

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

PUBLICATIONS OF THE CHEMSAR PROJECT
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PREPAREDNESS TO MARITIME CHEMICAL ACCIDENTS IN THE BALTIC SEA REGION



Johanna Yliskylä-Peuralahti



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FOREWORD

The ChemSAR project aims at increasing maritime safety in the Baltic Sea region in incidents involving hazardous and noxious substances (HNS). Despite the lack of common procedures and processes, countries of the Baltic Sea region have had a clear need to prepare for potential incidents nationally in their own territory. However, nationally coordinated practices, training and response measures differ between states due to no internationally coordinated preparations of common practices. ChemSAR aims at answering to this existing international need by producing common operational plans and operating procedures for search and rescue (SAR) operations involving HNS incidents where threat to human life is imminent. Operational plans and procedures are created in order to assure the execution of maritime SAR operations involving actors from several states in the Baltic Sea region. On the other hand, operational plans and procedures will be developed in a way that they are applicable in national context as well.

This background report lays out important information on the current situation and development needs. According to the survey, several authorities experience that there is a clear need for joint operational plans and procedures. Indeed, international cooperation is seen as a driving force in the ChemSAR project as well. The challenges posed in this report will be addressed in the development of the operational plans and procedures, yet the practical experiences from different exercises and testing phases will indicate the actual results of the work done.

As the leader of work package 2, the Finnish Border Guard would like to thank the Centre for Maritime Studies of the University of Turku and other project partners for their valuable contributions.

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Abbreviations

ACO	Aircraft coordinator
ARCC	Aeronautical Rescue Coordination Center
BSR	Baltic Sea region
CCME	Central Command for Maritime Emergencies (Germany)
COSPAS-SARSAT	International satellite based search and rescue distress alert detection and information distribution system
CSO	Company Security Officer
CRV	Chemical recovery vessel
DPA	Designated Person Ashore
EEZ	Exclusive economic zone. A sea zone prescribed by the United Nations Convention on the Law of the Sea (UNCLOS) over which a state has special rights regarding the exploration and use of marine resources, including energy production from water and wind.
EMSA	European Maritime Safety Agency
FRMR	Fire and Rescue Marine Response (UK)
HEMS	Helicopter emergency medical services
HNS	Hazardous and noxious substances
HSEQ management	Health, safety, environment and quality management
IAMSAR	International Aeronautical and Maritime Search and Rescue manual published jointly by International Civil Aviation Organization (ICAO) and International Maritime Organization (IMO)
IMDG Code	International Maritime Dangerous Goods Code. International guidelines to the safe transportation or shipment of dangerous goods or hazardous materials by water on vessel.
JRCC	Joint maritime and aeronautical rescue coordination centre
MAR-ICE	Marine Intervention in Chemical Emergencies Network. A network of experts established by European Maritime Safety

Agency	(EMSA) that provides expert information and advice for the authorities of the affected coastal state on chemical substances during an emergency situation.
MAR-CIS	Marine Chemical Information Sheets. Datasheets developed by EMSA that contain relevant information for responding to hazardous and noxious substances (HNS) marine spills. The 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.
MAS	Maritime Assistance Service
MCA	Maritime Coastguard Agency (UK)
MRC	Marine Response Centre (UK)
MIRG	Maritime incident response group
MRCC	Maritime Rescue Coordination Centre
MRSC	Maritime Rescue Sub-Centre
NCEC	National Chemical Emergency Centre (UK)
OP	Operational plan
PoE	Protection of environment
RCC	Rescue Coordination Centre
RNLI	Royal National Lifeboat Institution (UK)
SAR	Search and rescue operations
SMC	Search and Rescue Mission Coordinator
SOP	Standard Operational Procedures
SOSREP	Secretary of State's Representative for Maritime Salvage and Intervention (UK)
VTs Centre	Vessel Traffic Service Centre
WP	Work package

1 INTRODUCTION

1.1 Introduction of the ChemSAR project

Large quantities of different chemicals are transported by sea in the Baltic Sea and the risk of accidents exists. There is a lack of operational plans and standard operational procedures (SOPs) for cross-border search and rescue operations (SAR) applicable to cases of hazardous and noxious substances (HNS) incidents where international collaboration is required. The aim of the ChemSAR project is creating operational plans and SOPs for such incidents occurring at the Baltic Sea. The specific focus when creating the plans and SOPs is how people can be rescued from a distressed vessel where a normal SAR-SOP cannot be used due to a dangerous zone. Common SOPs will be created in the project for Rescue Coordination Centres (RCCs), rescue units, the crew of the distressed vessel, and shipping companies. The prevention or reduction of the damage to environment due to the leakage of the HNS is framed out of this report and the creation of the SOPs.

The aim of this report is to give an overview on the level of information and competence related to preparedness of maritime HNS incidents in different in Baltic Sea region countries. The report contains selected results of two surveys that were connected with WP2 (“Operational plans and standard operational procedures for SAR operations”) and WP4 (“Chemical data bank for joint use for maritime and environmental authorities and shipping companies”). Besides the survey data, publicly available information has been used. The reports used are listed in references. The report is written by Dr. Johanna Yliskylä-Peuralahti (Brahea Centre at the University of Turku, Centre for Maritime Studies) in supervision by Lieutenant Senior Grade Teemu Niemelä and Lieutenant Commander Seppo Häkkinen, Finnish Border Guard Headquarters.

1.2 Aims of the surveys addressed to authorities and shipping companies

Two electronic (Webpropol) surveys were produced. The aim of the first survey was to get an overview on 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 data bank 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 national authorities who responded to the survey have checked the text of this report, especially the description on the roles and responsibilities of the different organisations participating in maritime SAR mission (chapter 2.2).

The aim of the second survey was to get an overview on shipowners' preparedness to maritime HNS incidents. The second survey was addressed to shipping companies operating in the Baltic Sea region and especially to persons responsible for safety and/or 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.

1.3 Respondents

Altogether 8 responses were received to the survey addressed to authorities (see Table 1). Responses were received from all BSR 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.

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 CMS 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. below). Due to the very small number of responses the results should be treated with caution. Since the group of shipowners that responded to the survey is not a representative sample of shipping companies operating in the Baltic and North Sea regions, conclusions on the overall state of the maritime safety or shipping companies preparedness for maritime HNS incidents in the Baltic Sea cannot be drawn on the basis of responses.

The majority of the shipping companies that replied to the survey belong to 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).

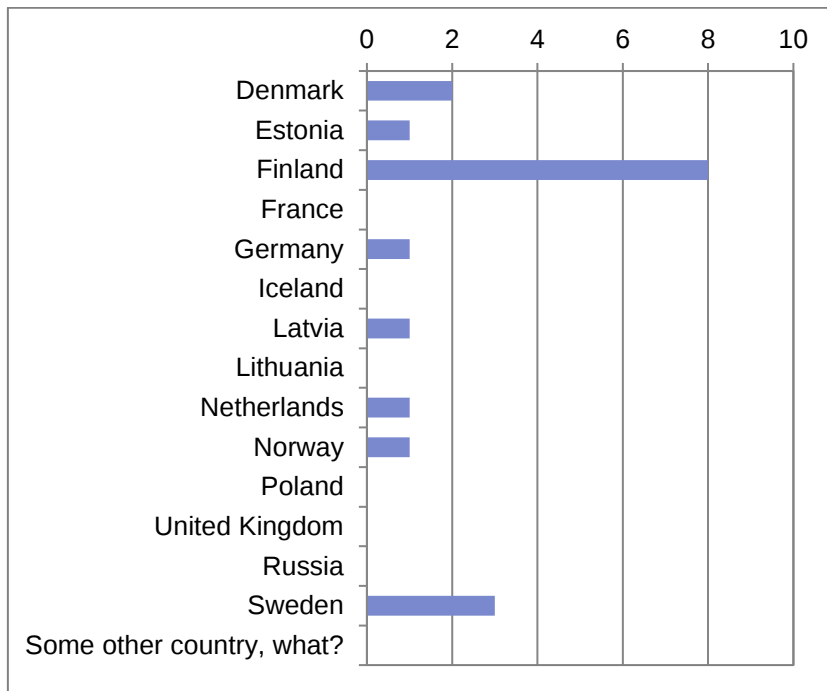


Figure 1. Shipowners' responses to the survey by country

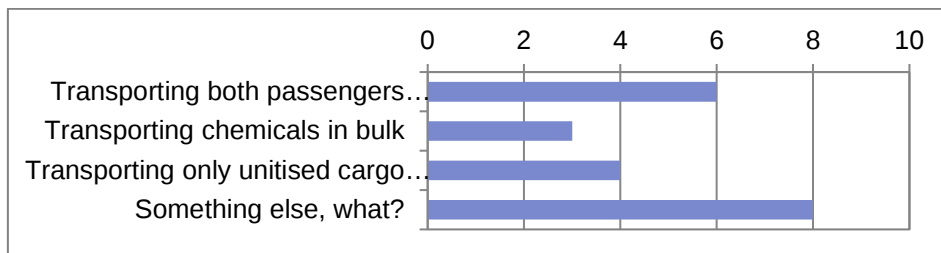


Figure 2. The main activity of respondents' shipping company

The majority of the shipping company respondents work at managerial level and are responsible for safety or security issues. Many of them are working either as Company Security Officers or Designated Persons Ashore (see Fig. 3., next page. 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.

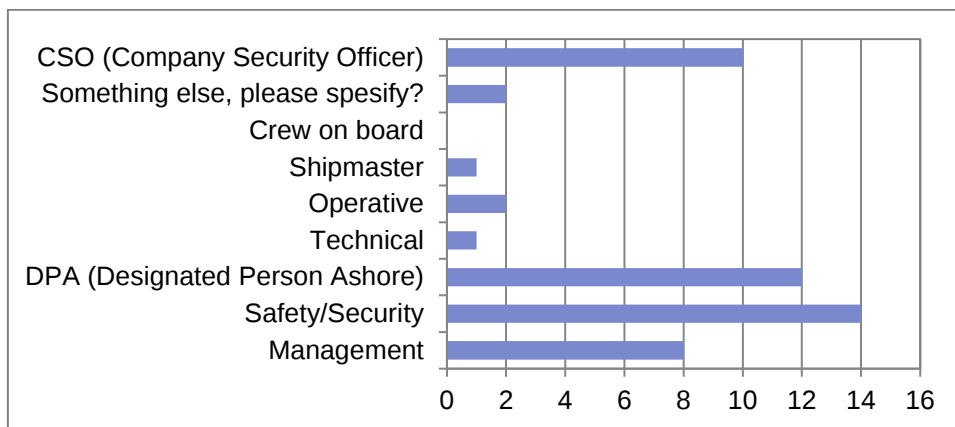


Figure 3. Respondent's own role in the company

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

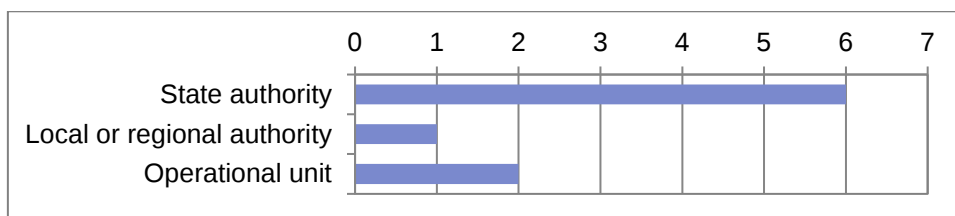


Figure 4. Authority respondents by background organisation

2 SAR OPERATIONS IN A LARGE SCALE MARITIME HNS INCIDENT

2.1 SAR operations in a multisectoral maritime HNS incidents

A search and rescue mission related to a large-scale maritime incident often requires actions both at sea and on land. Such incidents can simultaneously endanger human life, property and the environment, and therefore they are often called multi-sectoral incidents. Saving human life is always the first priority in maritime incidents regardless of their scale, even though salvage operations to save property and prevent environmental damage are also carried out. Maritime SAR operations require multidimensional approach, as often rescue missions involve working in the air (with rescue helicopters) as well as on and below the sea surface. Usually a large number of different actors from several countries take part in large-scale and/or multi-sectoral maritime incidents as rescue operations cannot be conducted with the resources of a single country, or by a single authority alone. Operations run by various different actors both at sea and on land thus need to be well organised and carefully coordinated, and shared situational awareness among all parties is essential (Hatakka, BSMIR report 2014).

Operations at sea in multi-sectoral maritime incidents are run by maritime rescue officials, and other organisations can be ordered to take part in SAR operations. On the basis of the IAMSAR manual, the rescue mission is coordinated by the country whose search and rescue region (SAR region) the incident takes place. The master of the vessel is in charge of evacuation of the crew and possible passengers. In addition, general emergency services and first aid is required for injured persons on land and also salvage operations (e.g. to protect further damage and to enable the work of rescuers) both at sea and on land. However, the organisation of the on-shore operations must be agreed upon separately, and an assembly point needs to be established (Hatakka, BSMIR report 2014).

The characters and the amount of the chemicals on-board of a distressed vessel need to be known before SAR operations at sea can begin because the presence of hazardous chemicals notably restricts emergency mission. With chemical accidents the risks for human health is usually caused by reactivity of the chemicals with air, water or with other chemicals, and their toxicity and long-term effects (e.g. carcinogenic effects). The greatest danger to human health mostly originates from chemicals in vaporous or gaseous form. First responders must know which chemical substances are transported on-board of a distressed vessel, in which form (solid, liquid or gaseous) the chemicals are, and what are the potential synergetic reactions between these chemicals. The reliability of the cargo information is thus essential. The assessment of the chemical risk can be very difficult if a vessel is carrying several different chemicals whose characters are not known, or if the cargo information is unprecise. Chemicals can be transported either in bulk or in packed form. In the Baltic Sea most of the chemical transports are done by chemical parcel tankers or gas carriers with multiple separate (typically between 10 and 60) cargo tanks. The same vessel can thus carry multiple different chemicals. In addition, various

chemicals are also transported in packed form in the Baltic Sea in special chemical containers or trailers (with the possibility of temperature control) and also in regular sea containers on Ro-Ro and Ropax vessels and container carriers (Marchand 2002; EMSA 2007; Luhtala 2010; Häkkinen & Posti 2014).

According to EMSA studies (EMSA 2007), majority of the maritime accidents that have caused HNS release in the EU waters have occurred on vessels transporting (single) chemicals in bulk form. Collision and groundings are the main accident types in the Baltic Sea. Majority of the past incidents where HNS substances have been present have taken place in the Southwestern part of the Baltic Sea in Danish and Swedish waters where traffic intensity is high and where chemicals are frequently transported (Häkkinen & Posti 2014). Analysis of the COWI report on traffic and dangerous goods transportation in German waters (COWI 2016, CCME 2017) shows a significant risk of incidents in the south-western part of the Baltic Sea, where the main traffic line through “Kadetrinne/Kadetrenden” is split into other passage lines or crosses ferry lines between Germany and Poland, and Denmark and Sweden, respectively. Another “hot spot” for chemical transports is the Gulf of Finland (Luhtala 2010).

The risks of a chemical spill on human health depend largely on where and in what kind of environmental and weather conditions the incident occurs. If the incident takes place at open sea, rescue operations may take a long time because it usually takes several hours before the first responders reach the vessel, and since only a limited amount of persons (15-20) can be taken on-board by each SAR helicopter that is used in the rescue mission. In addition, bad or cold weather conditions on site may also impede the rescuers’ work. Therefore it is essential, that the vessel in distress send the request for help immediately and that the crew is prepared for accidents. If the incident takes place during winter, the cold weather and the presence of ice in the water may change the properties and/or form of the chemicals. Some chemicals may become less reactive in colder temperatures and thus easier to recover while others may evaporate or dissolve more slowly or even become viscous or solid. In case the incident takes place closer to the shore the site is easier to reach but the negative consequences of the incident for human health and to the environment can be much higher, especially if the site of the incident is close to densely inhabited areas. If the accident occurs in a port, terminal or in a closed sea area near a shore, the first respondents may reach the site quickly but the risk for human casualties can be much higher as even a small spill may cause elevated chemical concentrations in a small area. Port workers and local inhabitants near the site of the incident are then at risk (EMSA 2007; Häkkinen & Posti 2014).

2.2 Organisations participating in maritime HNS incidents in different countries, their roles and responsibilities

Estonia:

Table 2. The main organisations responsible for SAR operations related to HNS accidents at sea in Estonia

Service	Responsible party
Coordination of SAR operations at sea	Estonian Police and Border Guard Board
Provision of fire and rescue teams	Estonian Rescue Board
Coordination of oil and HNS pollution response operations at sea	Estonian Police and Border Guard Board
Vessel traffic safety on accident area at sea	VTs Centre
Provision of HNS response vessels	Estonian Police and Border Guard Board
Emergency medical care at sea	Health Board
Expertise on safety regarding vessel in distress	Estonian Maritime Administration
Aeronautical SAR services	Estonian Police and Border Guard Board

The Estonian Police and Border Guard Board is the responsible authority for leading SAR operations at sea, and it is also responsible for providing units taking part in maritime SAR operations. Estonia has a joint maritime and aeronautical rescue coordination centre (JRCC) in Tallinn. Estonian Police and Border Guard Board also coordinates oil and HNS pollution response operations at sea. In addition, Estonia has four (4) oil spill clean-up vessels. Pilot and tugboats can also be used if needed. Other authorities that take part in maritime SAR operations include Navy, Environmental authorities, and Vessel Traffic Service (VTS) centre. In addition, Environmental Inspectorate, environmental emergency hotline 1313 can be consulted in the case of HNS incidents. Estonian Ministry of the Environment, Analysis and Planning Department, is responsible for national coordination and development of the actions related to HNS accidents at sea. Estonia has a national plan for combatting sea pollution but the plan does not include a specific SOP for maritime HNS incidents. Estonia has 1,400 km of coastline. The heaviest maritime traffic volumes in the Estonian SAR region are on the fairways leading to the ports of Tallinn and Paldiski.

Estonia has at least one SAR helicopter on continual stand-by. The JRCC personnel have been trained to coordinate both maritime and aeronautical SAR operations. In the case of accident, the JRCC's Search and Rescue Mission coordinator (SMC) will act as an ACO. The aviation group radar operators have been trained for ACO function as well.

The main organisations taking part in on-shore SAR rescue operations in Estonia include Police and Border Guard, Emergency fire and rescue services, Emergency medical services, Healthcare authorities, Maritime administration, Environmental authorities, Navy, voluntary associations and National Defence League.

Estonia has SAR collaboration agreements with its neighbouring countries and it organises joint SAR exercises annually with them. Estonia has bilateral SAR collaboration arrangements with Sweden, Finland, Latvia, and a protocol with Russian Federation.

Germany:

Table 3. The main organisations responsible for SAR operations related to HNS accidents at sea in Germany

Service	Responsible party
Coordination of SAR, oil and HNS pollution response operations at sea	Central Command for Maritime Emergencies (CCME)
Provision of on-board fire and rescue teams	MIRG Teams on behalf of CCME
Vessel traffic safety on accident area at sea	VTs Centre
Provision of HNS response vessels	Federal Waterways and Shipping Agency
Emergency medical care at sea	MIRG Teams on behalf of CCME
Expertise on safety regarding vessel in distress	MAS Service, CCME
Aeronautical SAR services	German Naval Air Wing, Federal Police

The Central Command for Maritime Emergencies (CCME) located in Cuxhaven is responsible for coordination of SAR in major cases, non-daily and mass rescue operations, and it is also responsible for oil and HNS pollution response operations at sea in Germany. The CCME takes command in case of a large maritime emergency, on request of other authorities (e.g. MRCC), or if a smaller incident threatens to escalate. Maritime search and rescue coordination centre (MRCC) located in Bremen is responsible for SAR operations in the whole German SAR zone which extends 400 km into the North Sea and covers the German SAR zone in the Baltic Sea. The SAR zone includes also the 78 kilometres long Kiel Canal that connects North Sea and Baltic Sea. Germany has approximately 700 km of coastline.

Due to large volumes of maritime traffic especially to the ports of Bremerhaven, Wilhelmshaven, Kiel, Lübeck, Rostock and Hamburg Germany has a national response plan which covers the roles and responsibilities of different authorities during a maritime incident. Germany has also prepared a SOP for maritime HNS incidents. The SOP contains operational plans (OPs) for the response vessel and the MIRG teams. The situation assessment, the HNS monitoring and the response options are also covered.

The Central Command for Maritime Emergencies has its own rescue assessment and coordination centre, and besides maritime SAR operations it also coordinates emergency medical care in case of maritime HNS incidents. In addition, several other authorities take part in maritime SAR operations. Local fire services provide on-board fire and rescue teams. Hamburg Fire Brigade has an Analytical Task Force specialized in monitoring HNS incidents. German Navy operates CCME's remote sensing aircrafts and provides airlift services in maritime rescue missions. Federal Police provides reconnaissance flights and airlift with helicopters. The Federal Waterways and Shipping Agency has four (4) multirole HNS combat vessels. Germany has at least one SAR helicopter on stand-by on Helgoland, and four (4) types of maritime incident response (MIRG) teams on a continuous stand-by for maritime incidents. The MIRG teams are designed and trained for various operations requiring advanced medical care, fire fighting, response to HNS, and provision of technical rescue at sea. Other parties that can be consulted in the case of HNS incidents include Transport Accident Information System (TUIS) of the German chemical industry, and the manufacturer of chemicals in vessels' cargo. In addition, German Maritime Search and Rescue Service (Die Deutsche Gesellschaft zur Rettung Schiffbrüchiger, DGzRS) takes part in maritime SAR operations. The DGzRS is a voluntary, independent, non-governmental organization which is totally funded by donations, and it is responsible for daily SAR operations.

Germany has in total 13 rescue stations on stand-by 24/7 for maritime rescue operations. Six of the stations (Flensburg, Kiel, Lübeck, Wismar/Schwerin, Rostock and Stralsund) are located on the coast of the Baltic Sea, and seven stations (Emden, Wilhelmshaven, Bremen, Bremerhaven, Cuxhaven, Hamburg and Brunsbüttel) on the North Sea. All stations have at least one (1) MIRG team trained for fire fighting and HNS response per station available 24/7. At some of these locations MIRG teams specialized in medical care or technical rescue are stationed as well.

Germany has close collaboration agreements with The Netherlands, Denmark and Sweden and it organises joint exercises with them. In addition, Denmark, Germany and the Netherlands have also formed "quick response" areas on both sides of their borders. If an accident occurs, maritime incident response vessels from both side of the border can operate in other country's waters inside the quick response areas with granted diplomatic clearance in advance.

Finland:**Table 4. The main organisations responsible for SAR operations related to HNS accidents at sea in Finland**

Service	Responsible party
Coordination of SAR operations at sea	Finnish Border Guard
Provision of fire and rescue teams	Fire and Rescue services
Coordination of oil and HNS pollution response operations at sea	Finnish Environment Institute (SYKE)
Vessel traffic safety on accident area at sea	VTs Centre
Provision of HNS response vessels	Finnish Border Guard
Emergency medical care at sea	Helicopter emergency medical services (HEMS)
Expertise on safety regarding vessel in distress	Maritime administration
Aeronautical SAR services	Finnish Border Guard, Helicopter Emergency Medical Services (HEMS),

Finnish Border Guard is responsible for coordinating SAR operations at sea. Finland has two SAR regions. The MRCC Turku is responsible for the western SAR region which covers the Southwestern archipelago area, Åland islands, and the Finnish side of the whole Northern Baltic Sea up to the Bay of Bothnia. The Helsinki MRSC is responsible for the SAR region in the Gulf of Finland. Aeronautical SAR operations are coordinated in the ARCC located in Tampere. Finland has approximately 1,250 km of coastline. Maritime traffic is dense both in the Gulf of Bothnia and in the Gulf of Finland. A particular concern in the latter area is cargo vessel traffic going in the East-West direction that crosses frequent Ro-Pax ferry traffic going in the North-South direction between Helsinki and Tallinn.

Finland has a plan for multi-sectoral maritime incidents and the MRSC and MRCC have also prepared regional maritime SAR plans for their respective regions. However, Finland does not have a SOP for maritime HNS accidents.

In the case of a maritime HNS accident the Finnish Border Guard is responsible for coordinating SAR operations. Fire and rescue services provide fire and rescue teams, resources and expertise on chemical response. In addition, Finnish Environment Institute (SYKE) provides expertise on oil and chemical response. The Vessel Traffic Service Centre (VTs Centre) provides information on vessel traffic in the accident area and maritime administration expertise on issues concerning

the vessel in distress. Finnish Meteorological Institute provides information on the weather conditions on the site of the incident. Other organisations taking part in maritime SAR operations include Emergency medical services, Finnish Defence Forces and the Navy, Police, helicopter emergency medical services (HEMS), and voluntary maritime rescue associations.

Finland has maritime SAR helicopters on standby on three locations: Helsinki, Turku and Rovaniemi in the Northern Finland. Finnish rescue teams primarily use these dedicated maritime SAR helicopters. Army helicopters can also be used. Finland has two (2) MIRC teams on a continuous 24/7 standby for maritime incidents in Turku and Helsinki. Both MIRC teams usually have five (5) members. The composition of the team may vary depending on the nature of the SAR operation in question and distance to the incident site. In addition, the personnel working in maritime SAR positions and at MRSC/MRCC are trained on the basics of chemical response operations. Other resources for maritime HNS incidents include surface vessels and a multi-purpose chemical recovery vessel.

The following organisations take part in on-shore SAR operations: Finnish Border Guard, Emergency response centre, Police, Emergency fire and rescue services, Emergency medical services, Healthcare authorities, Social Welfare authorities, Finnish Defence Forces/Navy, volunteer fire departments, VTS Centres, Helicopter Emergency Medical Services, Finnish Red Cross, and Transport Safety Agency (Trafi). The Helicopter Emergency Medical Services (FinnHEMS) has six (6) helicopter bases in connection with university hospital districts in different parts of the country (Vantaa, Turku, Tampere, Kuopio, Oulu and Rovaniemi).

Finland has bilateral SAR agreements with its neighbouring countries Russia, Estonia and Sweden and organises annual joint exercises with them. In addition, Finland takes part in joint Baltic SAR exercises. Finnish SAR helicopters have been used in SAR operations in Estonia, Sweden and Russia.

Latvia:**Table 5. The main organisations responsible for SAR operations related to HNS accidents at sea in Latvia**

Service	Responsible party
Coordination of SAR, oil and HNS pollution response operations at sea	Latvian Naval Flotilla Coast Guard Service
Provision of fire and rescue teams	State Fire and Rescue Service
Coordination of oil and HNS pollution response operations at sea	Latvian Naval Flotilla Coast Guard Service
Vessel traffic safety on accident area at sea	Latvian Maritime Administration
Assisting organization to the Latvian Coast Guard Service	State Border Guard/Port Authorities
Emergency medical care at sea	State Emergency Medical Service
Expertise on safety regarding vessel in distress	Latvian Maritime Administration
Aeronautical SAR services	Latvian Naval Flotilla Coast Guard Service

Latvian Naval Flotilla Coast Guard Service coordinates all operations at sea regarding maritime incidents, e.g. SAR, MAS, PoE and HNS pollution response operations at sea. For this purpose it maintains Maritime Search and Rescue Coordination Centre (MRCC Riga). Latvian SAR region extends the Latvian EEZ borders and is 28 810 km². The main shipping route in the Baltic Sea from the Danish Straights to Gulf of Finland passes through Latvia's SAR region. The narrow straight of Irbe between the Southern part of island of Saarenmaa and Latvian coast leading to the Gulf of Riga is a higher risk area in terms of maritime incidents. Latvian coastline is 494 km long.

In case of any incident at sea, Naval Flotilla Coast Guard Service is in charge of coordinating all response operations at sea. SAR operations at sea are carried out by the Naval Flotilla Coast Guard Service according to the maritime SAR plan. Oil and HNS response operations at sea are carried out by the Naval Flotilla Coast Guard Service according to the National Oil and Chemical Spill Contingency Plan. HNS response at sea is a part of the National Oil and Chemical Spill Contingency Plan of Latvia.

Air Force helicopter (MI-17) on 24/7 stand-by is used as a primary resource for maritime SAR and other airborne operations. Navy vessels on 24/7 stand-by are used as primary resources for maritime SAR and other sea-based operations. State border Guard vessels on 24/4 stand-by are used to provide assistance to the Navy. Two Navy vessels and one non-propelled barge are available and adapted for oil combatting and clean-up tasks. Port authority and other

governmental resources, including e.g. icebreakers, tugboats, pilot vessels etc., are used as secondary resources for operations at sea. Chemical, Biological, Radiological and Nuclear Unit of the Latvian National Armed Forces is in charge of chemical expertise and assistance to the Naval Flotilla Coast Guard Service. Latvian Maritime Administration is responsible for shipping safety and dangerous cargo operations in case of a maritime incident. State Emergency Medical Service is in charge of emergency medical care at sea in case of a maritime incident.

State Fire and Rescue Service is in charge of coordinating and execution of all response operations in inland waters, on shoreline and on land. All response operations, e.g. SAR, oil and HNS response operations in inland waters, on shoreline and on land are carried out by the State Fire and Rescue Service according to the State Civil Protection Plan. Experts of Fire Safety and Civil Protection College can also be consulted in HNS incidents. Local municipalities provide assistance to the State Fire and Rescue Service and are in charge of carrying out Local Civil Protection Plans.

State Environmental Service is in charge of overall national strategy regarding protection of environment from pollution, and in case of any incident it provides environmental expertise as well as performs the role of Environmental Advisor both for maritime incidents, as well as for inland, shoreline and on land incidents. State Environmental Service also deals with wildlife response issues.

Latvia has bilateral SAR collaboration agreements with Estonia, Lithuania and Sweden, and bilateral marine pollution response agreements with Estonia. Naval Flotilla Coast Guard Service organises regular joint SAR exercises with the neighbouring countries. Latvia also participates in joint Baltic SAR exercises and EU projects (e.g. BSMIRG, Vessel Triage). Naval Flotilla Coast Guard Service is a member of the EMSA Consultative Technical Group for Marine Pollution Preparedness and Response (CTG MPPR/TCG-HNS) and user of EMSA MAR-ICE and MAR-CIS data sheets.

Lithuania:

Table 6. The main organisations responsible for SAR operations related to HNS accidents at sea in Lithuania

Service	Responsible party
Coordination of SAR, oil and HNS pollution response operations at sea	Maritime Rescue Coordination Center (MRCC) (The Navy of the Lithuanian Armed Forces)
Provision of fire and rescue teams	Fire and rescue services*, Lithuanian Armed Forces, State Border Guard Service, Klaipeda State Seaport Authority
Coordination of oil and HNS pollution response	Maritime Rescue Coordination Center (MRCC)
Vessel traffic safety on accident area at sea	Lithuanian maritime safety administration, Klaipeda State Seaport Authority**
Provision of HNS response vessels	Lithuanian Armed Forces, State Border Guard Service, Klaipeda State Seaport Authority
Emergency medical care at sea	Military Medical Service, Emergency Medical Services
Expertise on safety regarding vessel in distress	Lithuanian maritime safety administration
SAR operations and HNS clean-up at local level	Klaipeda State Seaport Authority, Fire and Rescue Board, State Border Guard Service
Aeronautical SAR services	Aeronautical Rescue Coordination Center, Lithuanian Air Force

* The provision of Fire and Rescue Services is foreseen mainly for the port area. Operations at sea are only conducted upon the request of MRCC.

** Klaipeda Seaport Authority regulates the safety of the vessel traffic within the sea area defined in its jurisdiction.

Maritime Rescue Coordination Center (MRCC) under The Navy of the Lithuanian Armed Forces is responsible for control and coordination of SAR operations related to HNS accidents at sea. Lithuania has one MRCC located in Klaipeda and it is responsible for the whole Lithuanian SAR region. Aeronautical SAR operations are coordinated from the Aeronautical Rescue Coordination Center (ARCC) located in Vilnius. Lithuanian Armed Forces also provide assistance

with aeronautical SAR operations and pollution response in marine areas (with available resources). Lithuania does not have MIRS units. The Lithuanian Air Force has six (6) helicopters that can be used in maritime SAR operations. The helicopter base is near the Palanga airport and the base usually has two helicopters on a continuous stand-by. In addition, the State Border Guard has also two (2) helicopters on a standby on a base in Vilnius, but they are more than 300 km away from the maritime SAR region. The Lithuanian Navy has an oil pollution recovery vessel, while the Navy and State Border Guard have other supporting vessels for the SAR operations. Also tug boats with fire-fighting capabilities owned by port-authorities, stevedoring companies and pilot vessels can be used in maritime SAR operations. State Border Guard Service under the Lithuanian Ministry of Interior gives assistance in SAR operations and oil pollution response. Port authorities are responsible for SAR operations and oil/HNS clean-up in their own jurisdiction areas. Klaipeda Region Environmental Protection Department gives recommendations on the response means, provides information for coastal municipalities on the possible pollution risks. Environmental Protection Agency gives forecasts regarding spill drifting. Lithuanian maritime safety administration is responsible for the investigation of maritime accidents and providing information from the SafeSeaNet database. Fire and Rescue Board of Klaipeda County gives support with HNS monitoring situation and evacuation procedures in the port area. Other authorities which should be consulted in case of maritime HNS incidents include European Maritime Safety Agency (EMSA), Lithuanian Ministry of Environment and Lithuanian Ministry of Interior. In addition, a Commission of the Extreme Situations can be established by the Lithuanian Government in case of serious and large-scale emergency.

While Lithuania has only 97 km of coastline, its SAR region extends 198 km west from its coast to the Baltic Sea. The shape of the SAR region causes difficulties for maritime SAR preparedness and organizing of the operations in case of emergency because of resource limitations. The heaviest maritime traffic volumes in the Lithuanian SAR region are on the route leading from the port of Klaipeda to Danish straits. Lithuania has a preparedness plan for maritime SAR describing the roles and responsibilities of different authorities, and a response plan for the marine pollution incidents. However, the latter only covers oil pollution. In addition, there is a lack of expert groups which could provide an experienced view on the reactivity of the chemicals with air, water or other chemical substances, or the toxicity and long-term health effects of the chemicals in case of an HNS incident.

The following organizations take part in the on-shore SAR operations: The Navy, State Border Guard, Police, Emergency fire and rescue services, Emergency medical services, Healthcare authorities, Transport Agency, Environmental Authorities, and coastal municipalities.

Lithuania has made bilateral SAR agreements with its neighbor countries (Latvia, Russia and Sweden) and participates in joint exercises with them. Lithuania has also taken part in joint Baltic SAR exercises (e.g. Baltic SAREX).

Poland:**Table 7. The main organisations responsible for SAR operations related to HNS accidents at sea in Poland**

Service	Responsible party
Coordination of SAR, oil and HNS pollution response operations at sea	Maritime Search and Rescue Service
Oil and HNS pollution response in inland waters and on shore	Maritime Administration (shore)/ State Fire Service (shore and inland waters)
Vessel traffic safety on accident area at sea	VTs Service, Maritime Administration
Provision of HNS response vessels	Maritime Search and Rescue Service
Emergency medical care at sea	Maritime Search and Rescue Service
Expertise on safety regarding vessel in distress	Maritime Administration
Aeronautical SAR services	ARCC Warsaw, Polish Navy

Maritime Search and Rescue Service is responsible for coordination of SAR, oil and HNS pollution response operations in Poland. The Maritime Rescue Coordination Center is located in Gdynia and a second local coordination subcenter operates in Swinoujscie. Aeronautical SAR services (including the COSPAS-SARSAT system) are coordinated from ARCC located in Warsaw (working under the Civil Aviation Authority).

Poland has 528 km of coastline on the Baltic Sea. The heaviest maritime traffic flows are directed to the ports of Gdansk, Gdynia, Swinoujscie and Szczecin.

Cooperation between authorities in case of a HNS accident at sea is based on maritime SAR plan. In addition, in the National Oil Pollution Contingency Plan there is a chapter on HNS incidents. The SOPs for maritime HNS response are similar to oil pollution response. Units from the Maritime Search and Rescue Service, the Navy, and Border Guard participate in maritime SAR operations. Poland has one (1) oil pollution response vessel with limited HNS response equipment and one (1) maritime SAR helicopter (operated by Polish Navy) on a continuous 24h stand-by in Darlowo. Poland has also 14 coastal stations that provide watercraft (rescue vessels and lifeboats) for maritime SAR operations. Poland does not have any MIRC units. Other authorities consulted in the case of maritime HNS incident include Maritime Administration (Maritime Offices in Gdynia, Slupsk and Szczecin), State Fire Service at the level of the National Centre of Rescue Coordination and Protection of Population, The National System of Detection of Contamination operated by Polish military forces, and EMSA (MAR-ICE).

The following organizations take part in on-shore SAR operations in Poland: Border Guard, Police, Emergency Response Centre, Emergency Fire and Rescue Services, Emergency Medical Services, Healthcare authorities, Social welfare authorities, Maritime administration, Transport agency, Environmental Authorities and medical helicopters.

Poland has made bilateral SAR arrangements with its neighboring countries Lithuania, Sweden, Germany, Denmark, and Russia. It organizes bilateral exercises mainly with Germany, and has also with Russia (MRCC Kaliningrad) and Lithuania. Poland has also taken part in joint Baltic SAR exercises (e.g. SAREX Bornholm).

Sweden:

Table 8. The main organisations responsible for SAR operations related to HNS accidents at sea in Sweden

Service	Responsible party
Coordination of SAR	Swedish Maritime Administration, Joint Rescue Coordination Centre (JRCC) Gothenburg
Coordination of oil and HNS pollution response operations at sea	Swedish Coast Guard (Command Centre) Gothenburg
Provision of fire and rescue teams	Swedish Coast Guard response divers/Fire dept. from municipalities (MIRG)
Vessel traffic safety on accident area at sea	VTS Centre
Provision of HNS response vessels	Swedish Coast Guard
Provision of maritime SAR teams	Swedish Maritime Administration/Swedish Sea Rescue Society (voluntary associations)/Swedish Coast Guard
Emergency medical care at sea	Swedish Maritime Administration
Asset for the SAR mission coordinator	Military navy
Expertise on safety regarding vessel in distress	Maritime administration/Swedish Transport Agency (ship surveyors)
Aeronautical SAR services	Swedish Maritime Administration Helicopter Swedish Coast Guard fixed wing air craft

Sweden has one joint Maritime Search and Rescue Coordination Centre (JRCC) located in Gothenburg where also aeronautical SAR operations are coordinated. The Swedish Coast Guard is in charge of coordinating operations in case of a HNS incident at sea. The units that participate in maritime SAR missions come from the Swedish Maritime Administration, Swedish Sea Rescue Society and Coast Guard maritime SAR teams. Swedish Maritime Administration owns 6 SAR helicopters. There are five (5) SAR helicopters on a 15 minutes standby in the case for maritime incidents. Helicopter bases are located in different municipalities close to the SAR region in Söve, Kallinge, Visby, Norrtälje and Umeå. Municipal Fire Departments and Swedish Coast Guard provide fire and rescue teams. Military Navy can provide assistance and e.g. watercrafts.

Sweden has the largest SAR region among the Baltic countries: the region borders with all Baltic Sea region countries and also Norway on the North Sea side. Sweden has 3,200 km of coastline and the SAR region also includes the inland lake regions of Vänern, Vättern and Mälaren. Due to the large extent of the SAR region, collaboration with neighboring countries is essential in case of a HNS incident. Sweden has signed bilateral SAR collaboration agreements with all of its nine neighbor countries (Denmark, Estonia, Germany, Finland, Latvia, Lithuania, Norway, Poland, and Russia) and it arranges annual joint SAR exercises with all of them. In addition, Sweden has actively participated in joint Baltic SAR exercises, including SAREX Bornholm.

Sweden does not have a SOP for maritime HNS accidents but the Swedish Coast Guard has compiled own guidelines for combatting chemical spills at sea. Sweden has one (1) specialized chemical recovery vessel and limited capability on all other response vessels, around 70 response divers (scuba + firefighting and chemical response), MIRG units and chemical experts. The MIRG teams are on a continuous 24/7 stand-by in Stockholm, Gothenburg and Karlskrona, and the units are available for deployment throughout the Swedish SAR region. MIRG teams in Sweden are under agreement with Maritime Administration for firefighting in SAR missions and for chemical response under Swedish Coast Guard. The usual size of the MIRG teams is 1+1+4 for chemical response and could be less for other missions depending on the situation. The composition and the expertise of the team will vary depending on the rescue operation in question.

The following authorities and other organisations take part in on-shore SAR operations in Sweden: Coast Guard, Police, Emergency Response Centre, Emergency Fire and Rescue Services, Emergency medical services, Healthcare authorities, Social welfare authorities, Aeronautical SAR services, Civil aviation authority, Army, voluntary associations, and volunteer fire departments.

United Kingdom (UK):**Table 9. The main organisations responsible for SAR operations related to HNS accidents at sea in the United Kingdom**

Service	Responsible party
Coordination of SAR operations at sea	Maritime Coastguard Agency (MCA)
Provision of fire and rescue teams	Fire and Rescue Service*
Coordination of oil and HNS pollution response operations at sea	Maritime Coastguard Agency, Environment Agency
Vessel traffic safety on accident area at sea	VTs and MCA
Provision of HNS combat vessels	MCA
Emergency medical care at sea	Ambulance Service
Expertise on safety regarding vessel in distress	MCA, SOSREP, UK FRMR National Coordinator (FNC) or National Marine Tactical advisor
Provision of lifeboats and SAR rescue teams	Bristow Helicopters (tasked by the MCA) for SAR rescue teams, Royal National Lifeboat Institution (RNLI, a voluntary association)
Aeronautical SAR services	Maritime Coastguard Agency (MCA)

*** Only those Fire and Rescue Service units with a declared sea capability**

The Maritime and Coastguard Agency (MCA) is the maritime authority in the UK. It is responsible for coordinating operations in case of maritime HNS incident in the United Kingdom and it is also the competent authority for counter pollution response regarding oil and HNS. In the case of a large maritime incident, the MCA establishes a Marine Response Centre (MRC). The National Maritime Operations Centre located in Fareham. Since 2016 it operates as a joint Maritime Search and Rescue Coordination Centre (JRCC). In addition, there are 10 smaller Coastguard Operation Centres in different parts of the UK (Maritime Coastguard Agency 2016). Fire and Rescue Services provide fire and rescue teams and Environmental Agency units and expertise on pollution response. There are 6 coastal Fire Service stations that have the declared capacity to assist the MCA with maritime SAR and HNS incident operations, and only those can participate in such missions. Bristow Helicopters operates civilian search and rescue (SAR) helicopter service for the MCA. Other authorities or agencies that take part in SAR operations in maritime HNS incidents include Police, Environmental authorities, Chemical agency, Emergency Response Centre, VTS centre, SOSREP, and UK FRMR National Coordinator or Marine Tactical Advisor. In addition, the Royal National Lifeboat Institution (RNLI) participates in rescue missions. In case

the distressed vessel is brought into a port, also Ambulance Service, Helicopter Emergency Medical Service (HEMS), and local authorities take part in the rescue and response operations.

The UK's maritime SAR region is extensive and it is 3.5 times larger than the country's terrestrial area. The British Isles consists of several islands and the length of the coastline is 12,429 km. Because the country is an island, maritime transport has a great importance for the national economy and security of supply in the UK. There are approximately 1,500 large commercial ships off the UK coast every day. Approximately 500 vessels use daily the Dover Strait with frequent Ro-Ro and Ro-Pax connections to France and Belgium (HM Government 2014).

The available resources for maritime HNS incidents in the UK include the national HNS Response Teams contracted by a private company. The teams have specialised monitoring and detection equipment. The contractor provides appropriate training and equipment for the response teams. The MCA has access to 24 hour advice on chemical hazards from the National Chemical Emergency Centre (NCEC), which also provides MCA with chemical spill modelling capability (ITOPF 2014). The MCA operates four (4) SAR helicopter units on a 15 minute readiness on daytime and 45 minutes on nighttime. In addition, the Coast Guard has emergency towing vessels and the MCA and FRS have MIRC teams.

The UK has several SOPs for maritime incidents. The Maritime Coastguard Agency is responsible for maintaining a set of contingency plans that are developed in collaboration with other Civil Contingencies Act respondents. The Department of Energy and Climate Change (DECC) is responsible for pollution preparedness, regulation and response regarding offshore installations and the Department for Transport (DfT) for shipping in the U.K. The most relevant plans regarding HNS incidents at sea are the Major Incident Plans and the National Contingency Plan for Shipping and Offshore Installations. The national contingency plan for shipping and offshore installations is aimed to provide general guidance on incident management. It identifies key stakeholders involved, the governance arrangements under which they should operate, the roles and responsibilities of each party, the method and structures of coordination and communication, and resources that can be used (Maritime Coastguard Agency 2014).

In addition, the local authorities in England and Wales are responsible for taking action in case of emergencies or disasters and they have prepared response plans for their own jurisdictions. However, they do not have a statutory obligation to provide maritime SAR response. Each Fire authority sets its own policy for SAR operations in its region. As an example, The Kent Fire and Rescue Service has developed a draft for Hazmat SOP for incidents at sea. It is based on the national-level maritime contingency plan and UK MIRC SOP. The Hazmat SOP includes the following issues:

1. Coordination and command
2. Identification of chemicals on scene
3. Arrival to the scene of accident

4. Emergency medical care for the persons exposed to chemicals
5. Evacuation
6. Determination of the no-go area
7. Assessment of the incident and application of a containment strategy

The above mentioned SOP was tested as part of the MIRG EX exercise (see www.mirg.eu.) The MIRG EX was a collaboration project between partners from the Netherlands, Belgium, France and UK. The partners have signed a collaboration agreement on maritime safety.

The UK has a collaboration agreement with its neighbour countries (Belgium, France, Germany, Ireland, The Netherlands, Norway, Sweden, and Denmark) on SAR. Anglo-French Joint Maritime Contingency Plan (Mancheplan) covers counter pollution and search and rescue operations in the English Channel.

3 THE PRESENT SITUATION REGARDING PREPAREDNESS FOR HNS INCIDENTS WITH AUTHORITIES

3.1 A general situation regarding preparedness for HNS incidents

Most of the Baltic Sea region countries have contingency plans or SOPs either for maritime incidents in general or oil incidents taking place at sea. However, SOPs for HNS incidents occurring at sea are currently lacking in most responder countries (see Fig. 6). Since combatting a major HNS incident at sea often requires considerable amount of resources, most of the responder countries are not capable of handling such situations alone (Fig. 7). The respondents are therefore in unison that collaboration between different countries, authorities and other parties is needed. In addition, all respondents see a need for Baltic level guidelines on how to respond to an HNS incident occurring at sea that involves collaboration of several countries (Fig. 8). In two responses the authorities commented that they are interested in creating plans and procedures for cross-border collaboration between multiple Baltic Sea region countries to handle HNS incidents on the condition that the available human and technical resources and the (different) administrative structures in each country are taken into account when creating the SOPs.

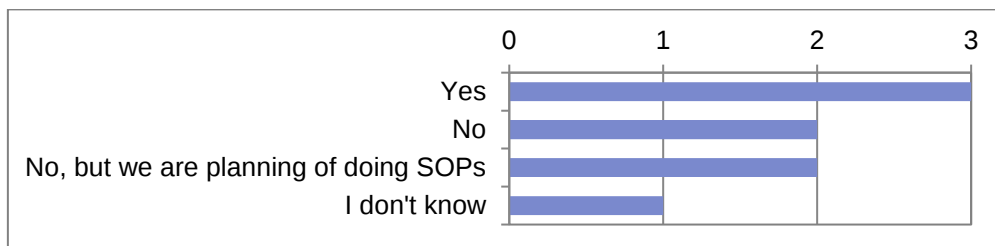


Figure 6. The existence of SOPs for HNS accidents in responder countries

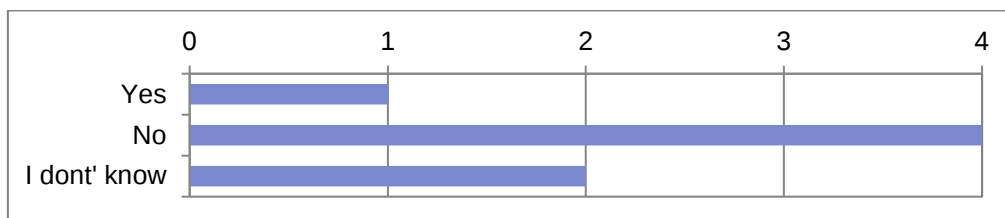


Figure 7. Does your country have enough resources to cover SAR at HNS accidents at sea?

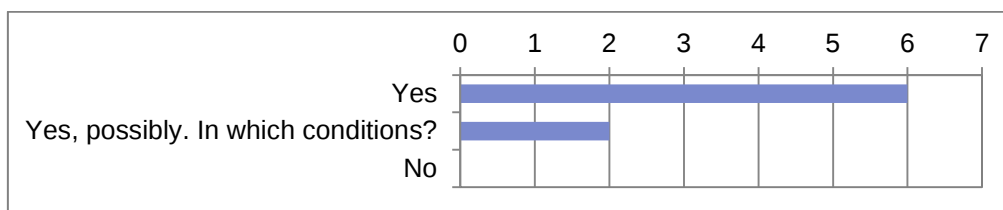


Figure 8. Would your organization be interested in to develop Baltic Sea level SOPs for HNS accidents at sea?

Only three respondent countries (UK, Poland and Lithuania) have SOPs in place for HNS accidents (Fig. 8). At the time of writing this report, Germany and Latvia were making preparations for a national level SOPs for maritime HNS incidents. In Latvia, defining the administrative response structure was on-going. Germany was preparing contingency planning for chemical spill response.

1.1 Resources and collaboration

There are significant differences regarding how rescue missions are organised in different BSR countries and how much resources are available (Fig. 9). Three of the responder countries (Sweden, Finland and Germany) have special HNS groups. Finland and Sweden have chemical recovery vessels. Other resources include multirole vessels capable for combatting oil and HNS substances (Germany), oil spill clean-up vessels (Estonia), Coast guard patrol vessels with limited capability in HNS accidents (Finland), oil response vessel with limited HNS response capability (Poland), navy vessels, and tug boats with firefighting capabilities (Lithuania). In Latvia National Armed Forces has chemical, biological and nuclear unit, and Lithuania has specialized aeronautical services conducting SAR operations and medical evacuation.

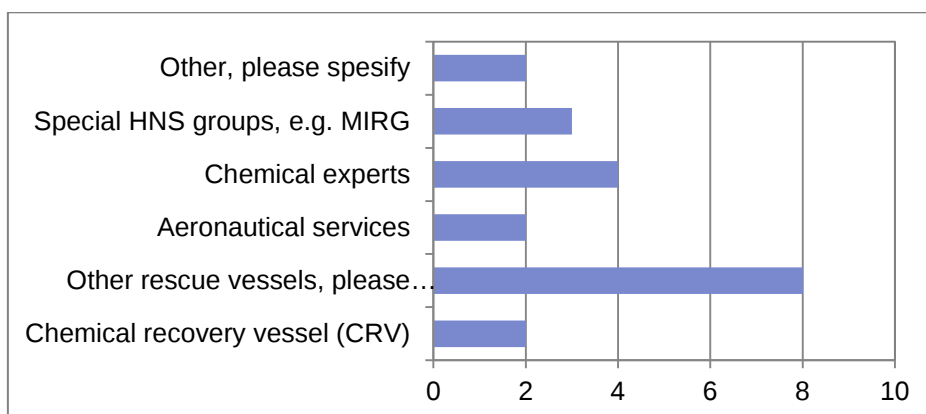


Figure 9. What kind of resources your country has in case of a HNS accident at sea?

The majority of the respondents collaborate in SAR issues with their neighboring countries (Fig. 10). Forms of collaboration mentioned include participation bi- or multilateral tabletop and live exercises (e.g. BALEX DELTA, SAREX, MIRGEX) and collaborative projects (e.g. BSMIRG, Vessel Triage), and sharing information, expertise and resources (e.g. equipment). Sweden and

Germany have the most extensive collaboration, as they organize joint SAR exercises with all their neighbors.

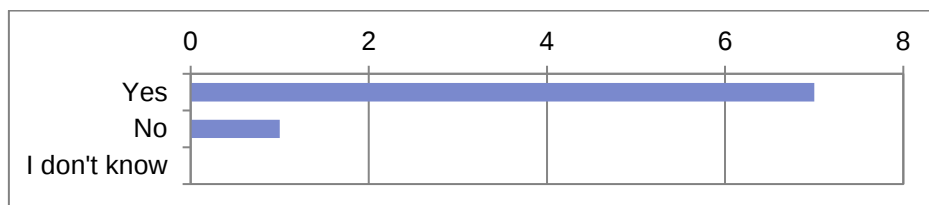


Figure 10. Does your country collaborate in SAR issues related to maritime HNS accidents with neighbouring countries?

3.2 Essential development needs regarding collaboration and SOPs

When asked about the essential development needs regarding collaboration with neighbouring countries, the respondents mentioned the following issues:

- Harmonization of approach towards HNS accidents should be developed, taking into account available human/technical resources in each country and administrative structure.
- Assessment of basic needs to respond to HNS at sea
- Cooperation in case of mass rescue operations, assistance requesting from neighbouring countries (for example: specialised vessels, MIRC groups, helicopters), SAR units coordination on scene, joint exercises.
- Clean up and control equipment standards to be created; Standard operation procedures for first responders and expert teams (safety, equipment etc); Countries cooperation and response procedures in case of HNS accidents; Exchange of information and communication.
- Emergency procedures for top 20 chemicals, safe platform
- Deployment, transportation, equipment, communication, risk analysis, containment

On the basis of the authorities' survey responses, there is a great deal of variation regarding the needs and wishes on SOPs. Authorities in some countries desire general outlines and/or principles for collaboration for maritime SAR operations in HNS incidents, while in other countries there is a need for more detailed instructions.

4 THE REQUIREMENTS FOR SOPS AND FOR JOINT PLANNING

According to the respondents, SOPs should cover responsibilities between different authorities, and common procedures for rescue actions. SOPs should cover the procedures how rescue service should provide assistance regarding e.g. firefighting or mass evacuation to different types of ships in case of fire or explosion and spillage (leakage) accidents with HNS on board. Most important issues include: how to request the assistance from other countries; how to get information about types of dangerous cargo (HNS) on board; what are the procedures on the removal of leaked HNS from the seabed (sunk) and nearshore/coastal areas?

The respondents suggested a following procedure for creation of SOPs:

1. **Identification** of main HNS types transported by sea
 - Create a scenario and invite different actors for a couple of table top. After this you know what you need and what you are missing
2. **Analysis of earlier accidents and response operations** - Start with risk assessment for each country, assessment of available resources and administrative structure, and the existing experience of other countries earlier involved in the HNS accidents
 - Check existing SOPs developed in other EU countries
3. **Establishing** a working group, a correspondence group, contact with the HELCOM Response Group, especially with expert working group on HNS
4. **Conducting joint exercises at sea**

Crucial issues that should be taken into account when creating SOPs include:

- Consensus between all involved countries
- SOPs should match available human and technical resources of each country, differences in administrative structures and fire and rescue service regulations in different countries
- SOPs should include emergency procedures for top 20 chemicals, safe platform
- SOPs need to be based on risk assessment of HNS incidents for each country. The target response capabilities for each country should be set to match their available resources and response capacity when creating the SOP for joint SAR operations in the Baltic Sea
- In case of MRO's no country in Baltic sea region cannot handle rescue actions alone, co-operation with other countries is essential

5 SHIPPING COMPANIES' PREPAREDNESS TOWARDS HNS INCIDENTS

Majority of the shipping company respondents have instructions and practices for HNS accidents taking place at sea (Fig 11), or a contingency plan. In some companies the instructions regarding what to do does not differ between HNS accidents and other critical incidents at sea.

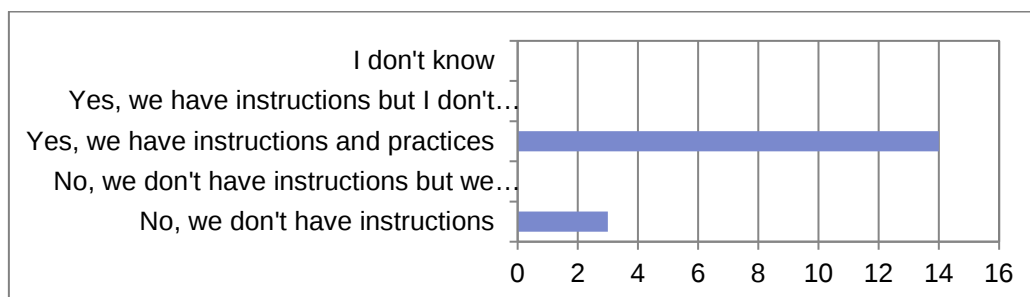


Figure 11. The presence of instructions or practices for HNS accidents at shipping companies

While on the basis of the responses to the survey the instructions and practices differ somewhat between different companies and shipping segments, almost all the guidelines include the following issues: how to use equipment and other means of protection; guidelines for evacuation; emergency medical care; working in the area exposed to chemicals; cleaning of contaminated people, as well as coordination and operation models (Fig. 12, next page).

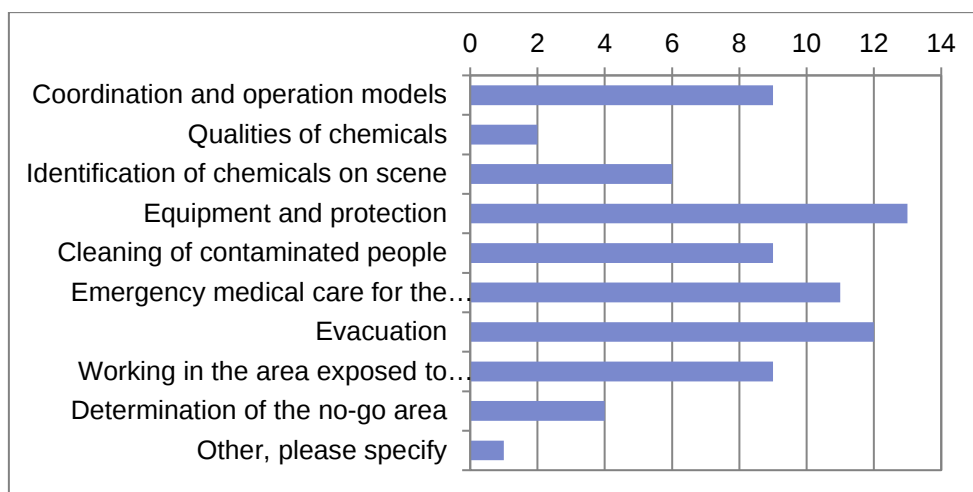


Figure 12. The content of the shipping companies' instructions or practices for HNS incidents

Majority of the shipping companies organise live trainings in order to keep up preparedness for HNS accidents at sea (Fig 13). Tabletop or theoretical exercises are also fairly common and four respondents have simulator trainings. Class "other" includes organizing training in connection

with fire drills or salvage operation training. Only one respondent replied that their company does not train at all.

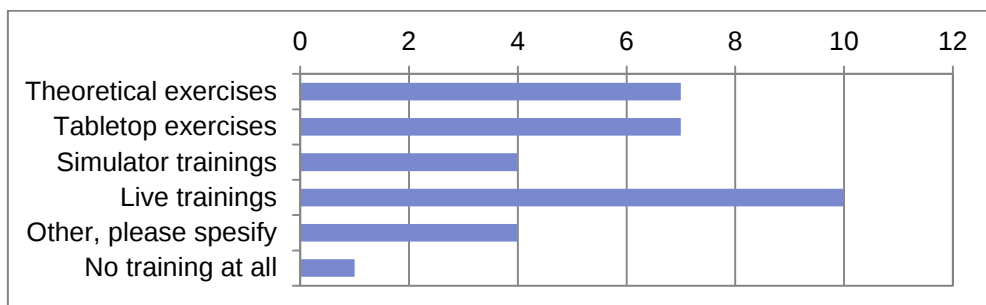


Figure 13. Maintenance of preparedness for HNS accidents at shipping companies

Majority of the shipping companies train for accidents on a regular basis: nearly 80% train at least once a year or even more often (Fig. 14). While most of the companies' safety drills focus also on other emergency situations, seven of out the 18 companies specifically train for HNS accident also together with authorities (Fig. 15, next page).

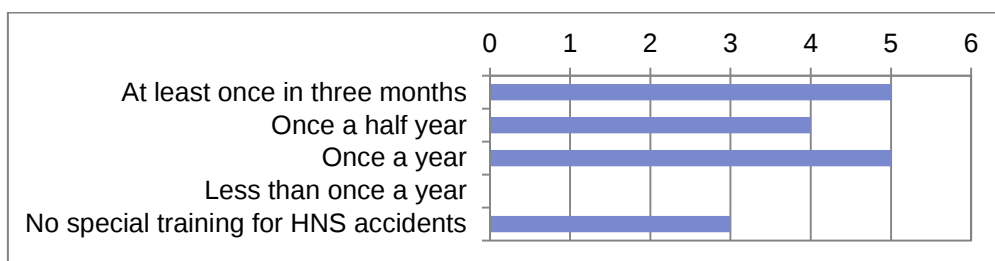


Figure 14. The frequency of training for accidents

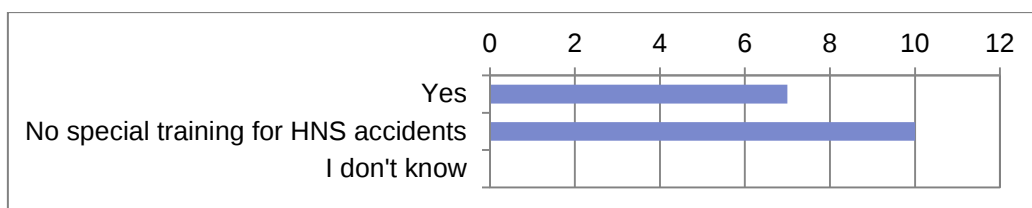


Figure 15. Training together with authorities

All vessels must have life-saving equipment e.g. in case of fire and other incidents. The survey responses indicated that vessels transporting HNS cargo have other equipment on-board, such as chemical boiler suits, gas masks or chemical analysators (Fig 16.)

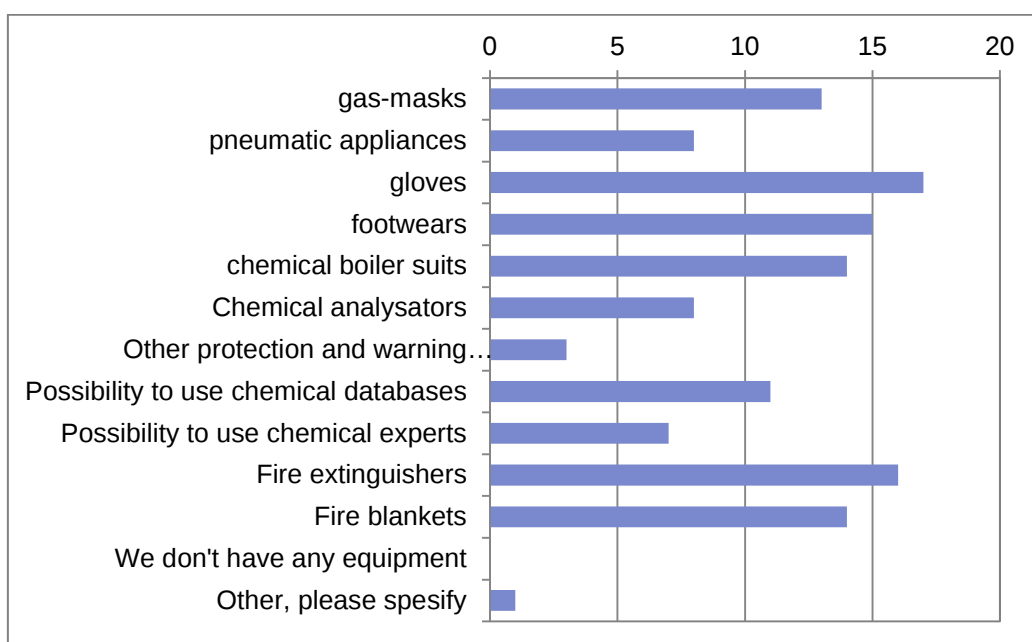


Figure 16. Resources and/or equipment available for HNS accidents at sea

The essential development needs regarding collaboration with authorities for the shipping companies include the following issues:

- It is always good to have close cooperation with the authorities.
- We have in the past had close co-operations with the Swedish and German coast guards, and emergency towing exercises.
- Compatible equipment, joint exercises
- Vessel Triage is a good start but more co-operation is needed. Borders should not limit the use of foreign country's resources for cleaning etc. operations in other countries. Decision making for co-operation should be fast.

When asked “What are the most important issues that should be taken into account from the shipping company's point of view when creating a Baltic SOP (standard operation procedures) related to HNS accidents at sea?”, the respondents emphasize the following:

- To ensure that our procedures are in place and take into consideration all aspects related to the trading area.
- Clear points of contacts. If at sea, is there any response team available! Which ports could take the ship in? Emergency docking! Normal chemical spill procedures. Contain and make sure nothing gets in the water
- Follow the rules and regulations.
- Procedures have to be simple and understandable for all possible users
- Clear contact details to response organisations and relevant authorities, rescue organisation structure information and response procedures
- There is shipping outside Helsinki and Stockholm also. More resources up north in Bay of Bothnia needed

- To create a model, which can be related to MARPOL and SOPEP emergency plans.
- Easy access and central operation.
- Awareness of dangerous goods transportation. That corresponding documents are correct. IMDG-check by authorities. Guidelines for ship crew.

6 SUMMARY AND CONCLUSIONS

The survey responses and previous project reports (e.g. BSR MIRG) indicate a clear need for standard operational plans and procedures for HNS incidents. While most countries have prepared for SAR incidents involving oil (and oil products), only two BSR countries have made preparations for a national level SOP on HNS. In addition, most authorities clearly indicated that they cannot handle a SAR mission related to an HNS incident by their own resources only. All respondents see a need for Baltic level guidelines on how to respond to an HNS incident occurring at sea that involves collaboration of several countries, and sharing of expertise and resources.

Majority of the countries in the Baltic Sea region are collaborating with their neighbouring countries. This already existing bi- or multilateral collaboration takes place in the form of joint exercises, collaborative projects, or sharing expertise and/or equipment. However, as different countries within the Baltic Sea region have organised the coordination of SAR operations in a different manner and have varying amount of resources available, there is a strong need for creating jointly agreed and harmonised plans and procedures regarding how to coordinate and organise SAR operations in case resources are required from multiple countries. Critical issues for authorities regarding creation of Baltic level SOPs include: how to request the assistance from other countries; how to get information about types of dangerous cargo (HNS) on board of a distressed vessel; what are the procedures on the removal of leaked HNS from the seabed (sunk) and nearshore/coastal areas?

For shipping companies that responded to the survey, clear contact details to response organisations and relevant authorities, rescue organisation structure information and response procedures are essential. They also stressed that procedures have to be simple and understandable for all possible users. Many of the shipping companies that responded to the survey had previous experience with collaborating with authorities and they considered collaboration to be beneficial. However, since the respondent group of shipping companies was small, the sample may be biased towards companies that have invested into safety and/or value collaboration with authorities. Negative issues regarding collaboration or what authorities could do better were not mentioned.

7 REFERENCES

- Baltic Sea MIRG project (2016). MIRG Services and Training in Europe. http://niinidigi.kopioniini.fi/mirg_services_and_training_in_europe/#/1/
- BSMIR-report (2014). Baltic Sea maritime incident response survey. Final report. Finnish Border Guard. http://www.raja.fi/facts/bsmir/1/1/the_final_report_of_the_bsmir_project_has_been_published_53419 (Accessed 29.12.2016)
- CCME (2017). Gemeinsames Systemkonzept des Bundes und der Küstenländer zur Bekämpfung von Meeresverschmutzungen.
- COWI A/S (2016). Verkehrs- und Gefahrgutanalyse. Bericht. Havariekommando. Central Command for Maritime Emergencies.
- European Maritime Safety agency EMSA (2007). HNS action plan. emsa.europa.eu/opr-documents/download/456/260/23.html (Accessed 29.12.2016)
- HM Government (2014). The UK national strategy for maritime security. www.globalsecurity.org/military/library/.../uk-strategy-for-maritime-security_2014.pdf. (Accessed 3.1.2017)
- ITOPF (2014). Country profiles. United Kingdom. <http://www.itopf.com/knowledge-resources/countries-regions/countries/united-kingdom/>. (Accessed 3.1.2017)
- Häkkinen, J.M. and Posti, A. (2014). Review of maritime accidents involving chemicals –special focus on the Baltic Sea. TransNav 8:2, 295-305.
- Luhtala, H. (2010). Maritime transport of chemicals in the Baltic Sea. University of Turku, Centre for Maritime Studies. www.merikotka.fi/julkaisut/Luhtala_kemikaalikuljetukset.pdf. (Accessed 28.12.2016)
- Marchand, M. (2002). Chemical spills at sea. In: Fingas, M. (ed.), The handbook of hazardous materials spill technology. McGraw Hill, New York.
- Maritime and Coast Guard Agency (2014). The national contingency plan. A strategic overview for responses to marine pollution from shipping and offshore installations (2014 version). <https://www.gov.uk/government/publications/national-contingency-planncp>. (Accessed 2.1.2017)
- Maritime and Coastguard Agency (2016). Maritime & Coastguard Agency Business Plan 2016-2017. <https://www.gov.uk/government/publications/mca-business-plan-2016-to-2017>. (Accessed 3.1.2017).
- MIRGEX project (2016). www.mirg.eu. (Accessed 3.1.2017)
- Search and Rescue framework for the United Kingdom of Great Britain and Northern Ireland (2008). https://www.gov.uk/government/uploads/system/uploads/...data/.../mca_uksar.pdf. (Accessed 3.1.2017)

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>



ChemSAR