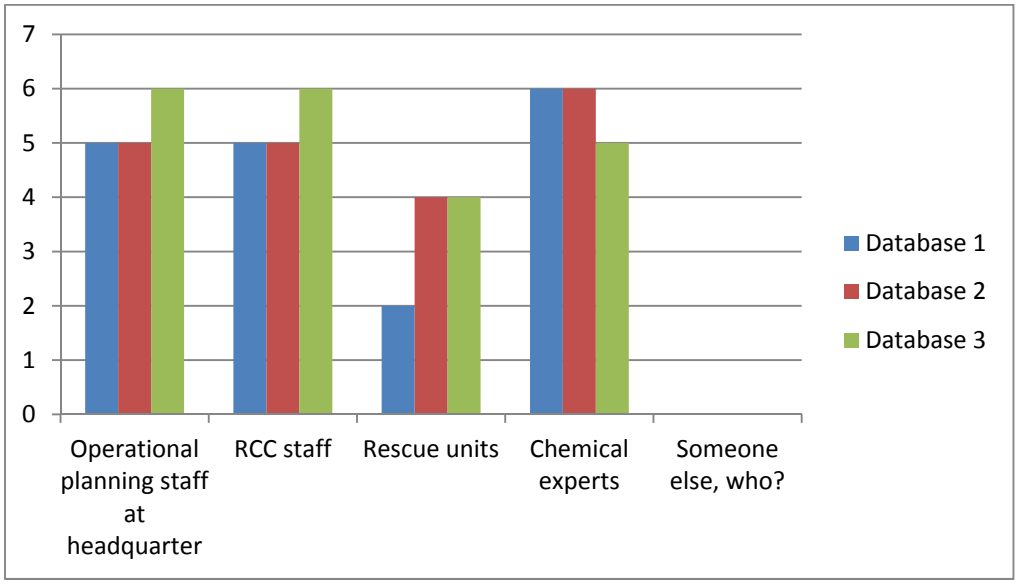
There also exist databases outside the suggested ones that are very important for shipping companies. When they were asked to name the three most important databases also Chemserve Miracle, SeaHealth database, IMBSC Code and Google were mentioned outside the listed options.

2.2 Usage, users and training of the databases

In addition to real incidents rescue authorities are using chemical databases and response manuals for training and education, both in table top exercises and during exercises at sea. Databases are used for to search for detailed information about the products and chemicals. Information of the databases helps to know the qualities of the chemicals and to define the level of the danger both for people and for marine environment. Databases also give directions and recommendations on how to carry out SAR operations. Most of the respondents stated that databases are used in real HNS incidents but there also existed opposite opinion since one respondent remarked that in case of an emergency, databases are only hypothetically used. This authority respondent saw that databases are more useful during training.

Databases are used by quite similar user types in every country among authorities (figure 5). Chemical experts use the most important databases in almost every country. Only in Lithuania there was no chemical expert among the users of the databases. Another difference between countries is that in Latvia, Lithuania and in Poland rescue units do not use the databases at all whereas in other responding countries also rescue units use chemical databases.

Figure 5. Users of the databases among rescue authorities

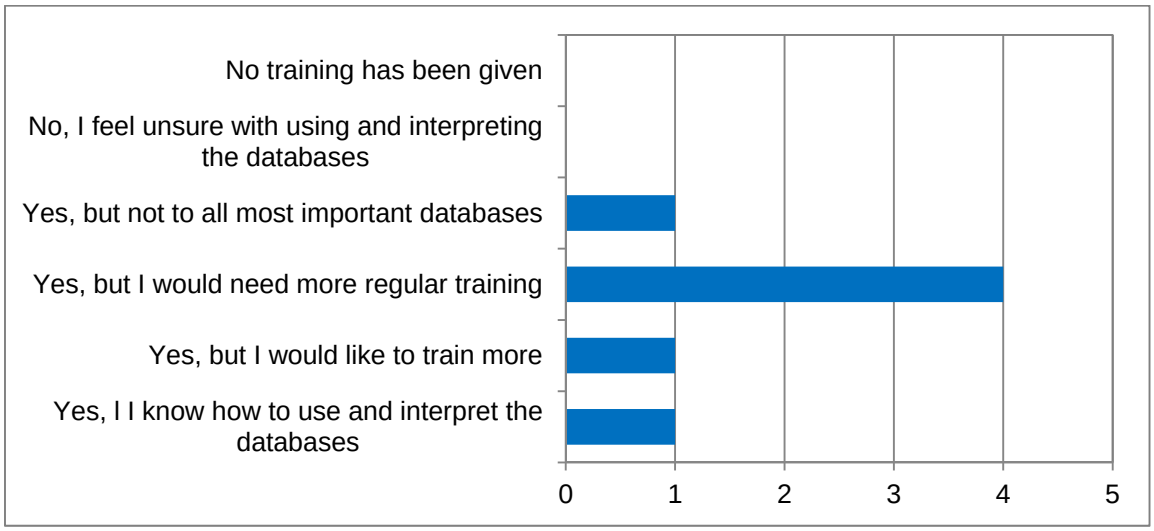


Who is using these three most import databases? n=7

Only 9 of the shipping company respondents were using databases at their work, and answered to the question about users of the chemical databases. Master mariners, other crew members and DPAs are the ones that use chemical databases in shipping companies. Also other shipping company personnel on shore quite often use the databases. In one of the responding shipping company there also exists chemical expert that uses chemical databases.

All rescue authority respondents feel that they have received some training for the use of the chemical databases (Figure 6). However, most of the respondents feel that they would need more regular training or would like to train more and one respondent hasn't received training to all most important databases. According to these responses it seems that more training would be useful and needed. For the question "What kind of training is provided to the users of the three most important databases?" two of the authorities stated that users don't get any training at all whereas for others training is provided by their own organization or by some other organization. Responses for these two questions were a bit conflicting with each other since at first only one respondent had not received any training and in the second question there were two respondents saying the same. However, both of the questions support the impression that more training is needed among rescue authorities and that is should be done more regularly.

Figure 6. Training of the use of the most important chemical databases among rescue authorities

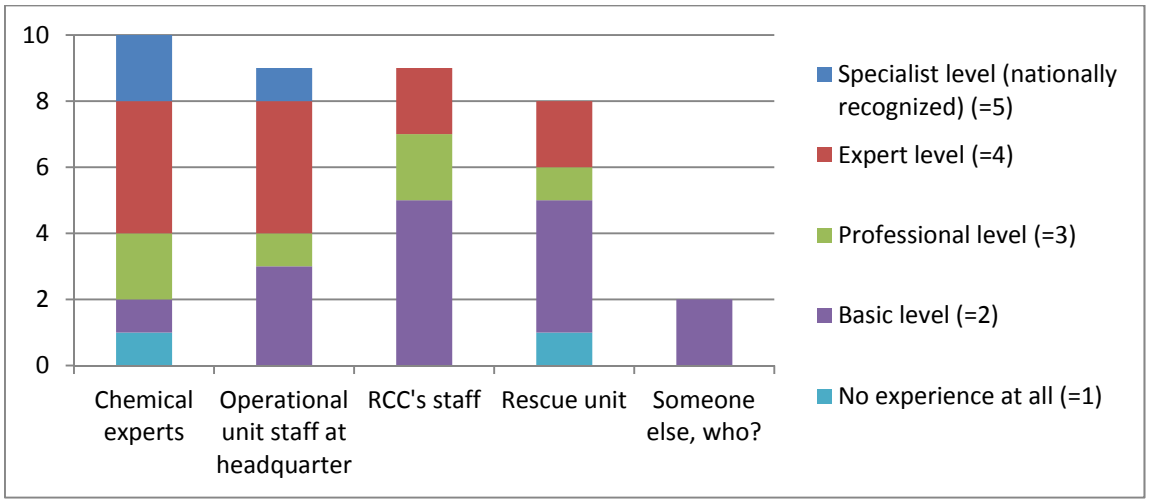


Have you received enough training for the use of the three most important databases? (n=7)

The level of expertise differed a lot between rescue authority database users. In general chemical experts were estimated to know most about HNS and using of the databases (average 3,5 e.g. their knowledge was evaluated between professional and expert levels). The average level of operational unit staff was evaluated almost the same (3,3). The average level of RCC's staffs (2,7) and rescue units (2) were not evaluated very high since those did not reach professional level. However, it must be noticed that the answers differed quite a lot inside user groups. For example most of the respondents estimated knowledge of the chemical experts at least for professional level but it was also estimated by two respondents that some of them may not have experience about using of the databases at all or it is at basic level. Some respondent had also chosen many levels of knowledge for same group of users meaning that there exist large personal differences inside the same user group. Option "someone else" was also chosen in two of the seven authority responses. In the other one of these two responses "someone

else" was defined as environmental inspectors, while the other one had not defined "someone else" more precisely.

Figure 7. Level of knowledge about HNS and using of the databases among rescue authorities of the Baltic Sea



How much the users of the databases know about HNS and using of the databases? (n=7)

2.3 Weaknesses of the databases

Respondents were also asked to define the main weaknesses or vulnerabilities of the three most important databases they are using (table 5). It must be noticed that respondents could choose many weaknesses and vulnerabilities for each database they had defined among three most important ones. Among rescue authorities answers scattered quite much and no one of the given options received more than 15 % of the votes. It must be noticed that only five countries responded to this question and that respondents evaluated different databases since they had named different databases among the most important ones. However, the most common problems that rescue authorities face with databases are questions about technical solutions, usability and response guidelines. One rescue authority respondent also defined lack of experience and absence of training as a main weakness of one database.

Only six shipping companies answered to the same question, so it must be careful when comparing the answers of these two groups. However, the attention fixes on the large percentage of the option "too difficult information". It seems that it must be carefully decided who are the users of the databases, and that the database should be tailored just to the needs of each user group. The same conclusion also derives from the conflicts of the answers: some databases contain too little information and others too much, in some databases information is too difficult to understand whereas other databases don't contain enough information. It seems that the most important issue is to find a proper database for each user group.

Table 5. Main weaknesses of the most important databases from the users' point of views.

	Total/authorities	Percentage/ Authorities	Total/ shipping c.	Percentage/ Shipping c.
Technical solution	6	14,63 %	2	8,33 %
Usability	5	12,20 %	6	25,00 %
Response guidelines are missing	5	12,20 %	0	0,00 %
Reliability	4	9,76 %	2	8,33 %
Not all relevant chemicals are listed	4	9,76 %	1	4,17 %
Too little information	4	9,76 %	1	4,17 %
Language options are limited	3	7,32 %	2	8,33 %
Content of information	2	4,88 %	1	4,17 %
Too difficult information	2	4,88 %	5	20,83 %
The information is not clear enough	2	4,88 %	1	4,17 %
Response guidelines are not clear	2	4,88 %	0	0,00 %
Too much information	1	2,44 %	2	8,33 %
Something else, please describe	1	2,44 %	0	0,00 %
User support is inadequate	0	0,00 %	1	4,17 %
Total votes	41	100,00 %	24	100,00 %

What are the main weaknesses or vulnerabilities of these most important databases from the user's point of view? Please choose max. 3 weaknesses per database. (rescue authorities n=5, shipping companies n=6)

The respondents were also asked to define what kind of information is currently missing from these three most important databases by their own words. Only four of the authority respondents answered to this question. Respondents hoped for more information about chemicals in marine environment, response measures, more information about physical and chemical properties (e.g. pH-value), better response guidelines, more listed chemicals, updating of the information and information on goods in bulk, liquid bulk and gas. More precise answers are represented in the chapter 3: introduction of the 12 most important databases that Baltic Sea rescue authorities are using in case of an HNS accidents.

3 INTRODUCTION OF THE MOST USED CHEMICAL DATABASES AND RESPONSE MANUALS

Rescue authorities of the Baltic Sea countries named 12 different chemical databases and response manuals among the three most important sources of information of each responding country. These 12 databases are introduced in this chapter. The description of each database or response manual contains the same information, including description, amount of chemicals, language options, up-date frequency, possibility to online/offline use and link for additional information even though information and type of the databases and response manuals are very different.

Different databases offer different types of information. For example SafeSeaNet consist information about HNS cargo on board of a specific ship, MAR-CIS offers chemical information datasheets, Tokeva concentrates on the response measures whereas TUIS offers contacts and consulting of chemical company fire brigades.

For some databases respondents also named some problems or weaknesses. These answers are represented under specific databases. Even though the respondents did not comment on weaknesses of all databases or response manuals, it does not mean that there is nothing to be improved or developed in those databases. The amount of respondents was very limited and the activity of the respondents was different. There might have been just one respondent describing some database and its features, and if that respondent had not answered to the questions considering the weaknesses of the specific databases the information was not received at all.

3.1 SafeSeaNet

Description: SafeSeaNet is a network for maritime data exchange linking together maritime authorities from European Union Member States, Norway and Iceland. It is a vessel traffic monitoring and information system that links National Single Window (NSW) systems. It is mandatory for shipping companies to inform HNS cargo they are carrying to the NSWs. All HNS information reported to the National Single Windows moves automatically to the SafeSeaNet and from there it can be seen by relevant target groups also in other SafeSeaNet countries. Also information deriving from mandatory Ship Reporting Systems (SRSs) is feeded to the SafeSeaNet. At the Baltic Sea there exist four SRSs: Gulf of Finland (GOFREP), Gulf of Gdańsk, (GDANREP), Sound between Denmark and Sweden (SOUNDREP) and the Storebaelt (Great Belt) Traffic area (BELTREP).

SafeSeaNet contains for example following information: details of hazardous goods carried on board, automatic Identification System (AIS), archived historical ship positions, additional information from AIS-based ship reports (e.g. identification name/numbers, flag, dimensions, course, speed, dimensions, destination and ship type), estimated/actual times of

arrival/departure, details of waste carried on board/to be offloaded and ship security-related information

Amount of chemicals: SafeSeaNet doesn't contain chemical information sheets.

Availability: Only for use of authorities. In SafeSeaNet there exist different user types and limitations to available information among authority users. For example user type 1 can see the information of the traffic that departs or arrives to their domestic country whereas user type 2 can also see the traffic that sails under the domestic flag. Port authorities and authorized agents and operators can only see the information of the vessels departing or arriving to their port.

SafeSeaNet is managed by European Maritime Safety Agency EMSA.

Language options: English

Updated: real-time

Online/offline: Only online use possible.

Link for additional information: http://www.emsa.europa.eu/ssn-main.html

(telephone call Arkima Antti. Finnish Transport Agency; Baltic Sea Clean Shipping Guide 2016; SafeSeaNet. Guidelines on Reporting HAZMAT).

3.2 Mar-CIS

Description: MAR-CIS means Marine Chemical Information Sheets. These datasheets of chemical substances are developed by European Maritime Safety Agency EMSA and they contain relevant information for responding to marine spills of hazardous and noxious substances (HNS). The objective is to gather all relevant information needed for the initial stage of the response operations to incidents involving HNS. This will help the competent authorities to identify and prioritize the hazards and risks associated to chemical substances and link those to the particulars of maritime transport.

MAR-CIS datasheets provide concise information on the substances' physical and chemical properties, handling and emergency spill response procedures and maritime transport requirements for safe transport at sea. The datasheets contain following types of information:

- Key properties: main hazard, physical and chemical properties that define the emergency response operations from the very beginning e.g. flash point, vapour pressure.
- Identification: references numbers and names used to identify the substance.
- Substance properties: main properties, appearance and behavior.
- Shipping information: explanatory information from the maritime transportation codes (IMDG, IBC and IMSBC codes) to help to understand how the substance is transported

by sea and what can the responders expect when they go on-board of the vessel. Graphical representation of the GESAMP hazard profile.

- Hazards & risks: classification and labelling, health and environmental hazards and substance intrinsic hazards.
- Emergency measures: emergency health measures, emergency measures on board of vessels, exposure safety limits, environmental protection measures and danger zones for six different spill scenarios.
- Case histories: past incidents involving the substances and response used.
- Physical & chemical properties: the substance's finger print.

MAR-ICE is a network of experts who provide information and advice on HNS accidents at sea, also during an emergency to support the requesting party's decision making process. MAR-ICE aims to support the affected coastal states in the response to incidents involving HNS. EMSA focuses on the rapid provision of expert information and advice on chemical substances during an emergency to support the requesting party's decision making process. (http://www.emsa.europa.eu/chemical-spill-response/mar-ice-network.html)

Amount of chemicals: MAR-CIS includes information on 213 different chemical substances.

Availability: only for use of authorities

Language options: English

Updated: once a year

Online/offline: only online use possible. Currently the users have to be connected to the internet in order to access the MAR-CIS web portal. Once the Application for mobile devices is released (around April 2017) the information will be available offline e.g. at the incident site.

Link for additional information http://www.emsa.europa.eu/about/faq/300-hazardous-noxious-substances-hns-operational-support/2166-what-is-mar-cis.html **and to the database:** https://portal.emsa.europa.eu.

(e-mail Catarino Ana Sofia. European Maritime Safety Agency)

Missing information: "Should be reliable, but lack of information." "Not all substances data sheets available" "Is not very much operational in case of emergency."

3.3 CAMEO Chemicals

Description: CAMEO Chemicals is a database of hazardous chemical datasheets that emergency responders and planners can use to get response recommendations and predict hazards, for example explosions or toxic fumes. It is developed jointly by National Oceanic and Atmospheric Administration (NOAA, U.S.) and the Environmental Protection Agency (EPA, U.S.).

CAMEO contains chemical identifiers (such as CAS and UN numbers), health hazards, information about air and water hazards, response recommendations and critical response information (recommendations for firefighting, first aid, and spill response), physical properties, regulatory information, alternate chemical names. It is also possible to make a collection of chemicals, and then use the chemical reactivity tool to predict what hazards could arise if the chemicals were to mix together.

Amount of chemicals: CAMEO contains 5155 chemical datasheets. The database also contains 2,358 UN/NA datasheets with information on substances based on the United Nations/North America number used in shipping.

Availability: Open for all and can be found from the web

Language options: The database is available in English. However, on the UN/NA datasheets and Emergency Response Guidebook PDFs can be accessed also in English, Spanish, and French.

Updated: The database is updated once or twice a year.

Online/offline: Both online and offline use possible. The CAMEO Chemicals program is available as a website, mobile website, and a desktop program that can be run offline. It is also in the process of developing an app for mobile tablets and phones that will be able to run offline like the desktop version of the program.

Link for additional information and to the database: https://cameochemicals.noaa.gov/ ; mobile version: m.cameochemicals.noaa.gov ; Desktop versions for Windows and Mac downloadable at http://response.restoration.noaa.gov/cameochemicals

(e-mail Connelly Brianne. NOAA)

Missing information: “lack of information about chemicals in marine environment” “it could have more information about physical and chemical properties”

3.4 Safety data sheets

Description: Safety data sheets provide information about the properties of the substance or mixture, its hazards and instructions for handling, disposal and transport and also first-aid, fire-fighting and exposure control measures in industrial or professional activities to help users of the chemicals to protect human health and the environment. **In the European Union** the format and content of the Safety data sheets are specified in REACH Regulation (EC) No 1907/2006, Article 31 of Title IV 'Information in the supply chain. Also in several other countries around the world there exist requirements for Safety data sheets but there may be some variations in the content demands.

According to the REACH regulation Safety data sheets provide information from the following topics: details on the supplier, identification and required composition details of the chemical,

information on the hazard classification and labelling and the exposure threshold values for human health and the environment; advice for handling and storage, and exposure controls, measures for first aid, firefighting, safe transportation; disposal and emergencies, the basic physical and chemical properties of the substance or mixture (e.g. water solubility, vapour pressure, biodegradability) including information on stability and reactivity. Also, detailed toxicological and ecological information and relevant regulatory information are included in the Safety data sheet.

The supplier of the chemical (manufacturer, importer, downstream user or distributor) who places a chemical substance or preparation on the market must compile a safety data sheet for chemicals intended for industrial or professional use and submit it to the recipient of the chemical.

Amount of chemicals: A safety data sheet should be provided to downstream users for all substances or mixtures that are classified as hazardous according to CLP regulations, for all substances that are persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB), and all substances that are included in the Candidate List of substances of very high concern (SVHCs).

Availability: Safety data sheets are an important information source but they are not a chemical database since they are separate information sheets that are not collected and saved systemically together on a certain database. There exist databases that contain most of the Safety data sheets supplied to some countries. For example in Finland Chemical product register (kemikaalituoterekisteri KETU) contains Safety data sheets from most of the chemical products that are marketed in Finland but not all of them.

Language options: A safety data sheet needs to be provided an official language of the EU country where the chemical is supplied to.

Updated: Safety data sheets need to be updated if new information becomes available on the hazards or the need for more appropriate risk management measures arises by the supplier of the chemical.

Online/offline: At least offline. Some of Safety data sheets can also be found on-line from the web.

Link for additional information and national helpdesks:
https://echa.europa.eu/regulations/reach/downstream-users/communication-in-the-supply-chain/safety-data-sheets https://echa.europa.eu/support/helpdesks

(Guide on Safety data sheets and Exposure scenarios, 2016; www.echa.eu)

3.5 OVA instructions: The safety instructions for hazardous chemicals (OVA-ohjeet)

Description: OVA instructions are a database used in Finland. This database is meant to fulfill the need of easily available and plain language basic information about the danger properties, first aid and needed prevention measures. OVA instructions provide information from the following topics: Identification of substance, characterization (physical state, color, odour), physical -chemical-properties, reactivity, fire/explosion hazard, labelling (CLP, transport), exposure limit values (HTP, IDLH, ERPG), major use purposes in Finland, health effects in short-term and repeated exposure, Environmental effects (in air, water and soil: environmental degradation, environmental mobility/transport, bioconcentration, toxicity), fire/explosion (prevention measures, fire-fighting, personal protection), spillage (danger zone information, prevention measures, personal protection), first aid measures, information for physicians, disposal, safe handling, storage, transport regulations.

OVA instructions are provided by The Finnish Institute of Occupational Health and the instructions were compiled together with representatives of chemical industry, authorities and specialist institutions.

Amount of chemicals: 132 chemicals

Availability: Open for all and can be found from the web

Language options: Finnish

Updated: Updated if needed, less than once a year.

Online/offline: Both offline and online

Link for additional information and to the database: http://www.ttl.fi/ova/

(e-mail Heinälä Milla. Finnish Institute of Occupational Health)

3.6 Tokeva (Toimintaohjeet kemikaalien vaaratilanteille)

Description: TOKEVA is a database used in Finland. It includes prevention measures in case of an HNS accident. It also contains tactical prevention measures, instructions for used methods and a user's guide. In addition TOKEVA 2012 also includes additional information about substances. Information of OVA instructions, International Chemical Safety Cards (ICSCs) and Safety data sheet information from Finnish chemicals product register (KETU) as well as instructions for CBRNE are included in the TOKEVA 2012. Tokeva is provided by Finnish Emergency Services College (Pelastusopisto).

Amount of chemicals: prevention measures to all UN numbered hazardous materials or classes (over 2300 products) of hazardous materials.

Availability: Public version of TOKEVA 2012 is open for all and can be downloaded from web. There also exists another version of TOKEVA 2012 that is meant for the use of authorities. Only authority version includes CBRNE (Chemical, biological, radiological and nuclear) Instructions and KETU information.

Language options: Finnish

Updated: Less than once a year

Online/offline: only offline use possible.

Link for additional information and to the database:
http://www.pelastusopisto.fi/fi/tutkimus-_ja_tietopalvelut/tutkimus-_ja_kehittamispalvelut/paattyneet/tokeva

(e-mail Ojala Tarja. Safety Futures Ky; Tokeva 2012 on valmis)

3.7 RESY

Description: RESY is a standby and emergency response information system for accidents that involve hazardous substances. This database contains information about hazardous substances (identification, hazards, dangers to environment, safety precautions, waste disposal), compact emergency response measures information and environmental protection instructions. Information about hazardous substances and dangerous goods concentrate especially to substances that are dangerous to water and chemicals that undergo bulk transshipment in German seaports.

RESY is developed by the Hamburg Ministry of Environment and Energy and it is operated by the Incident Management / Emergency Response Department.

Amount of chemicals: approximately 4300 substances with nearly 73 000 substance names in several languages. Over 120 items of information on substance properties, rules, hazards and emergency measures.

Availability: Available to all interested parties in return for a contribution (40€ / license in year 2016).

Language options: German, English, Estonian

Updated: once a year

Online/offline: Only offline (CD-ROM)

Link for additional information: https://www.hamburg.de/resy

(Resy infoflyer, 2015)

Missing information: "Some of the information is missing for some chemicals; also it could have pH value"

3.8 TUIS - the Transport-Accident-Information and Emergency-Response-System of the German chemical industry

Description: TUIS is a network of chemical company fire brigades of the German chemical Industry. It provides TUIS contacts and consulting with product suppliers or service providers for the public emergency services that are controlling and directing the emergency response effort in transport accidents involving chemicals and also in accidents in production and warehousing. The TUIS network comprises fire brigades from chemical companies as well as environmental chemists, toxicologists and further experts who are familiar with specific chemicals or biological substances. It is aimed for all modes of traffic accidents: roads, railways, sea and air.

The database is one part of the TUIS. The database gives a list of qualified experts or company fire brigades that are sorted by the vicinity to the accident location or by their expertise for giving advice on the chemicals in question after entering the zip code of the accident location and/or the UN code.

TUIS network contains three levels of support. Level 1 means advice over the telephone from TUIS experts for heads of operations by for example fire brigades, police, competent authorities and comparable institutions for advice or practical assistance. Level 2 means advice on the spot and level 3 means technical assistance (technical equipment and the operating know-how of chemical company fire brigades) on the spot.

Amount of chemicals: The list of substances in the database is oriented to the European Agreement concerning the International Carriage of Dangerous Goods by Road *(*ADR list).

Availability: The emergency call centers of TUIS member companies are available around the clock on 365 days of the year. TUIS advice over the telephone is free-of-charge for the enquiring services. For advice on the spot and technical assistance, the company fire brigades usually charge their own personnel and material costs to the party responsible.

TUIS supports public emergency services mainly in Germany but it also offers help abroad to Europe if special expertise or equipment is needed. TUIS is integrated in an important European support system "Intervention in Chemical Transport Emergencies "(ICE-system) of the European Chemical Industry Council (Cefic).

Language options of the database: German

Online/offline: Online. Emergency call centers are recommended to have printouts of TUIS members as a precaution. The TUIS app is available at the Apple Store for iOS and at the Google Play Store for Android.

Link for additional information and to the database:
https://www.vci.de/services/publikationen/broschueren-faltblaetter/tuis-the-hotline-to-know-how.jsp and www.tuis.org

(TUIS Infoflyer. Transport-Accident-Information- and Emergency-Response-System of the German chemical industry)

3.9 RIB - Integrated Decision Support System

Description: RIB - Integrated Decision Support System is used in Sweden. It is designed for prevention and emergency management combining a library, a chemical database with dispersion models, risk management tools and a command and control system. The library includes research reports, observation reports, fire investigations, training literature, legislation, videos and internet links. The chemical database includes physical facts about hazardous substances e.g. boiling point, melting point, vaporisation point and flammability range.

RIB provides information about experiences gained during other emergencies involving the substance in question and including contact details for experts and information about prevailing legislation. It also contains information about availability of resources of fire brigades, companies, organizations and authorities that can be used during large emergencies and emergency response operations. Both expertise and material resources are described and displayed on a map. RIB also provides access to objective statistics to analyze emergency response operations.

RIB also provides tools for training, tools for calculation of safety distances and spreading of substances in air and in ground, tools for on-scene coordinator (OSC) and sanitation guidance.

RIB also offers operational support by allowing user to organize their operation documents. During operational status users can register events, decisions, manpower, tactics, and trends to obtain an overview of an operation.

Rib is developed and operated by the MSB - Swedish Civil Contingencies Agency.

Amount of chemicals: The database contains more than 14,700 items, of which more than 5,000 are in full text.

Availability: Use is partly restricted. Some parts of rib are open for all but full use of RIB requires a yearly payment of about 90€.

Language options: The RIB-module is in Swedish, but the dangerous substances can be searched and found in English, French and German

Updated: The program searches for updates once per week and every time it is restarted.

Online/offline: Both online and offline use are possible. However, it is possible to use some functionalities of the RIB only offline.

Link for additional information and to the database:
https://www.msb.se/en/Products/Support-systems-/RIB/

https://rib.msb.se/

(e-mail Feltenstedt Oskar. Swedish Coastguard; RIB – Resurser och Integrerat Beslutsstöd)

3.10 PÄKE (Päästejuhised keemiaõnnetustel)

Description: PÄKE is a chemical database used in Estonia. It is a translated version of Finnish database Tokeva and therefore it presents prevention measures and operating instructions in case of an HNS accident as well as general information about substance properties, health hazards and cleanup activities. PÄKE is translated in Estonian 2009 from the year 2006 Tokeva version.

Amount of chemicals: approximately 130 chemicals.

Availability: Only Estonian Rescue Board uses PÄKE. The Rescue Board is responsible for inland fire and rescue services in Estonia.

Language options: Estonian (and Finnish)

Updated: Last update from the year 2006.

Online/offline: Only offline

Link for additional information: -

(e-mail Melnik Triin. Estonian Rescue Board)

Missing information: “some information may be old, because Estonian version is from 2009”.

3.11 International Maritime Dangerous Goods Code (IMDG Code)

Description: The objective of the IMDG Code is to enhance the safe carriage of dangerous goods in packed form and to protect crew members while facilitating free and unrestricted movement of dangerous goods and prevent pollution to the environment. IMDG Code includes a list of the most commonly transported dangerous goods and their special provisions. It sets out in detail the requirements applicable to each individual substance, material or article as well as provisions for the classification, packing and on the use of hazard labels, consignment procedures, provisions for required documentation aboard the ship and advice on terminology, segregation, stowage and handling guides. Supplement of the IMDG Code includes information about emergency response procedures (The EmS Guide), first aid guide (MFAG), reporting

procedures and recommendations on the safe use of pesticides in ships. EmS Guide provides guidance for dealing with fires and spillages on board that involve dangerous goods listed in the IMDG Code.

IMDG Code is accepted as an international guideline to the safe transportation or shipment of dangerous goods or hazardous materials by water on vessel. Since 2014 the implementation of the Code has been mandatory for the states under the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). Only packaged goods belong under the IMDG Code, other types of dangerous goods (in solid bulk, liquid bulk, gas) are regulated in other Codes (IBC, IMSBC, IGC) of the IMO.

The Code is directed primarily at sea transport, but the provisions of the Code may affect to all those involved in industries and services connected with shipping. IMDG Code is developed and operated by the International Maritime Organization IMO.

Amount of chemicals: Approximately 2800 dangerous goods listed.

Availability: Available to all interested parties in return for a contribution.

Language options: English, search by French and Spanish language substance names is possible on the database.

Updated: The Code is updated every two years to accommodate new dangerous goods and to supplement or revise existing provisions. Maritime Safety Committee (MSC) of the IMO is authorized to adopt amendments to the Code.

O**nline/offline:** Both offline and online versions are available. Book, CD and a downloadable version exist. Also intranet and internet versions are available.

Link for additional information:
http://www.imo.org/en/OurWork/Safety/Cargoes/DangerousGoods/Pages/default.aspx and to the database: http://vp.imo.org . Link for two day trial for the IMDG Code at vp.imo.org/Public/TrialSetup.aspx

(IMDG Code International Maritime Dangerous Goods Code, 2014)

Missing information: “response guidelines are missing or not clear” and “No response measures”

3.12 HELCOM Manual on Co-operation in Response to Marine Pollution - Volume 2 (Chemicals)

Description: HELCOM has produced response manuals for oil (Volume 1), chemicals (Volume 2) and response on the shore (Volume 3). The aim of the Manual Volume 2 (chemicals) is to provide information to support decisions when responding to accidents in the marine environment involving chemicals and dangerous goods. It is used as a guide to carry out response operations. The Manual is not meant to be used on the scene of the accident. It should be reviewed and studied beforehand and it is recommended to be used as guidance when Contracting Parties to the Helsinki Convention participate in a joint action in responding to spillages of harmful substances. Helcom Response Manual is not a chemical database, it is a publication.

The Manual Volume 2 focuses on spills and lost packages. It contains information about spill behavior, predicting the drift and spread of chemical spills, monitoring and sampling. It also contains information about body protection and first response actions and presents techniques for corrective response to accidents involving both HNS spills and lost packaged dangerous goods. Manual also contains facts about resistivity of materials, classification of spills, labelling, measurement units and case histories.

Amount of chemicals: Helcom Response Manual 2 does not aim to concentrate on the properties of individual chemicals and dangerous goods. It contains more general descriptions.

Availability: Available for all and can be found from the web.

Language options: English

Updated: Helcom Manual Volume 2 is published 2002 and needs an update.

Online/offline: Pdf –format

Link for additional information: http://www.helcom.fi/helcom-at-work/groups/response

Link to the response manuals: http://helcom.fi/action-areas/response-to-spills/manuals-and-guidelines

(Helcom Manual on Co-operation in Response to Marine Pollution Volume 2, 2002; e-mail Backer Hermanni, Helcom)

Missing information: “Too general description of response measures”

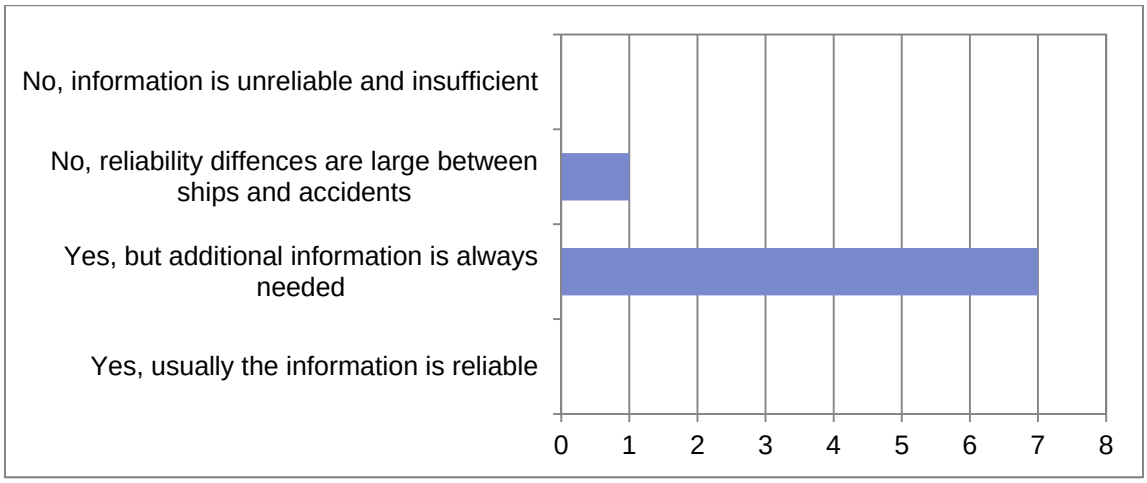
4 INFORMATION ABOUT CARGO ON BOARD

When rescue authorities are entering the ship in distress it is of utmost important to know what kind of cargo the ship is carrying. This chapter concentrates on the questions considering the reliability and availability of cargo information and sources of information in case of HNS accident.

4.1 Reliability of cargo information

Rescue authorities believe that information about cargo on board can in most cases be considered reliable. However, it must be noticed that all authority respondents believe that additional information is needed (Figure 8.). Additionally there seems to be big differences in opinions about the reliability of the information since one respondent saw that reliability differences are large between ships and accidents and the other respondent commentated the reliability of the information with following phrase: “Ships manifest; owner manifest; ground truth!”.

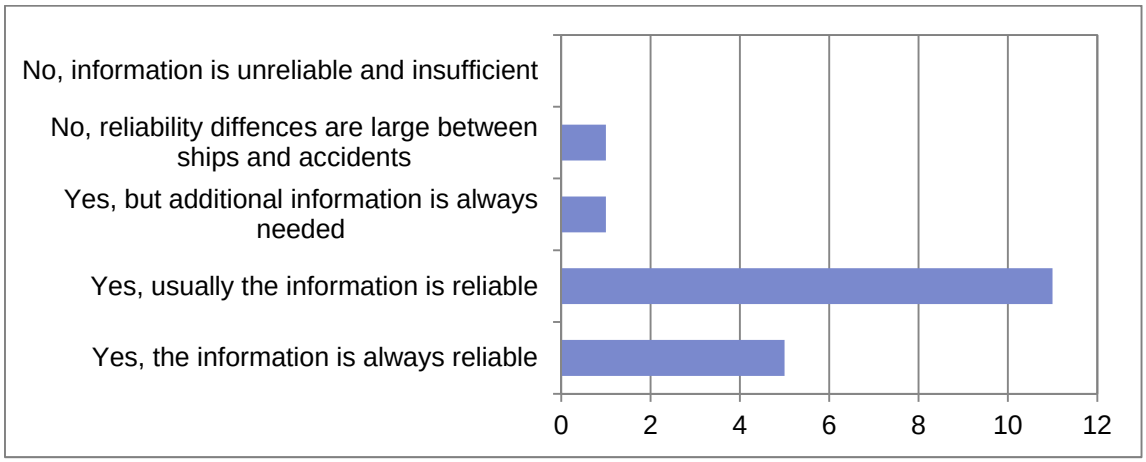
Figure 8. Reliability of the cargo on-board information on rescue authorities’ point of view



Do you think the information on what is onboard of a vessel is reliable? (n=8)

Responses of the shipping companies are very similar when comparing those to the answers of the authorities. The information is in almost all cases considered reliable but there also exists opposite opinion pointing out that there exists large differences between ships and accidents when considering the question of the reliability of information (figure 9).

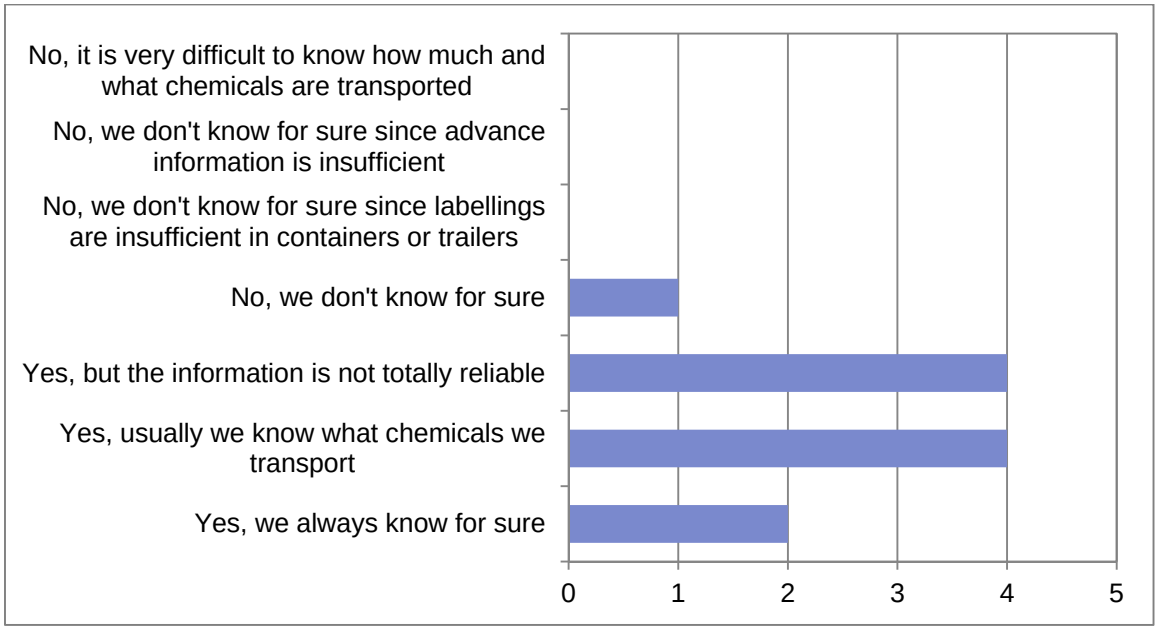
Figure 9. Reliability of the cargo on-board information from shipping companies point of view



Do you think the information on what is onboard of a vessel is reliable? (n=18)

Eleven shipping companies had answered to question that was addressed to the companies transporting cargo in unitized form. Knowledge about the chemicals on board in containers or in trailers seems to be more unreliable. One respondent said that they don't for sure what chemicals are transported in containers or trailers and four respondents saw that the information is not totally reliable. Even though majority (six out of 11) always or usually know what chemicals are transported in containers or in trailers these answers point out that SAR Mission Coordinators and rescue personnel need to look carefully on the reliability of the available information about the cargo on board especially when the cargo is transported in unitized form.

Figure 10. Reliability of the information considering chemicals transported on board in containers or trailers



For companies transporting cargo in unitized form: How well do you know if there are chemicals on board in containers or trailers transported? (n=11)

The same variety between responses continues when shipping companies were asked if they can give enough data on the chemicals and their location on board in case of an accident. Eight out of fourteen (57 %) shipping company respondents said that they can give enough data about chemicals and their location when asked whereas two (14 %) of the respondents said that they can't. The rest of the respondents (4 persons, 29 %) saw that their information is reliable only in the case when chemicals are reported accordingly. The importance of cargo manifest was also mentioned in these answers: *"Before every departure there will be issued a cargo manifest which is forwarded by mail to the captain. Before loading of dangerous goods (HNS) the ship is informed about UN-number, technical name of goods, amount (in kg), IMDG-class, how to separate DG-goods/non-DG-goods. This is done by the manifest suggest placement on the deck. If location ends up to be different the ship's crew inform shore side personnel about this".*

Shipping companies were also asked about the weakest points in the chain of information regarding cargo data. One respondent didn't see any weak link but all the other respondents mentioned insufficient information and nodes of the transport chain as the weakest links. Shipper and insufficient or unreliable information were seen as the weakest points in many of the responses of the shipping companies:

"There is no legal ground and practical possibility to verify whether the shipper's cargo information given on behalf of the authorities is done in legal way (with other words - if the cargo to be shipped was tested and certified and brought under IMSBC code)."

"Reliability on information given by the shipper. Some of the b class bulk cargoes (some of them can be IMDG cargoes) are not always possible to link to IMSBC code, therefore verified whether they can be safety transported by vessels."

"Weakest point is to get adequate information about the cargo."

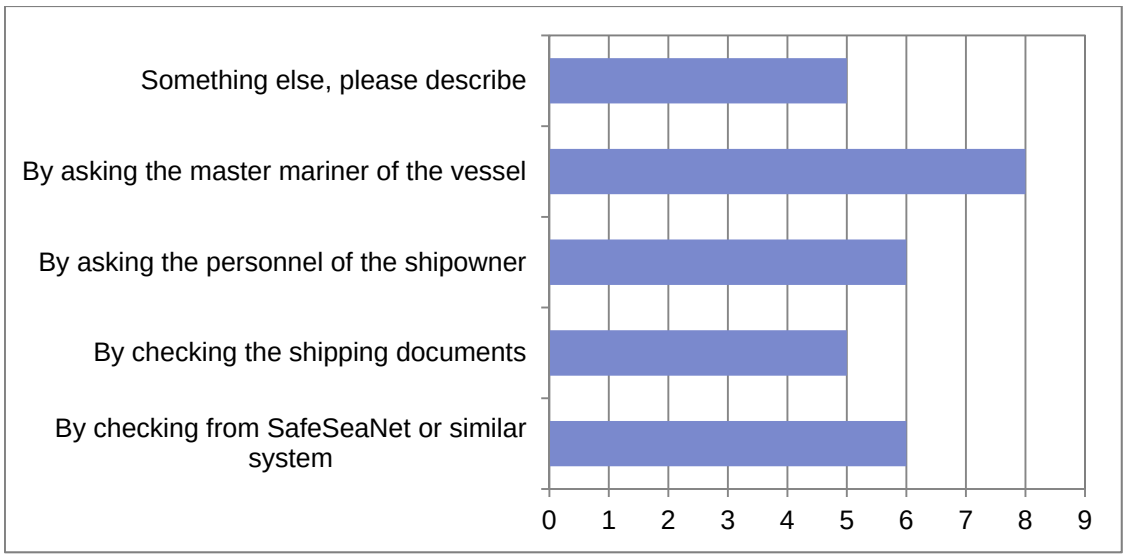
Also other nodes of the transport chain were mentioned in answers. Booking of the cargo, transportation, packaging of the cargo and ports as well human error were seen as the weakest points. Respondents also mentioned that certificates of quality may be missing or cargo might have wrong labels. Shipping companies don't usually check information about cargo. As one of the respondents said: "*If transport company does not inform correctly. We have no means of resource either rights to do check."*

As a means to improve the reliability of the cargo information shipping companies mentioned several suggestions. Most popular suggestion recommended tighter and additional control by authorities. Once again many respondents also emphasized importance of exact and detailed information that is given to vessels. Electronic identity and verification system, international regulations and sanctions, standardized information and procedures as well as issue certificate of quality were suggested. Also responsibility and attitude of master mariner was seen important: "*The cargo owner must always give exact information of the cargo and the Master should always ensure that this is onboard prior to taking the cargo onboard."*

4.2 Sources of cargo information

In case there is a HNS incident at sea SAR Mission Coordinators (SMCs) try to find out the information what is on board on a distressed vessel from several sources, since it is likely that the more sources of information you have the more reliable information about the cargo you get. All the rescue authority respondents had chosen many options from the given possibilities (figure 11). All the authority respondents would ask the information about cargo from the master mariner of the distressed vessel in case of an HNS incident at sea. Most of the respondents would also check the SafeSeaNet or similar system containing information about the carried cargo of the vessels, ask the personnel of the shipowners' and check the shipping documents. Five of the respondents had also chosen the possibility to specify their answers. These open answers are represented later in this chapter.

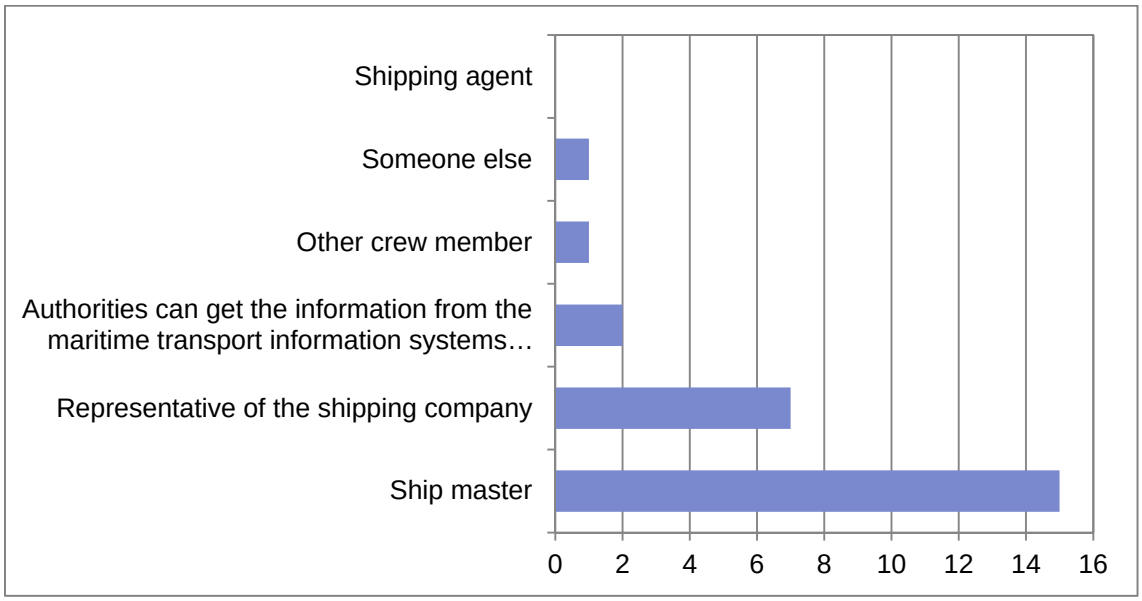
Figure 11. Sources of information about cargo in case of HNS accident at sea



Imagine there is a HNS incident at sea. How does the SMC (SAR Mission Coordinator) get information what is onboard on a distressed vessel? (n=8)

Shipping companies get information about the cargo and its contents from transport operators, cargo owners, shippers, shipping agents, freight forwarders and also from their companies own departments dealing with operations, charter and cargo. Also shipping companies named master mariners as the best option to tell rescue authorities about the cargo ships are carrying. 15 shipping company respondents out of 17 (88%) mentioned master mariner as a primary source of information to rescue authorities in case of an HNS accident at sea. Also representatives of shipping companies were seen as quite a popular option since 41% of the respondents mentioned also them as a primary source of information to rescue authorities.

Figure 12. Source of information according to the shipping companies



Who primarily gives the information on cargo to rescue authorities (e.g. SAR Mission Coordinator) in case of an HNS accident at sea? (n=17)

Additional ways to get more information on cargo on-board of a vessel were described more precisely both in open answers and in following question "How is it possible to get more information on cargo on-board of a vessel?" Authority respondents mentioned national single window, National Vessel Management Information systems and similar databases or contacting port of arrival/departure as a ways to find out more information about cargo. Also contacting of cargo owner, cargo supplier, shipper, manufacturer and purchaser were mentioned as ways to find out the information about cargo on board. One respondent had also described the order of the information: the initial report comes from the vessels and then information is checked from the SafeSeaNet, agent, shipowner and shipper. Also patrol vessel on site and MIRG provide information about the cargo on-board. One respondent also mentioned that they use questions from the mission tasking form to find out information about cargo on board of the vessel.

5 SUMMARY AND CONCLUSIONS

There exist a lot of high-quality chemical databases that are used for several and diverse purposes. Different native languages, target groups and information needs are covered by several chemical databases in each of the responding country. It would be easiest to work together if all the rescue authorities of the Baltic Sea region would use the same information source in case of HNS accidents. It would also make formulation of common guidelines easier. However, the reality is more complex. There exist 12 different databases among the three most important databases of Baltic Sea countries. The most commonly used chemical databases and response manuals among rescue authorities are Safety data sheets and IMDG Code. MAR-CIS, CAMEO and SafeSeaNet are considered very important and used in several Baltic Sea Countries and also national databases are among the most frequently used databases for many of the authority respondents. For shipping companies Safety data sheets and IMDG Code are among the most frequently used chemical databases.

Precise, up-to-date and easily obtainable information of chemical databases supports maritime SAR operations by offering crucial information about properties and reactivity of the substances and their hazards, information about handling, response measures and precautions as well as information about the cargo on board. Also other useful tools exist. For example dispersion models, risk management tools and command and control system as well as support such as contacts and consulting of chemical company fire brigades are available through TUIS and MAR-ICE networks.

Chemical databases are in different position with each other since some of those are mandatory for shipping companies and more international from their characters. SafeSeaNet is made up of the collected information of obligatory National Single Window reporting systems and IMDG Code is obligatory for shipping companies transporting dangerous goods in packed form. Some of the databases are developed to the needs of specific country whereas some of the databases are selected on the basis of their content and functionalities.

Some of these most important databases are developed exactly to the needs of the specific country since they contain national language options and country specific information such as maps, available rescue resources and national contact information. Type of information of the databases need to be planned for the target group. For example chemical specialists and fire fighters may benefit from different kind of information and databases. It seems that it must be carefully decided who are the users of the databases, and that the databases should be tailored just to the needs of each user group.

One goal of the survey was to find out what kind of additional information would be needed and what are the weaknesses of already existing databases. The survey does not give a clear answer to this question. There exist vulnerabilities and weaknesses in databases but a clear common target of needed database development is not reveled through this survey. This question

demands more discussions between project partners and specialists of chemical databases, transportation and rescue authorities before the demand for the development of chemical database is clearly defined.

However, already an additional knowledge about chemical databases of the other Baltic Sea countries is one step forward in Baltic Sea region co-operation. Need and importance of international co-operation is well acknowledged through the Baltic Sea region. From this report rescue authorities may find additional or replacing sources of information and networks besides the ones they are using at the moment. Also realization of useful features and good practices of databases that the others are using may lead to the development of other chemical databases and this way promotes the safety of the transportations and travelling.

The survey also revealed that many chemical databases are being developed further at the moment. Mobile apps are under construction or consideration, amount of chemical datasheets is increasing and also some new databases are being developed. For example the Finnish Safety and Chemicals Agency (Tukes) is developing a national online database of chemicals to bring information on substances into one place to enable companies to handle chemicals with reporting obligations through a single service (Kemidigi project).

In addition to real incidents rescue authorities are using chemical databases and response manuals for training and education. According to the survey more training is needed since most of the respondents feel that they would need more regular training. It is clear that using of these chemical databases need to be well known in case of an HNS accident. Users of the databases need regular training so that all information and functionalities of the databases can be totally utilized in accident situations. All user groups of the databases need to know how they work and what kind of information they include. Otherwise the information and databases are underutilized and waste of existing resources. The whole rescue personnel of some country may be trained and qualified to use these specific chemical databases. It is always a question of safety when making decisions considering sources of information.

It is very important to know what kind of cargo the ship is carrying when rescue authorities are entering the ship in distress. According to the survey cargo information is not totally reliable. Rescue authorities believe that information about cargo on board can in most cases be considered reliable but also additional information is needed. There exist weak points in the information chain of the cargo on board. Since shipping companies rely on the information supplied by others, knowledge about the chemicals on board can’t be considered totally reliable in every case. Especially the cargo information considering the content of containers or trailers needs to be treated suspiciously.

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The ChemSAR project

There is a lack of operational plans and standard operational procedures (SOPs) for search and rescue (SAR) operations applicable to cases of HNS incidents in the Baltic Sea Region.

There are large quantities of different chemicals transported by sea and the risk of accidents exists. Demanding maritime accidents are almost always international in nature, which emphasizes the significance of common procedures and common level of know-how.

The ChemSAR project will create operational plans and SOPs needed in SAR operations of HNS incidents. It will develop e-learning material to enhance and harmonize the level of know-how to ensure safe rescue operations. It will also generate a chemical data bank to act as the basis for information seeking in rescue operations and e-learning.

The SOPs will be piloted in chart exercises and in an international rescue exercise at sea to test the applicability of the project results in practice.

Project duration: March 2016-February 2019
Project budget: 2.4 m€
Co-financed by the Interreg Baltic Sea Region Programme

See more at: http://blogit.utu.fi/chemsar