PROCEEDING

2013 NOWPAP MERRAC Expert Meeting

HNS Spill Preparedness and Response

Qingdao, the People's Republic of China

15-17 October 2013

Regional Seas

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1. Background

The Northwest Pacific Action Plan (NOWPAP) region characterized by high density of maritime transportation is exposed to high risk of oil and Hazardous and Noxious Substances (HNS) pollution incidents. A total of 56 HNS spill incidents exceeding 10 tons occurred during the period of 1990-2012, including unknown amount of HNS spillage incidents. Seven cases of major HNS spills exceeded 1,000 tons. The major causes of HNS spill incidents in the NOWPAP region were found to be collision (43%), grounding (18%), and sinking (12%). These HNS spill incidents mainly occurred in the coastal areas, resulting in serious damages. If HNS are introduced into the coastal and marine environment, they can seriously affect human health and marine life, damaging amenities and interfering with other legitimate use of the sea.

To prepare for and respond to HNS spill incidents, NOWPAP members have established and enhanced their national and regional response capabilities under the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)-HNS Protocol. NOWPAP Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC) Focal Points have developed NOWPAP Regional Oil and HNS Spill Contingency Plan (NOWPAP RCP) in order to provide an operational mechanism for mutual assistance during major marine oil and HNS pollution incidents in the region. As one of the routine tasks, NOWPAP MERRAC collects and shares information on HNS incidents as well as on contact points, such as competent national authorities, national operational contact points and assistance decision authorities to initiate a prompt and effective response in case of HNS spill incidents.

NOWPAP MERRAC has also conducted a variety of specific projects and published technical reports on HNS to provide information to the relevant users and also to promote public awareness. The NOWPAP HNS Response Operation Guideline (MERRAC, 2009) was developed based on international and other regional HNS manuals, focusing on first actions, risk assessment (properties, spill behavior and drift forecasting), monitoring, sampling, body protection, and response measures. The report on HNS Database in the NOWPAP Region (MERRAC, 2009) was developed in order to establish a database on HNS substance information in response to possible HNS spills. The Manual for HNS Training (MERRAC, 2011) which was also developed to be used in training courses is also providing skills and knowledge for effectively managing HNS incidents. Finally, the Regional Report on HNS Preparedness and Response (MERRAC, 2012) was published for better understanding of the current status of HNS spill preparedness and response in the NOWPAP region.

2. Meeting Summary

To enhance the understanding of the technical issues related to ship-based HNS incident response, an expert meeting was held in China, according to the workplan of NOWPAP MERRAC activities for the 2012/13 Biennium (UNEP/IMO/NOWPAP/MERRAC/FPM 15/21, Annex V). The main purpose of this meeting was to share knowledge on HNS issues and enhance regional collaboration for a better preparation and response to HNS spills in the NOWPAP region. The meeting consisted of 3 sessions and experts on HNS from NOWPAP members discussed the following technical issues:

- Session 1: Current status of ship-based HNS spill incidents in the NOWPAP region
- Session 2: Response methods related to HNS spill incidents in the NOWPAP region
- Session 3: Prevention and preparedness for HNS spill incidents in the NOWPAP region

In the first session, current status of HNS spill incidents in terms of spill volume, numbers and causes of the incidents was introduced based on statistical analysis and cargo volumes of HNS in the NOWPAP region. Through case studies of major HNS spill incidents, details of initial incident and phased actions related to the incident were introduced. Regarding the preparedness and response, experts presented the related laws, regulations and provisions of each NOWPAP member and they discussed on the establishment of policies and strategies.

Response methods related to HNS spill incidents in the NOWPAP region were introduced in the second session. In particular, the results of the case studies of high efficient sorbent for disposal of contaminated water were presented by the Chinese expert. The Japanese expert introduced operations and main tasks of national strike team, and the Korean expert presented technical review of chemical recovery vessels while the Russian expert introduced response methods related to LNG incidents and HNS spilled in packaged form onshore.

In the third session, the expert group focused on prevention of and preparedness to HNS spill incidents in the NOWPAP region. The Chinese expert made a presentation on response disposal procedures and key response techniques on HNS spill. Response system and the role of Maritime Disaster Prevention Center (MDPC) and Yokosuka training center were introduced by the Japanese expert. The Korean expert introduced the response team and procedures for HNS spills in Korea and current status of research and development in Korea Coast Guard (KCG). The Russian expert introduced organization

and role of State Marine Pollution Control, Salvage & Rescue Administration (SMPCSA) of the Russian Federation.

After the presentations on these topics, three breakout sessions were held under the auspices of MERRAC secretariat. The expert group reviewed and evaluated NOWPAP members' current status on each session topic and conducted in-depth discussions to identify MERRAC activities to be undertaken in the future. The group discussion results of each breakout session were summarized as follows, which includes the summary of each session topic and potential list of future MERRAC activities on HNS spill preparedness and response.

2.1. Current status of ship-based HNS spill incidents in the NOWPAP region

As one of its routine tasks, MERRAC collects and updates information on HNS spill incidents and exchanges information on Focal Points in the NOWPAP region. By conducting MERRAC specific projects, various technical reports on HNS spills were published. As one of the specific projects, MERRAC is currently implementing a project on development of pamphlet on HNS database and spill response in the NOWPAP region. The pamphlet can be used by the relevant operators who are dealing with HNS spills on site and it has also an objective to promote public awareness.

To share knowledge and enhance regional cooperation, the expert group identified future tasks, which include:

- Establishing lists of HNS response equipment
- Updating data on maritime transportation of HNS since 1997
- Sharing information on chemical database on land

2.2. Response methods related to HNS spill incidents in the NOWPAP region

Each country has been developing response measures for HNS spills. However, the response measures of HNS spill incidents are still not well developed compared to those of oil spill incidents.

Therefore, the expert group identified the following tasks to be implemented in the future:

- Development of appropriate devices for HNS monitoring and detection
- Development of prediction models of gas spreading
- Development of dedicated chemical recovery vessels
- Development and use suitable Personal Protective Equipment (PPE)
- Establishment of response teams consisted of specialized experts for HNS response
- Establishment of disposal facilities for HNS

- Exchange of information on HNS spill response procedures among NOWPAP members

2.3. Prevention and preparedness for HNS spill incidents in the NOWPAP region

China, Japan and Korea are contracting parties to the OPRC-HNS Protocol 2000. All NOWPAP members have national competent bodies that are responsible for Oil and HNS spill response. Japan, particularly, has a National Strike Team on HNS spill response. Regarding the National Contingency Plan (NCP), Japan and Korea are operating their own NCP, and China is in the process of developing and Russia is also considering of developing one.

For better prevention and preparedness for HNS spill incidents in the NOWPAP region, the expert group proposed the following tasks to be implemented in the future:

- Include a specific item concerning HNS spill preparedness and response in the agenda of MERRAC FPM
- Expand the MERRAC information system to cover HNS spill response matters
- Launch new MERRAC Specific Projects on HNS risk assessment and assessment of regional level of preparedness
- Provide HNS training and exercise
- Enhance public awareness

Program

Day 1 (October 15th)

09:00-09:30	**Registration**
09:30-10:10	**Opening of the Workshop**
09:30-09:35	Opening address by MERRAC
09:35-09:40	Welcoming address by China MSA
09:40-10-00	Congratulatory address by the head of delegation of all members
10:00-10:10	Group Photography
10:10-10:30	**Coffee Break**
10:30-10:50	**MERRAC activities regarding the preparedness for and response to ship-based HNS pollution incidents in the NOWPAP region** - Presented by MERRAC
10:50-12:10	**[Session 1] Current status of ship-based HNS spill incidents in the NOWPAP region (Chair: Mr. Chunchang ZHANG)**
	- Current status of ship-based HNS spill incidents in China and response capability building (Mr. Lei Tong, Yantai MSA) - Current status of ship-based HNS spill incidents in Japan (Mr. Kazuhisa TAKUMI, JCG)
12:10-14:00	**Lunch**
14:00-15:20	**(continued) Session 1**
	- HNS risk assessment and incident prevention measure on Korean seaborne trade (Mr. Hyoung-Jun LEEM, KCG) - Current status of transportation of HNS by ships and ship-based HNS spill incidents in the Russian part of the NOWPAP region (Dr. Natalia KUTAEVA, SMPCSA)
15:20-15:50	**Coffee Break**
15:50-18:30	**[Session 2] Response methods of HNS spill incidents in the NOWPAP region (Chair: Mr. Chunchang ZHANG)**
	- Functional resins with high efficient oil-adsorption and their application in waste-water disposal (Prof. Qingfeng XU, Soochow University) - Response methods of HNS spill incidents in Japan (Mr. Ichiharu TANAKA, JCG) - Technical review on chemical recovery vessels (Mr. Jae-Hoon JEE, KR) - Response methods of HNS spill incidents in Russia (Mr. Sergei Pak, Ecoshelf Ltd)
18:30	**End of Day 1**

Day 2 (October 16th)

09:00-10:20	**[Session 3] Prevention and preparedness of HNS spill incidents in the NOWPAP region (Chair: Mr. Chunchang ZHANG)**
	- HNS spill response procedures and key techniques at sea (Mr. Xuan CHEN, CATS) - Prevention and preparedness of HNS spill incidents in Japan (Mr. Ryohei YAMASAKI, MDPC)
10:20-10:50	**Coffee Break**
10:50-12:10	**(continued) Session 3**
	- Korean preparedness and response system for HNS spill (Mr. Jong-Wook CHOI, KCG) - Activities of State Marine Pollution Control, Salvage & Rescue Administration of the Russian Federation (Mr. Andrey Bryksin, SMPCSA)
12:10-12:20	**Organization of Breakout session**
12:20-14:00	**Lunch**
14:00-16:00	**Breakout session**
	1) **Session 1**: Current status of ship-based HNS spill incidents in the NOWPAP region (Chair: Dr. Se-Jin PARK/ Secretariat: Dr. Choong-Ki KIM) 2) **Session 2**: Response methods of HNS spill incidents in the NOWPAP region (Chair: Mr. Kazuhisa TAKUMI/ Secretariat: Ms. Yoon-Young BACK) 3) **Session 3**: Prevention and preparedness of HNS spill incidents in the NOWPAP region (Chair: Dr. Natalia KUTAEVA/ Secretariat: Dr. Jeong-Hwan OH, and Ms. Jung-Hyun LIM)
16:00-16:30	**Coffee Break**
16:30	**End of Day 2**

Day 3 (October 17th)

09:00-10:30	**Debriefing the results of the breakout session to the meeting (Chair: Mr. Chunchang ZHANG)** - Presented by each group chair
10:30-11:00	**Coffee Break**
11:00-11:30	**Summarizing the final results (Chair: Mr. Chunchang ZHANG)**
11:30-12:00	**Other matters**
12:00-12:30	**Closure of the meeting**
12:30	**Adjourn**

Session 1

Current status of ship-based HNS spill incidents in the NOWPAP region

Chair : Mr. Chunchang ZHANG

Speaker

- Mr. Lei TONG
  Current status of ship-based HNS spill incidents in China and response capability building
- Mr. Kazuhisa TAKUMI
  Current status of ship-based HNS spill incidents in Japan
- Mr. Hyoung-Jun LEEM
  HNS risk assessment and incident prevention measure on Korean seaborne trade
- Dr. Natalia KUTAEVA
  Current status of transportation of HNS by ships and ship-based HNS spill incidents in the Russian part of the NOWPAP region

Current status of ship-based HNS spill incidents in China

Mr. Lei Tong

Engineer

Yantai Maritime Safety Administration (MSA)

The presentation mainly illustrates the current status of ship-based HNS spill incidents in China from the three aspects - 1) current situation of HNS transport and incidents in China, 2) related Chinese laws and 3) HNS response and preparedness strategies. It analyzes the characteristics of the HNS transportation and incidents in China with statistics of the volume of the HNS cargoes transported by ships and the number of ships sailing in the coast of China. The presentation generalizes the major types and causes of ship-based HNS spill incidents by comparing the data of the incidents occurred from 1997 to 2011. The important legal documents related to HNS pollution are listed and the policy and strategy about the HNS incidents are also introduced in detail. China's HNS spill response and preparedness capacity including the National Contingency Plan (NCP), resources and professional training is also presented at the meeting.

◆ *Profile of the presenter*

Tong Lei, as a marine environmental technology expert with experience in the fields of environmental pollution risk assessment, environmental sensitive resources analysis, and emergency protective action, has 5 years of experience in marine environment pollution prevention and control after attaining a master degree from Dalian Maritime University. Prior to joining China MSA in 2009, he worked in Shandong MSA and Yantai Oil Spill Response and Technology Center as a deputy supervisor. He has participated in the formulation of laws and regulations related to the marine pollution prevention and emergency response actions including the Dalian "Xin-gang 7 • 16" Accident.

China MSA

Current status of ship-source HNS spill incidents in China

China MSA




Outline

China MSA

- 1 Situation of HNS transport and incidents in China
- 2 China laws related to HNS response and preparedness
- 3 Strategies of HNS response and preparedness
- 4 Summary

Volume of HNS transported by ship in 2010

China MSA

	Entering Ports		Departure from Ports	
	Substances (tons)	No. of Vessel	Substances (tons)	No. of Vessel
Packaged cargoes	12,175,263	96,213	13,784,904	93,035
Solid bulk dangerous cargoes	19,697,729	2,143	2,380,577	1,181
Liquefied gases in bulk	18,423,280	5,092	5,124,172	4,060
Liquid chemicals in bulk	81,305,990	38,245	41,576,695	39,023
Total	131,602,262	141,693	62,866,348	137,299

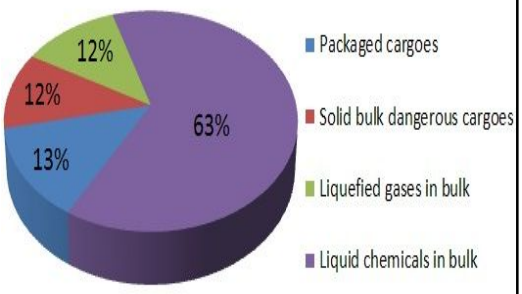
Volume of HNS transport

China MSA

130 chemicals involved in transport

Maximum volume :
Liquid chemicals in bulk

Minimum volume :
Solid bulk dangerous cargoes



Volume of HNS transport

China MSA

- 2010，the HNS amount of marine transportation in China is 131 million tons， the number of vessels is 137 hundred , increased by 92% and 50% compared with 2006 ;
- Obvious trend of large vessels
  Single ship transportation volume increases
- Main categories: vegetable oil, ethylene glycol, methyl alcohol, styrene, sulphuric acid, xylene, toluene and its mixtures, sodium hydroxide, ethylene dichloride, etc.

HNS Spill Accidents

China MSA

(1997-2011)

Number of accidents (above 50 tons): 16

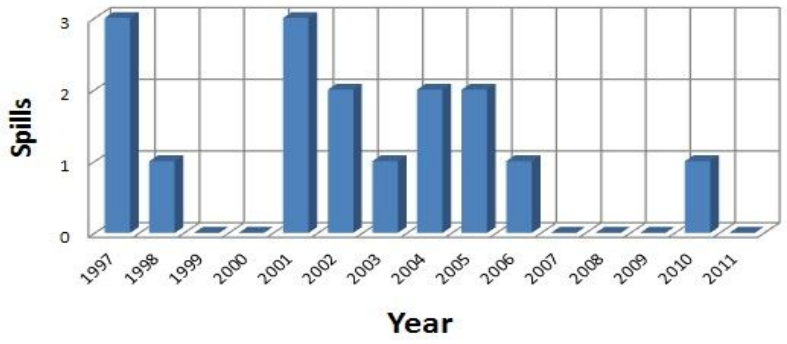
Total spillage: 6920 tons

Average spillage: 432 tons per accident

HNS Spill Accidents

China MSA

Number of HNS spill accidents above 50 tons from 1997 to 2011



Number decreased in recent years

HNS Spill Accidents

China MSA

Type of HNS Frequently spilled : Acids (8 accidents, 50%)

Type of chemical	Quantity (Tons)	Number of Accidents	Average Spillage (Tons)
Concentrated Sulfuric Acid	1445	6	240.8
Hydrochloric Acid	2100	2	1050
Benzene	149	1	–
Carbon Tetrachloride	220	1	–
Styrene	639	1	–
Sodium Hydroxide (solution)	240	1	–
MMA and PMA	225	1	–
Toluene	67	1	–
Diethylene Glycol	80	1	–
Methanol	1755	1	
Total	6920	16	432

Cause of HNS Accidents

China MSA

HNS accidents above 50 tons from 1997 to 2011,
Mostly attributed to Collision(43%)

Type of chemical	Cause of accidents
Concentrated Sulfuric Acid	Collision 3, Grounding 2, Sinking 1
Hydrochloric acid	Grounding and sinking, sinking 1
Benzene	Grounding
Carbon Tetrachloride	Grounding
Styrene	Collision
Sodium Hydroxide solution	Collision
MMA and PMA	Grounding
Toluene	Collision
Diethylene Glycol	Hull Breakage
Methanol	Collision

China MSA

The largest HNS spill:
2000 tons of hydrochloric acid at sea in 2004

The most serious HNS spill:
639 tons chemical "styrene" spilling in 2001




China's Laws and Legislation

China MSA

1. Laws

- **Marine Environmental Protection Law of the P.R.C.**
- **Maritime Traffic Safety Law of the P.R.C.**
- **Port Law of the P.R.C.**
- **Emergency Response Law of the P.R.C.**

2. Regulations

- Regulations on the Control over Safety of Dangero us Chemicals

- Regulations on Administration of Prevention and Control of Pollution to the Marine Environment by Vessels

China MSA

3. Provisions

- Provisions on Administration of Marine Environment Pollution Prevention by Vessels and their Relevant Activities of the P.R.C.

- Provisions on Administration of Response and Preparedness of Pollution to the Marine Environment by Vessels of the P.R.C.

Policy and Strategy

China MSA

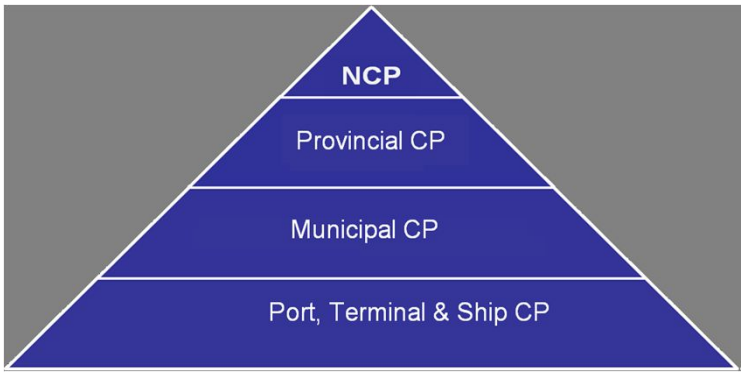
1、China attaches great importance to environmental protection and takes it as a fundamental national policy

(1) Improvement of the professional training and education

China MSA

(2) Control of ships

2、The responsibility is shared by the state, local governments ,port and shipping related companies



The improved tired Contingency Plans in the future

China MSA

3、Resources for emergency response to HNS accidents

Central gov. , Local gov. and industry

Technical support:

- Dalian HNS Transport Research Center
- National Registration Center for Chemicals, SAWS
- Experts Supporting System for Emergency Response

China MSA

Human resources:

- professional teams
- volunteers
- other relevant personnel

Summary

China MSA

HNS spill response and preparedness

- pay great importance
- legislation system
- strengthen the capability of the personnel
- four-level contingency plan
- supporting resources
- principles and procedures
- professional training institute

China MSA

Current status, case study and response system for HNS in Japan

Mr. Kazuhisa Takumi
Special Assistant to the Director
Japan Coast Guard (JCG)

1. Current status of HNS transportation and HNS spill incidents

While examining the intensity of transportation of oil & HNS by tankers in Japan, the most common goods were found to be white oil such as gasoline and diesel oil. The second largest is black oil such as heavy and crude oil and the third is the chemical substances such as xylene and benzene. A total of 11 incidents related to harmful liquid substances occurred during 2012 in Japan.

2. Case study related to HNS

2.1. Ammonia leak incident in fishing vessel

Certain amount of ammonia leaked from a freezing compartment of a fishing vessel moored in Sendai port in 2012. Japan Coast Guard (JCG) dispatched patrol vessels and the National Strike Team (NST) to the site. The NST monitored the density of gas in the vessel and identified the leaking spot, and finally confirmed the suspension of leaking with the specialized equipment and their expertise.

2.2. Blackout of a large LNG tanker in the Tokyo Bay

A LNG tanker lost its control due to an engine stop resulted from an electronic power failure in the Tokyo Bay in 2012. JCG dispatched patrol and fire-fighting vessels, the NST and Special Rescue Team (SRT) to take emergency response actions. JCG cooperated with a ship management company to promptly respond to the incident and prevent any hazardous situation.

2.3. Asphalt spill incident from onshore facility

Certain amount of asphalt leaked from the storage tank of an oil factory and spilled on the sea facing the Tokyo Bay in 2012. JCG mobilized the NST to the site to provide

technical advice and also to assist the recovery operations. JCG investigated the spread area of asphalt by airplanes and was able to complete the shoreline cleanup within a month.

3. Response system in Japan

There are two specialized organizations for HNS spill incidents in Japan: the NST and MDPC. The NST of JCG is a unit specialized in marine pollution and disaster prevention which provides technical guidance and advices on the formulation of response plans. The Maritime Disaster Prevention Center (MDPC) is a specialized organization for executing oil recovery and firefighting operations and it operates to promptly act in case of oil or HNS spillage and fires at sea.

◆ *Profile of the presenter*

Education

- Bachelor of Engineering, University of Tokyo, Japan
- Master of Engineering, University of Tokyo, Japan

Biography

Kazuhisa Takumi joined Ministry of Land, Infrastructure, Transport and Tourism (MLIT) in 2006. He started his career as a staff at Maritime Bureau and later he joined Road Transport Bureau and Civil Aviation Bureau of MLIT as a section chief. He is currently working for JCG as a special assistant to the Director of Marine Environment Protection & Disaster Prevention Division, Guard & Rescue Department, JCG. The division deals with the emergency response for oil & HNS spill incidents and is situated in JCG Headquarters.

Current status of HNS incidents, Case study and Response system in Japan

Mr. Kazuhisa TAKUMI

Marine environment protection
& disaster prevention division,
Guard & Rescue department,
Japan Coast Guard

October 15th, 2013

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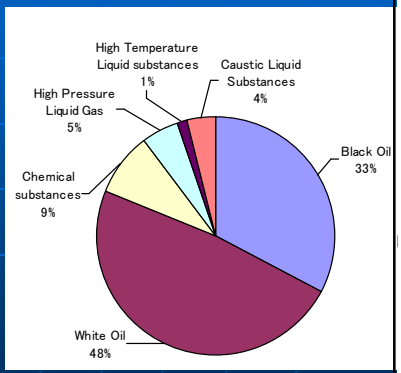
1. Transportation of HNS in Japan
2. Statistics of HNS spill incidents
3. Case study of HNS spill incidents
4. Response system in Japan

1. Transportation of HNS in Japan

3

1-1 Transportation amount of oil & HNS by coastal tankers in Japan

Item goods	FY 2012 (unit: kl, kton)	compared with FY2011
Black Oil（heavy oil, crude oil）	50,889,614	107.40%
White Oil（gasoline, kerosene, diesel oil etc.）	75,321,749	99.40%
Chemical substances（xylene, benzene etc.）	13,493,538	96.40%
High Pressure Liquid Gas (LPG, ethylene, liquid ammonia etc.)	7,793,009	94.60%
High Temperature Liquid substances (asphalt, dissolved sulfur etc.)	2,211,134	97.90%
Caustic Liquid Substances (caustic soda, sulfuric acid, hydrochloric acid	6,032,399	88.20%
Total	155,741,443	100.80%



Amount of item transported by coastal tanker in Japan in FY 2012

※ according to the data from HP of "Japan coastal tanker association "

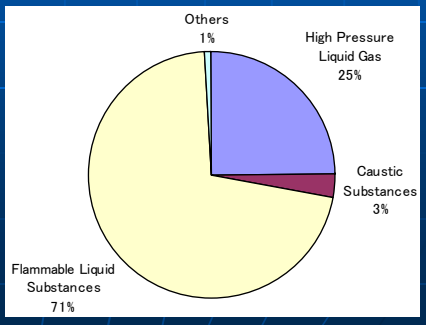
4

1-2 Cargo handling volume of Hazardous substances in Japan

unit: cargo handling volume(ton)

Jurisdiction	Total	High Pressure Liquid Gas	Caustic Substances	Flammable Liquid Substances	Others
1st Regional CGH	19,088,064	929,966	188,921	17,739,053	230,123
2nd Regional CGH	18,249,324	1,875,688	951,438	15,304,401	117,797
3rd Regional CGH	160,508,519	48,892,636	2,077,072	108,275,294	1,263,518
4th Regional CGH	48,357,563	21,098,539	1,430,057	25,208,973	619,993
5th Regional CGH	66,738,401	17,288,011	3,219,146	45,688,686	542,558
6th Regional CGH	52,166,543	7,031,820	3,768,010	40,646,008	720,704
7th Regional CGH	30,839,144	10,205,489	2,833,188	17,294,185	506,282
8th Regional CGH	950,200	1,079	102,852	845,211	1,058
9th Regional CGH	11,399,474	6,896,793	160,286	4,333,356	9,039
10th Regional CGH	45,003,246	283,598	15,170	44,700,699	3,779
11th Regional CGH	6,301,363	197,087	5,307	6,096,418	2,551
Total	459,601,840	114,700,706	14,751,448	326,132,283	4,017,403

Cargo handling volume of Hazardous substances sorted by substances



※ according to the data from "annual statistic report of JCG (2012)"

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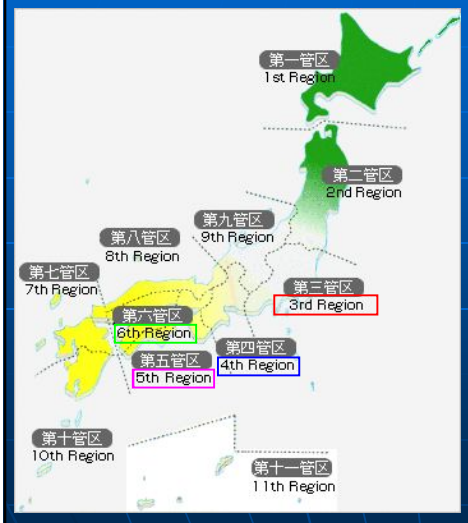
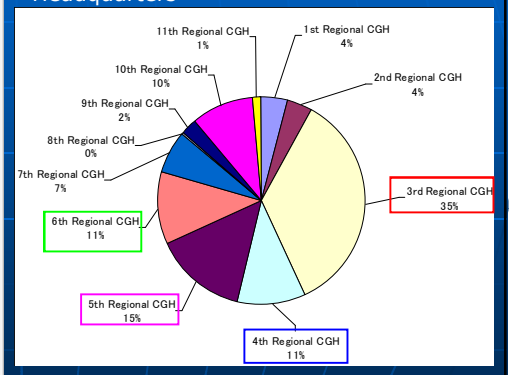
1-3 Cargo handling volume of Hazardous substances sorted by Region



Cargo handling volume sorted by Jurisdiction of Regional Coast Guard Headquarters



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2. Statistics of HNS spill incidents

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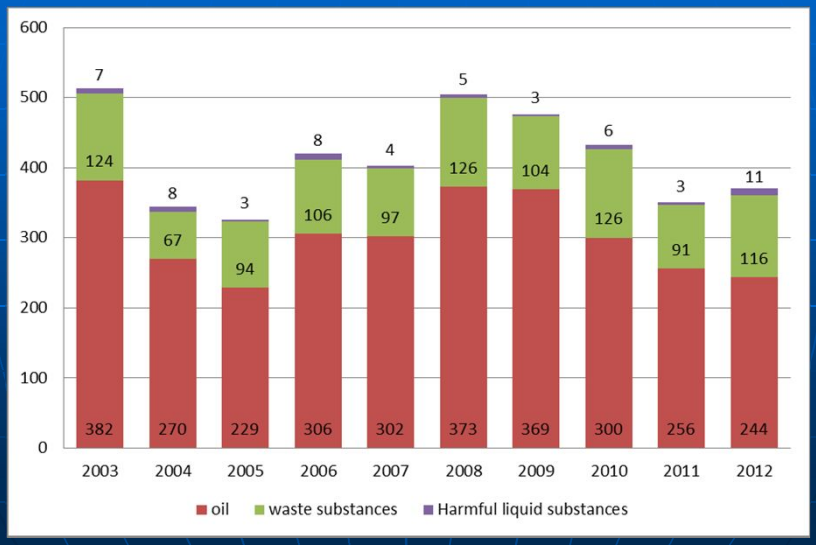
2-1 Number of incidents of marine pollution in Japan



* According to "Statistics for marine pollution in 2012 (JCG)"

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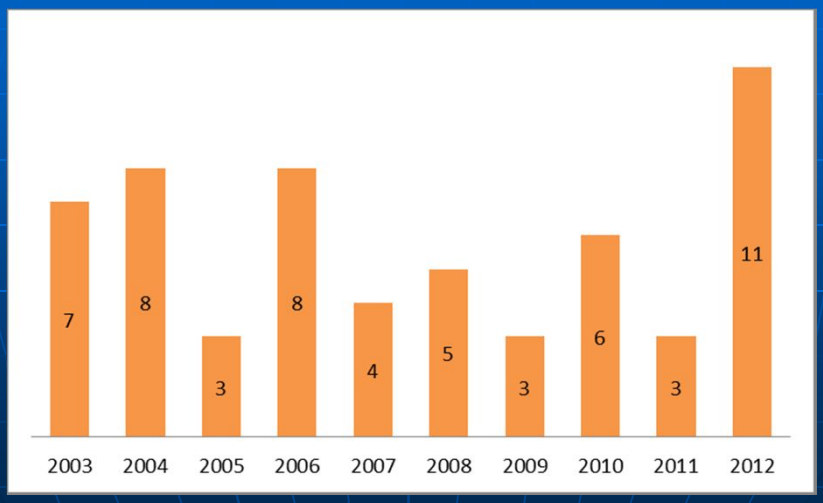
2-2 Number of incidents related to harmful liquid substances



* According to "Statistics for marine pollution in 2012 (JCG)"

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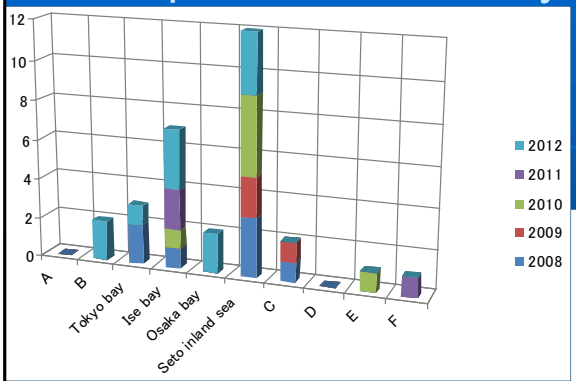
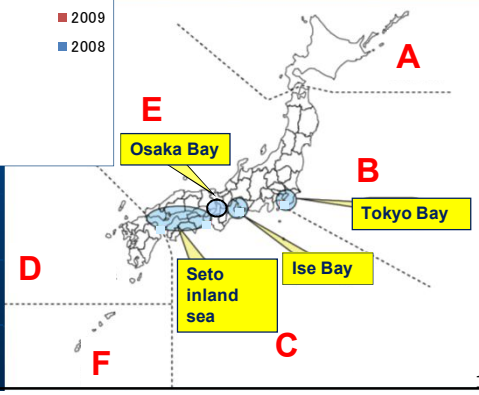
2-3 Number of incidents related to harmful liquid substances by regional sea

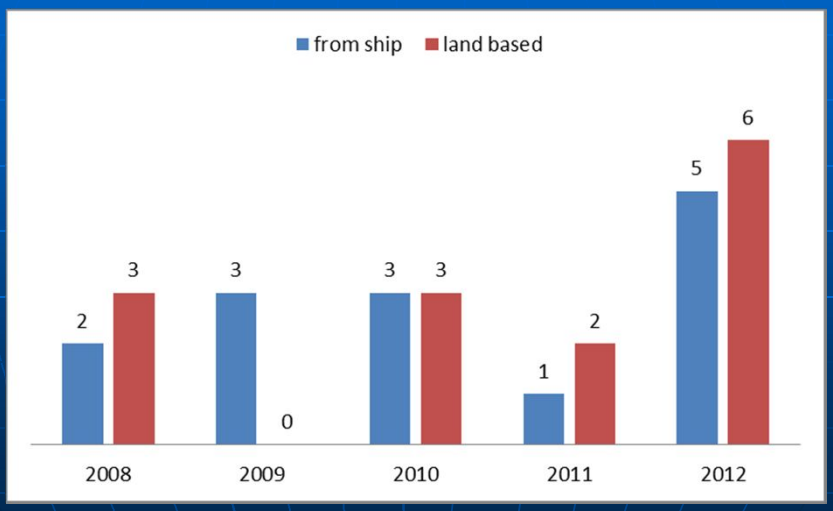




* According to "Statistics for marine pollution in 2012 (JCG)"

10

2-4 harmful liquid substances spill incidents sorted by emission sources



* According to "Statistics for marine pollution in 2012 (JCG)"

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3. Case study of HNS spill incidents

12

3-1 Ammonia leak incident in fishing vessel (Sendai-port)

Outline of the incident (initial)

- Some amounts of ammonia leaked from the freezing compartment of the fishing vessel moored in Sendai port on 28, August, 2012.
- 4 onboard crews who had aspirated ammonia complained of throat aches and sickness, and 2 of them were transported for emergency first aid.
- At that point, there was no information about whether the leak of ammonia was lasting or not and the density of gas in the vessel.

【outline of the ship】

- Fishing vessel
- Tonnage: 285 GT
- Length: 52 meter

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3-1 Ammonia leak incident in fishing vessel (Sendai-port)

Feature of the incident

【Property of ammonia】

- stimulated bad smell
- harmfulness
  - Gas aspiration result in breathing trouble
  - Contact liquid directly result in irritation
- flammable
- high volatile → density of gas increase quickly

【gas leaks within a vessel】

- Closed space (within a vessel)
- High possibility to be formed high density of gas by accumulation and saturation of ammonia gas.

It was necessary to have specialized equipment such as breathing apparatus, protective suits and gas monitoring device and also have technical knowledge to approach to the site in the vessel and take measures to prevent the leakage safely.

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3-1 Ammonia leak incident in fishing vessel (Sendai-port)

Outline of the incident

【Crew onboard】

●AM 28th , noticed the leakage of ammonia and shut down the valve of leaking pipe and escaped

【Fire Department】

●AM 28th , started to ventilate by firefighting vehicle

【Japan Coast Guard】

●AM 28th patrol vessels arrived at the site

●PM 28th National Strike Team (NST) arrived at the site

〈Activities by NST〉

●28th, monitored the density of gas in the vessel and identified the leaking spot and confirmed the suspension of leaking

●29th , confirmed reduction of the density of gas in all rooms of the vessel

NST member who are conducting gas monitoring with wearing protective suit in the vessel

【National Strike Team】

NST is mobilized to incident site such as oil & HNS spill and assist officers of regional coast guard in responding by providing not only specialized equipment but also technical knowledge as a specialized Team of JCG

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3-2 Blackout of a large LNG tanker in the Tokyo Bay

Outline of the incident(initial)

・On 3 December 2012, a LNG tanker was loss of control due to engine stop resulted from electronic power failure (blackout) in the Tokyo Bay (just close to metropolis).

↓

・As an emergency measure, the tanker was moved by tug boats and anchored in safe place.

↓

・The pressure control system of LNG tank (which can reduce the pressure with burning vaporized LNG gas) was also stopped

↓

・LNG gas may have to be released to the open air (outside of tanks) in case of avoiding the damages to LNG tanks by pressure increase within the tank.

【outline of a LNG tanker】

・Nationality	Marshal Islands
・Tonnage	95,000 GT
・Length	285 meter
・Load	LNG (57,000ton)

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3-2 Blackout of a large LNG tanker in the Tokyo Bay

Feature of the incident

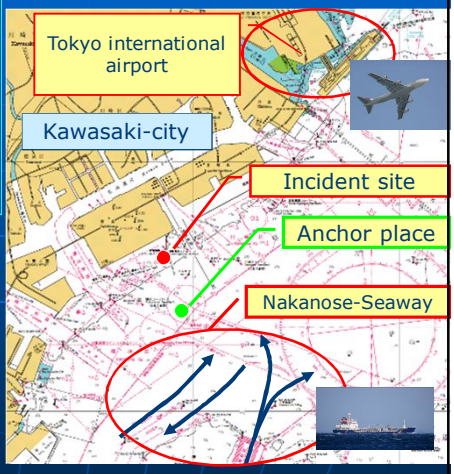
【Characteristic and Hazardous of LNG】

- transported as ultracold liquid (liquefy at -162 Celsius degree)
- volume expansion by evaporation(about 600 times)
- evaporated LNG gas is spreading(updraft)
- flammable nature

【Impact when LNG gas was released】

- Restriction/prohibition of navigation in the neighborhood sea area
- Restriction/prohibition of flight over the neighborhood area
- Limitation of operation in the neighborhood complex companies

【location】



Influence would get bigger when a fire occurs

17

3-2 Blackout of a large LNG tanker in the Tokyo Bay

Action to be taken

【Japan Coast Guard】

- patrol vessels, fire-fighting vessels, NST and SRT (special rescue team) stood by to emergency response
- instruction to ship management company regarding incident response
- information service to authorities concerned (Civil Aviation Bureau etc.)

LNG tanker which was moved to outside of Tokyo Bay with under close watch and support from 5 tug boats.

【Ship management company 】

- 4–5th Tanker was docked at LNG berth with assistance of tug boats. Pressure in the LNG tanks decreased by emitting gas into onshore facility.
- 5th Pressure control system of LNG tank made a recovery because of recovery of electronic generator.

→ Succeeded in avoiding of emitting LNG gas into the open air

- 14th Tanker was moved to out side of Tokyo bay with 5 tug boats
- 15–17th Electronic generator was repaired outside of Tokyo bay
- 26th LNG was unloaded at LNG berth
- 27th Tanker left for Qatar

Reference: Transportation of LNG is usually made based on accuracy plan of acceptation/consumption by electronic power/gas companies. It would take long period to re-coordination/reschedule of acceptation date

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3-3 Asphalt spill incident from onshore facility (Chiba port)

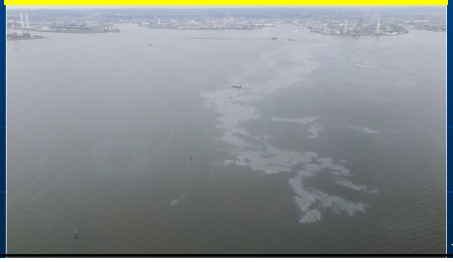
Outline of the incident (initial)

1. AM 28, June 2012, some amounts of asphalt leaked from the storage tank and spilled to the sea through a drainpipe at a oil factory in Chiba prefecture faced to the Tokyo Bay.
2. Oil factory operator extended the oil boom immediately after the incident.
3. A part of asphalt was accumulating in oil boom, but other went over the boom and spread to the Tokyo Bay.

Some asphalt was accumulating in oil boom

Damaged storage tank

Some asphalt was spreading to the Tokyo Bay



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3-3 Asphalt spill incident from onshore facility (Chiba port)

Feature of the incident (1)

【property of asphalt (heavy oil)】

- High viscosity
  → Response equipment can be used was limited
- Low volatile
  → Floating in the sea for a long period
- Have possibility to be mousse-ize
  (mousse-ize : increasing its viscosity and its volume (2-5 times) with absorbing sea water during floating
  → Increasing difficulty of recovery operations

※ some asphalt sank to the sea floor

Condition of asphalt spilled into the sea

Condition of mousse-ize asphalt

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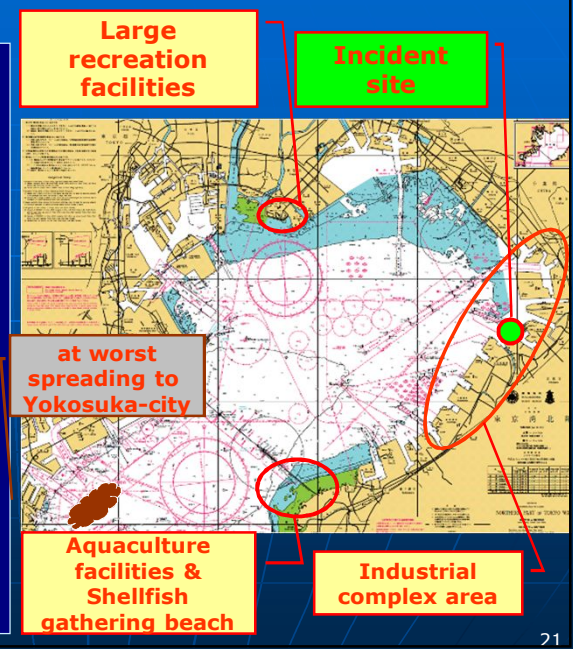
3-3 Asphalt spill incident from onshore facility (Chiba port)

Feature of the incident (2)

【Social influence】

- Sea traffic
  - Heavy sea traffic due to lots of industrial complex
  - Ships have to be navigated with avoiding polluted and response operation area
- Fishery
  - Spreading to aquaculture facilities and shellfish gathering beach
  - Damage to fishery
- Recreation facilities etc.
  - Large recreation facilities are located nearby the site.
  - The possibility of damage to leisure business due to shore pollution and oil smell



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3-3 Asphalt spill incident from onshore facility (Chiba port)

Action to be taken

【Japan Coast Guard】

- Investigate the spreading area of asphalt by patrol vessels and airplanes
- Recovery operation (collection & dispersing) by patrol vessels
- Mobilized NST to assist recovery operation of oil company and to provide technical advice to the company

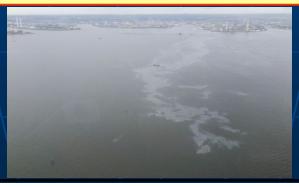
【Oil company (Maritime disaster prevention center)】

- Made a contract with MDPC for recovery
- MDPC conducted asphalt recovery in the oil boom, dispersed asphalt offshore and cleaned up shoreline

【Combined operation between JCG and MDPC】

- JCG provided MDPC with the information about the floating area of asphalt which was confirmed by patrol vessels or airplanes.
- MDPC collected and dispersed efficiently because they could grasp the exact location of asphalt by JCG assistance.

We could completed collecting spilled asphalt and cleaning shoreline within a month



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4. Response system in Japan

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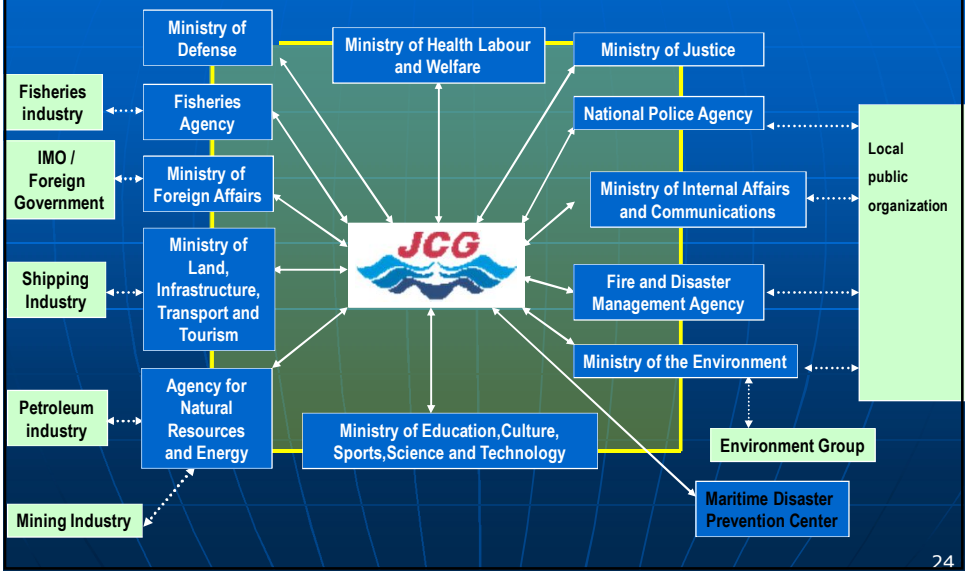
4-1 Government Agencies for HNS (Oil) Pollution Preparedness and Response



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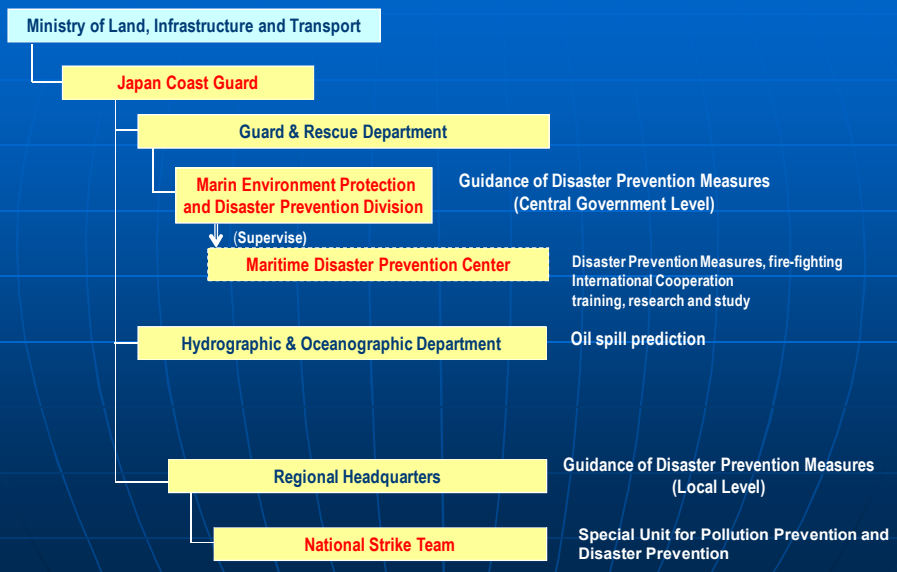
4-2 Organization Chart of HNS (Oil) Spill Response Authorities



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4-3 JCG NST (National Strike Team)

Special Unit for Pollution Prevention and Disaster Prevention of JCG

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4-4 Roles of the JCG and the MDPC

- **Duties of polluters (ship owners)**
  - Stationing and stockpiling of HNS spill combating equipment, notification, taking necessary measures
- **Roles of the JCG**
  - Evaluation of the spill
  - Supervising and/or directing the polluter to respond to the spill
  - Taking combating measures
  - Directing MDPC to take combating measures
- **Roles of the MDPC**
  - Carrying out countermeasures on consignment from polluters
  - Carrying out the countermeasures under the direction of the JCG Commandant
  - Stockpiling of Equipment and materials for Recovery of Spilled HNS
  - Others

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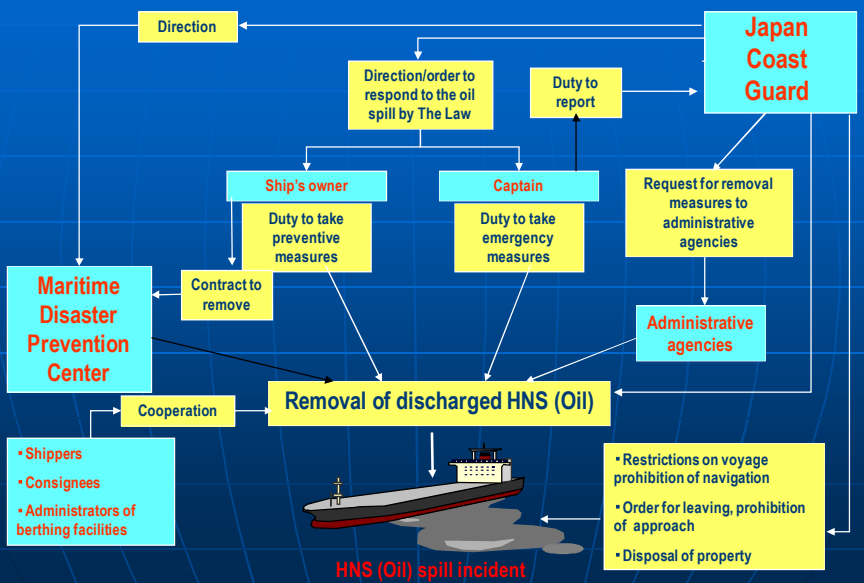
4-5 Response to HNS/Oil Spill Incidents



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Thank you for your attention!

JAPAN COAST GUARD

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Current status of ship-based HNS spill incidents in Korea

Mr. Hyoungjun Leem
Assistant Director
Korea Coast Guard (KCG)

The OPRC-HNS protocol was adopted in March 2000 and entered into force in 2007. Korea signed the convention in January 2008 and it took effect from April in the same year. As a party to the OPRC Convention, Korea established a National Contingency Plan (NCP) in 2000 and amended it in 2009 after the adoption of the OPRC-HNS protocol.

As a sub-plan of the NCP, the Regional Contingency Plan was established in 2002 and was amended in 2008 after the revision of the NCP. Through the revision of the marine environment management act, HNS response regime was included in the NCP. In 2006, Korea developed a HNS response manual which includes the response procedures, and the command and control of incidents. In 2007, Korea also developed the Standard Action Procedure including equipment safety check onsite, operation of the scene command post, site control, operation of decontamination platoon etc.

According to the statistics, the oil transportation in Korea has risen by 29% and the HNS transportation by 66% during the last 10 years. HNS cargoes take 19% of all quantity of the transported goods and among all HNS transportation, around 49% are the bulk solid cargoes. In general, liquid HNS are known as the most dangerous cargoes and it takes 23% of all HNS transportation. From 2000, the quantity of transportation of crude oil has not raised dramatically but the liquid HNS has increased around 3 times. A total of 112 HNS incidents occurred during 10 years and have resulted in 61 casualties. Human safety is the most critical concern of the HNS incidents but it is unfortunate that explosions usually result in human casualty or death.

◆ *Profile of the presenter*

Education

- Bachelor of Maritime Police Science, Korea Maritime University

Biography

2003 Engineer, Hyundai Merchant Marine

2006 Staff, Pohang Coast Guard Station

2011 Assistant Director, Headquarter of Korea Coast Guard


NOWPAP MERRAC EXPERT MEETING Oct. 15~17. 2013.
Current status of ship-source HNS spill incidents In Korea
KOREA COAST GUARD


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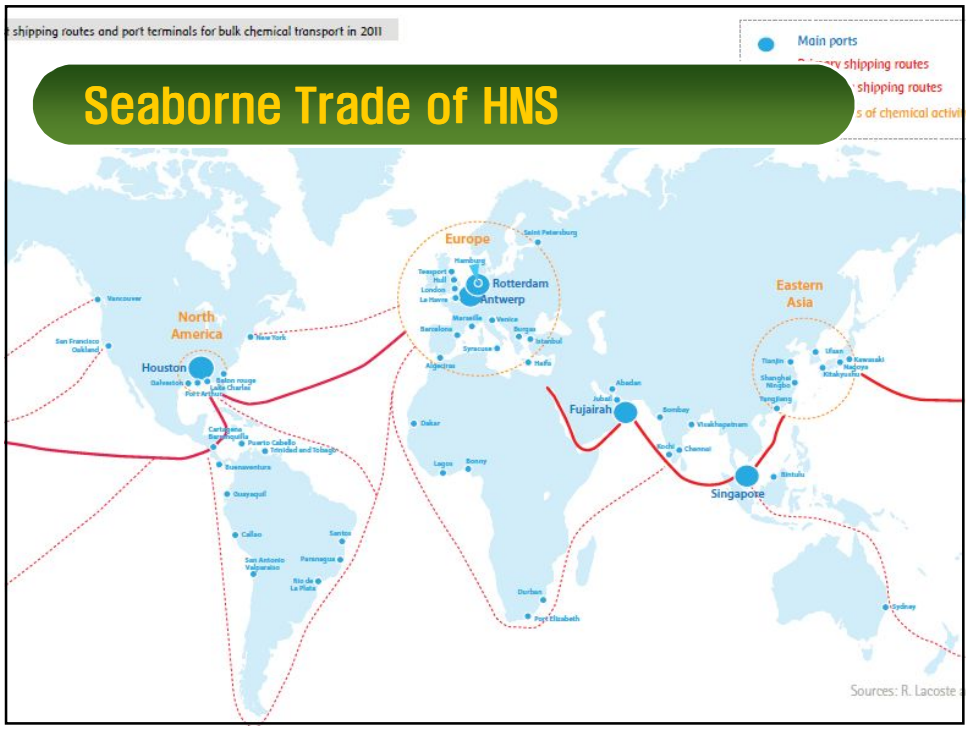
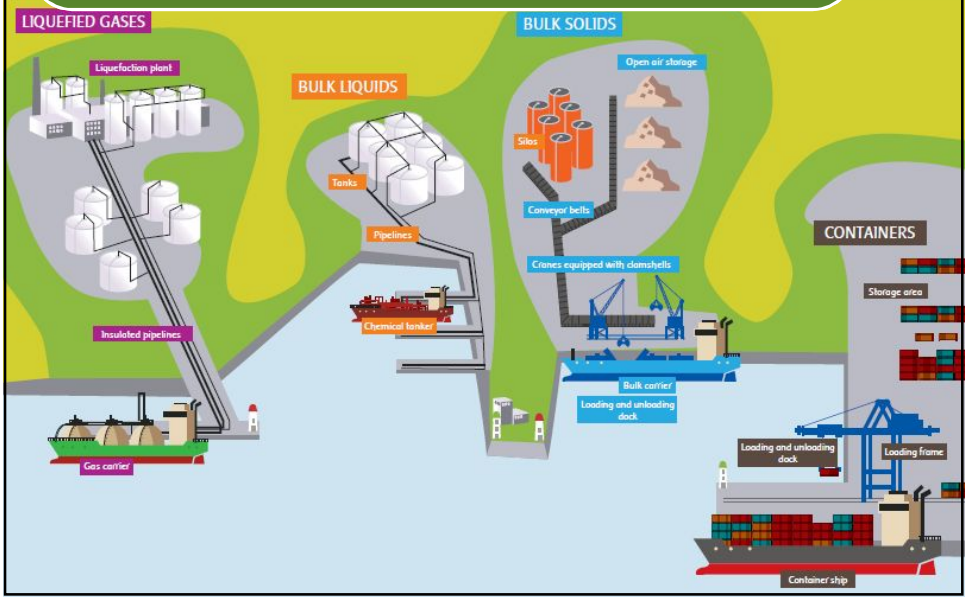
Ⅰ Outline of HNS & Case Study
Ⅱ National Response System of Korea
Ⅲ Risk of Marine HNS incident
Ⅵ Future Plan of Korea

Outline of HNS

Case Study on incident in Korea

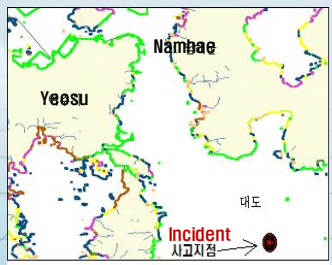


HNS type and carriage vessel



Case 1 : Morning Express(G/T 56,285ton)

- Date & Position : May. 2004, Off the Kyungnam, Korea
- HNS Type & Quantity : Naphtha 1,200ton
- Cause of Incident : HNS spill after collision
- Damage : injured 44 person, Response boat fired
- Weather : Wind NW 6-8m/s, Wave 0.5m, Cloudy



Case 1 : Morning Express

- Material Information : Naphtha

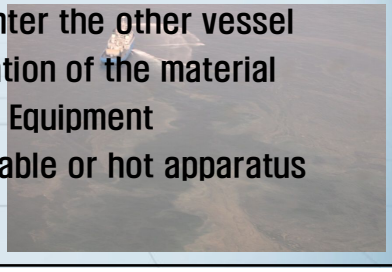
- Extremely flammable liquid and vapor.
- May be fatal if swallowed and enters airways – do not siphon gasoline by mouth.
- Suspected of causing blood cancer if repeated over-exposure by inhalation and/or skin contact occurs.
- Causes eye irritation. Can be absorbed through skin.

Specific Hazard Reactivity Health

Case 1 : Morning Express

- Response

- (1 Step) Checked the Material characteristic and then find the method of response
  -> Naphtha has high volatility, High inflammability
- (2 Step) Conducted the aerial suveillence and set the safety area not to enter the other vessel
- (3 Step) Promote the evaporation of the material by use of firefighting Equipment
  Never use the flammable or hot apparatus



Case 2 : Doo-Ra No.3 (G/T 4,191ton)

- Date & Position : Jan, 2012, Off the Incheon, Korea
- HNS Type & Quantity : Gas oil (Danger Goods)
- Cause of Incident : Oil Mist explosion when cargo tank Cleaning
- Damage : Vessel lost, Death 11 persons and Missing 4 persons

Case 2 : Doo-Ra No.3 (G/T 4,191ton)

- Material Information : Gas Oil

- Flammable liquid and vapor.
- May be fatal if swallowed and enters airways – do not siphon diesel by mouth.
- Suspected of causing skin cancer if repeated and prolonged skin contact occurs.
- May cause damage to liver, kidneys and nervous system by repeated and prolonged inhalation.
- Causes eye irritation by eye contact with liquid.

Case 2 : Doo-Ra No.3 (G/T 4,191ton)

- Response

(1 Step) investigate the Incident Area

- Investigated incident condition including casualty & hull
- Established the situation post including life rescue, vessel salvage, pollution control
- Set the safety area around the incident site

(2 Step)

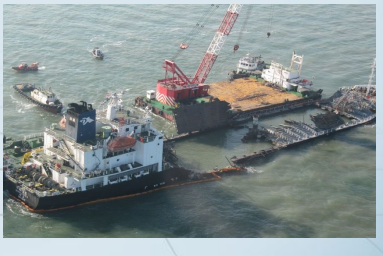
- Deployed the oil boom to prevent the oil residue spill
- Remained cargo and oil transfer operation with monitoring the vessel condition

Case 2 : Doo-Ra No.3 (G/T 4,191ton)

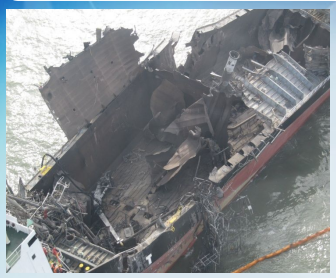
- Response

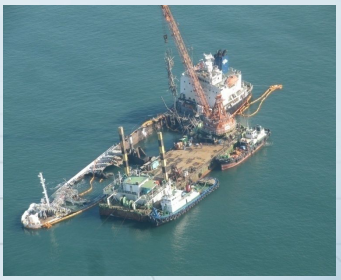
(3 Step) Removal of the Wreck

- Salvage company divided the vessel hull as 3 part, because of vessel hull had severe damage
- Move the divided hull to port by use of the barge
- Vessel dismantled at the port



Case 2 : Doo-Ra No.3 (G/T 4,191ton)



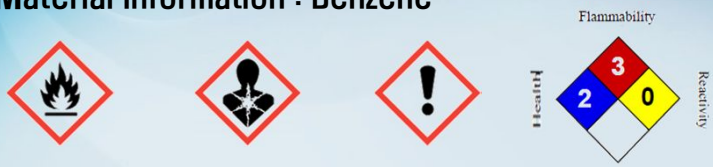



Case 3 : Stolt Distributer(GT 2,700Ton)

- Date & Position : Mar. 2011, At Sea away 7 miles
- from Jang-DO Is. Wando
- HNS Type & Quantity : Benzene 75ton,
- Cause of Incident : Collision with fishery vessel
- Damage : danger to fishing farms located nearby area


Case 3 : Stolt Distributer(GT 2,700Ton)

- Material Information : Benzene



– Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.
– Inflammation of the eye is characterized by redness, watering, and itching.

Case 3 : Stolt Distributer(GT 2,700Ton)

- Response

(1 Step) Investigation
– Checked the spilled HNS Characteristic
– Vessel' s Hull Condition, Bulk Cargo(Benzene) Condition
– Monitoring the marine Pollution (HNS spill)
– set the safety area not to enter the other vessel.

(2 Step) Confirmation of Safety
– Stopped the spillage from the incident site
– Prepared the blockade the damage point of the vessel (Gas free operation and residue gas detection)

Case 3 : Stolt Distributer(GT 2,700Ton)

- Response

(3 Step) Close of hull damage
- Never carried out flammable work (ex. wedding)
- Damage point was blockaded by use only bolt and nut
  ※ Produced the blocking plate at the remote area

Investigation (1 Step) | Frame Install (2 Step) | Close up (3 Step)

Lessons learned

- Adequate response measure
  - Use the special Equipment following HNS type
    ※ Rubber part of Equipment can be fired or melted
- Pre-assessment of Incident Condition
  - Residual Gas Detection to prevent secondary damag
  - Identification of Package HNS
- Secure of Personal Safety For specific HNS

National Response System of Korea

Joined the OPRC-HNS Protocol

- International adoption (May.15th, 2000), come into effect(07.6.14)
- Deposition(Jan.11st, 2008), come into Domestic effect (Apr.11st, 2008)
- Duties as a Party
  - Established National Contingency Plan and Regional Contingency Plan against HNS accident
  - Developed training and exercise program
  - Prepared the manual for response of HNS accidents

National Contingency Plan

- Established NCP (Jan. 2000)
  - Established by duty of a Party of the OPRC Convention
  - Considered and Settled at the Cabinet Meeting
- Amendment of NCP (Sep. 2009)
  - Considered and Settled at the Marine Fishery Development Deliberation Committee Meeting
  - Reflected the duties as a party of the OPRC-HNS Protocol

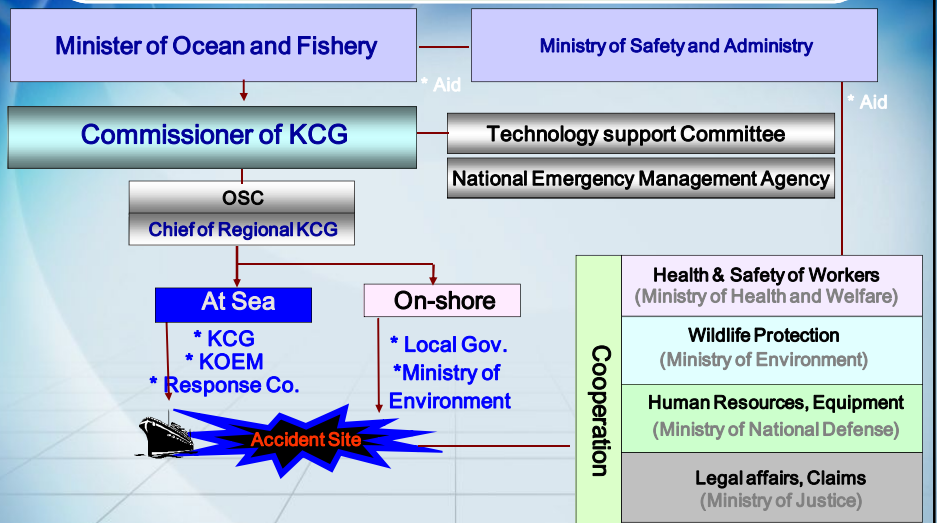
National Contingency Plan

- Established Regional Contingency Plan
  - Established the first RCP during 1999 to 2002
  - Regulated establishment and activation of RCP at NCP
  - Amended the RCP for reflection of HNS during 2006 to 2008
- Regulated system on HNS response
  - The Law of Marine Environment Control (Amended the Article 26th of the enforcement regulation, May. 2008)
  - Regulated basis of the National Response System on HNS at the Law

National Contingency Plan

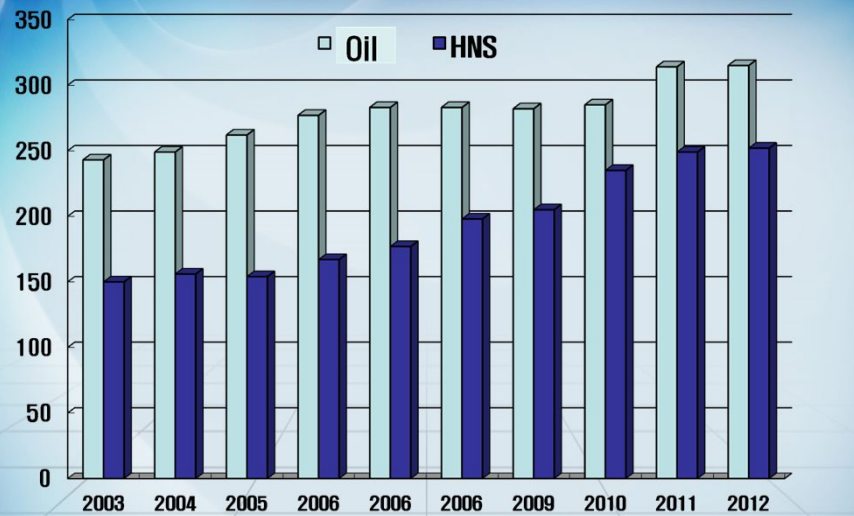
- Development of the Manual on HNS response
  - Developed the first manual on HNS accident response in 2006
    - Procedures of response, command and control of incident
  - Developed the Standard Action Procedure at scene in 2007
    - Included check of safety equipment at scene, operation of the Scene Command Post, Control of the scene, operation of decontamination platoon
  - Completely revised the manual on HNS response in Sep. 2009

National Response System of Korea

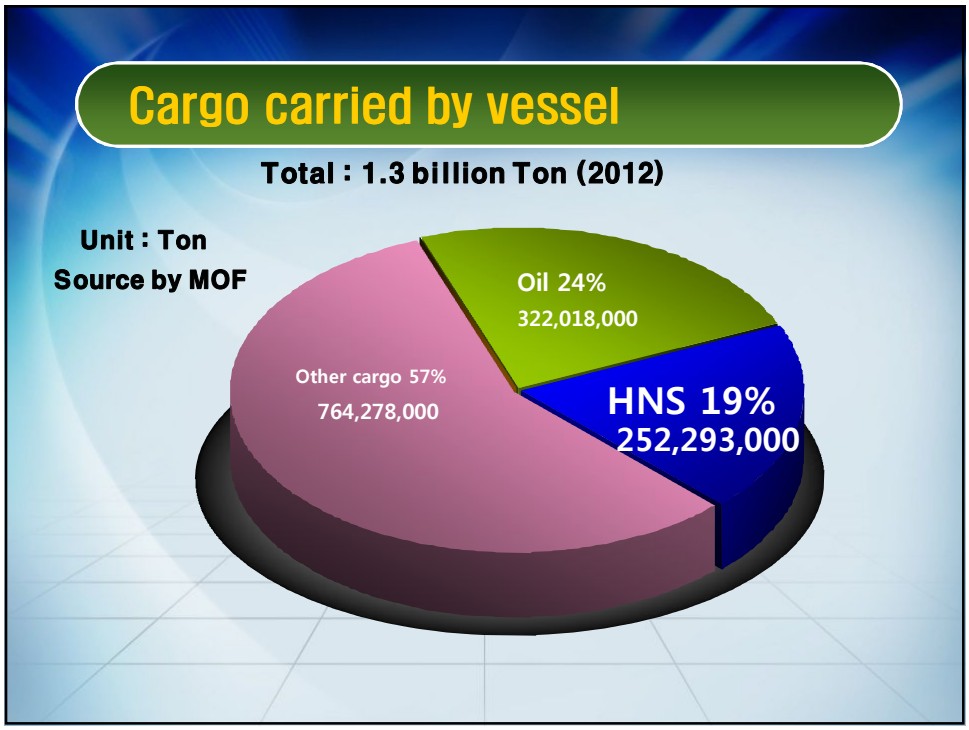


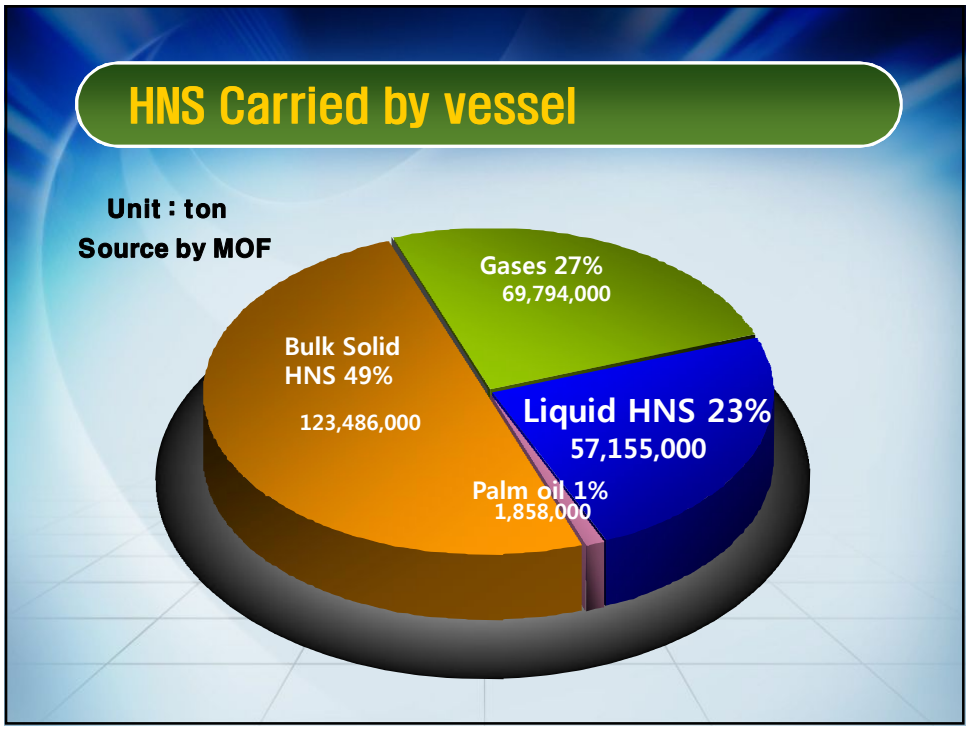
Risk of Marine HNS incident

HNS Transportation in Korea



< Korea Coast Guard>


Cargo carried by vessel
Total : 1.3 billion Ton (2012)
Unit : Ton
Source by MOF
Oil 24%
322,018,000
HNS 19%
252,293,000
Other cargo 57%
764,278,000


HNS Carried by vessel
Unit : ton
Source by MOF
Gases 27%
69,794,000
Liquid HNS 23%
57,155,000
Palm oil 1%
1,858,000
Bulk Solid
HNS 49%
123,486,000

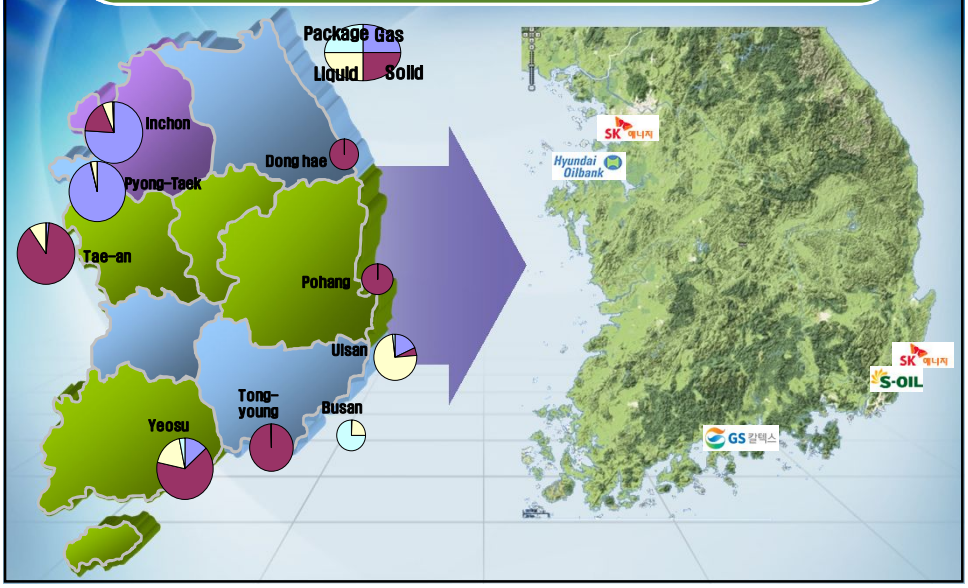
Quantity of HNS Transportation

〈 Unit : Mton 〉

Year	Total	Crude Oil	Liquid HNS	Bulk HNS	Package HNS	Dry HNS
1970	2,605	1,101	439	448	717	
1980	3,704	1,503	368	608	102	1,123
1990	4,008	1,315	440	988	234	1,031
2000	5,984	1,720	443	1,295	598	1,928
2006	7,700	1,783	915	1,814	1,076	2,112
2010	8,409	1,788	984	2,335	1,275	2,027
2011	8,748	1,762	1,034	2,477	1,385	2,090
2012	9,297	1,785	1,248	2,547	1,498	2,219

〈 UNCTAD 〉

HNS Cargo Transportation to Port



Marine HNS Incident Analysis in Korea (for 10 years)

- How many incident occured : 112 (2002-2011)
  - Liquid HNS Carrying vessel (Explosion, Fire, Collision, Spill)
- Casualty of Person : Death 60.7
  - Death 53 + Conversion following Level of Injured 7.7

Future Plan of Korea

Comparison with EU countries

Nation	Experience Of response	Prepardedness		Training
		Adoption of OPRC-HNS	HNS Incident Risk Assessment	
U.K	Sufficient	X	O	Limited
France	Sufficient	O	O	Periodical
German	Sufficient	O	O	Periodical
Finland	2~3(Minor)	O	O	Periodical
Sweden	2~3	O	O	Periodical
R.Korea	Sufficient	O	O	Periodical

< Source : EMSA, KCG >

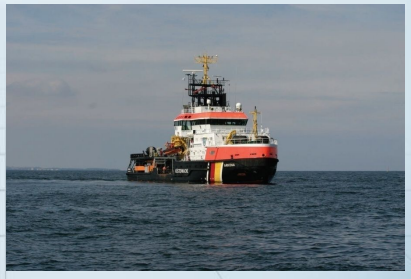
Comparison with EU countries

Nation	Response Ability				
	Info Sharing	Monitoring	Response Equipment	Special Response Vessel	Special Response Team
U.K	O	O	O	Contract	Limited
France	O	O	O	2	O
German	O	O	O	6	O
Finland	O	O	O	4	O
Sweden	O	O	O	1	O
R.Korea	Limited	O	O	None	None

< Source : EMSA, KCG >

1. Acquisition of Special HNS Res. Vessel





1. Acquisition of Special HNS Res. Vessel

- **EMSA provided the performance standard on Safe Flatform (2012)**

  Safe Platform Definition

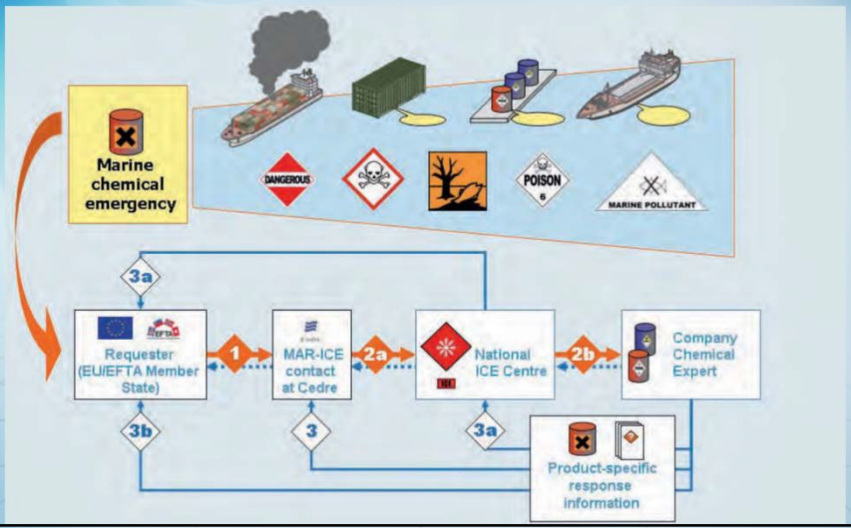
  A vessel which is able to provided rescue assistance and operational support during a HNS incident

2. Operation of Special Response Team

- (Recent trend) Establish Special Team for Marine HNS incident response
  - HNS Special response team by Coast Guard : Germany, Sweden, US(NSF), Japan(NST)
  - Collaboration with chemical rescue team or Army chemical response troops : U.K, France, Spain
- Designation of the Special HNS Team
  - Marine SAR Team, Assessment, Technical Support
    => Unified Special Response Team

3. HNS information sharing network

- (EU) MAR-ICE Network



3. HNS information sharing network

- Establishing information sharing network by collaboration with the HNS handler, expert, shipping company, receiving facility.
- NOWPAP Member country share the HNS response equipment By NOWPAP MERRAC information System

Current status of transportation of HNS by ships and ship-based HNS spill incidents in the Russian part of the NOWPAP region

Dr. Natalia Kutaeva

Head of Maritime Environment Protection Division
State Marine Pollution Control, Salvage & Rescue Administration (SMPCSA)

The report on “Current status of transportation of HNS by ships and ship-based HNS spill incidents in the Russian part of the NOWPAP region” gives information on the maritime transportation of HNS in the Russian part of NOWPAP area and its potential risk on the marine environment. In general HNS are transported in a package form and only coal and ferrosilicium are transported by bulk. The main shipping routes for the HNS transport are between Russian Far-Eastern ports and the ports of China and Korea. The HNS pollution prevention measures from ships are based on international obligations as well as relevant national laws and regulation related to HNS pollution prevention from ships.

◆ *Profile of the presenter*

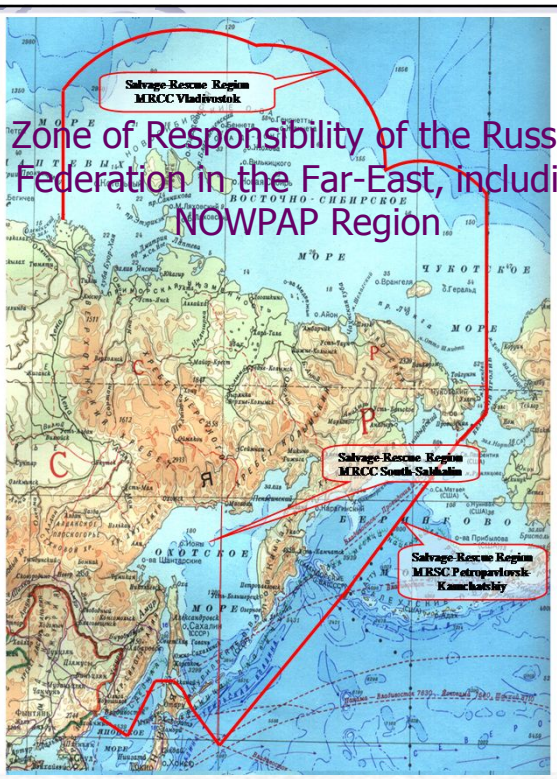
Natalia Kutaeva has more than 30 years of professional experience as an environment specialist in environment management among which she worked 20 years for marine environment pollution prevention from shipping and oil spill contingency planning and response. She worked at the State Marine Pollution Control, Salvage & Rescue Administration of the Russian Federation (SMPCSA) since 1993 and her current position is Head of the Maritime Environment Pollution Protection Division. She has a wide range of experience in the matters related to the international co-operation on marine environment protection and oil spill planning such as the activities of the IMO MEPC, Baltic Marine Environment Protection Commission (HELCOM), the Black Sea Protection Commission and the Arctic Council. She has been involved in the NOWPAP MERRAC activities for last decade and has been nominated as Focal Point of the Russian Federation since 2011.

STATE MARINE POLLUTION CONTROL, SALVAGE & RESCUE ADMINISTRATION OF THE RUSSIAN FEDERATION (SMPCSA OF RUSSIA)

Current status of transportation of HNS by ships and ship-source HNS spill incidents in the Russian part of the NOWPAP region

MERRAC Expert Meeting,Qingdao,
15-17 October 2013

Zone of Responsibility of the Russian Federation in the Far-East, including NOWPAP Region



MERRAC Expert Meeting,Qingdao,
15-17 October 2013

Main Russian Ports in the NOWPAP Region

Transportation of HNS by ships Vladivostok

Chemicals	Quantity of carried chemicals, 2012
Class 2.1: cooled oxygen (UN1073), hydrogen technical (UN1049) ology Sodium cyanide (class 6.6, UN 1686)	65 (20 'containers)
Class 2.3: propane (UN1978), hydrogen compressed (UN 1449)	136 (20 'containers) 9 (20 'containers)
Class 3.2: methanol (UN 1230) enamel (UN1263)	98 (20 'containers) 82 (20 'containers)
Class 4.1: lump sulfur (UN 1350) caprolaktam (UN 1325)	314330 th tn 7165 (20'containers)
Class 4.2: fish meal (UN1374) zinc dust (UN 1436) charcoal (UN1361) coal (UN 1362)	7 (20 'containers) 11500 th tn 1 (20 'containers) 1543042 th tn
Class 4.3: ferrosilicium (UN 1408) calcium hydroxide (UN1404) calcium carbide (UN1402)	555028 th tn (in bulk) 25 (20 'containers) 1 (20 'containers)
Class 5.1: ammonium nitrate (UN1942)	200 (20' containers)
Class 6.1: sodium cyanide (UN1689)	12 (20 'containers)
Class 8.2: sodium hydroxide (UN1823)	24 (20 'containers)
Class 8: nitric acid (UN 2031)	4 (20 'containers)

Transportation of HNS by ships
Vostozhny

Chemicals	Quantity of carried chemicals, 2012
In bulk, th tn	
Class 5.1, UN 1942 (ammonia nitrate)	2011 – 91607
Class 4.2, UN 1362 (coal)	21817
Container (20 'container), units	
Class 1	4452
Class 2	277
Class 3	20
Class 4	224
Class 5	977
Class 6	320
Class 7	430
Class 8	45
Class 9	2179

Port calls – Russian ports in the Far-Earth region , ports of China

Transportation of HNS by ships
Nakhodka

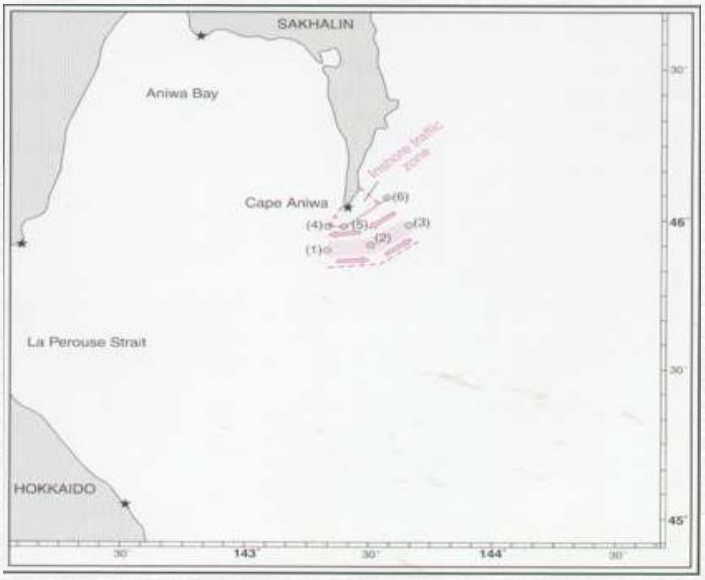
Chemicals	Quantity of carried chemicals, 2012
Class 4, UN 1362 (coals)	1.3317 th tn

Port calls – Russian ports in the Far-Earth region

Scheme of Tankers Route and dangerous area

MERRAC Expert Meeting,Qingdao,
15-17 October 2013

Traffic routes of all vessels in the Aniva Bay



MERRAC Expert Meeting,Qingdao,
15-17 October 2013

Traffic routes on the approaches to the port of Korsakov

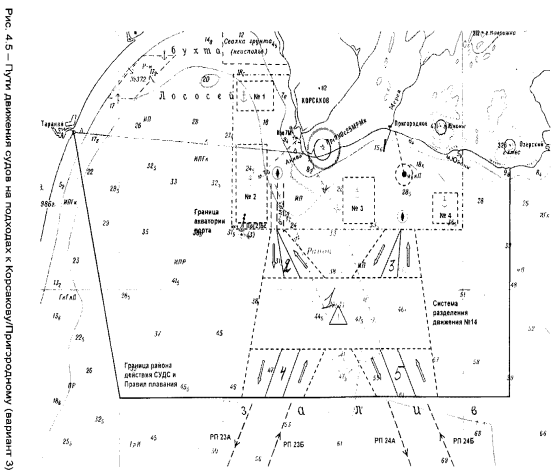
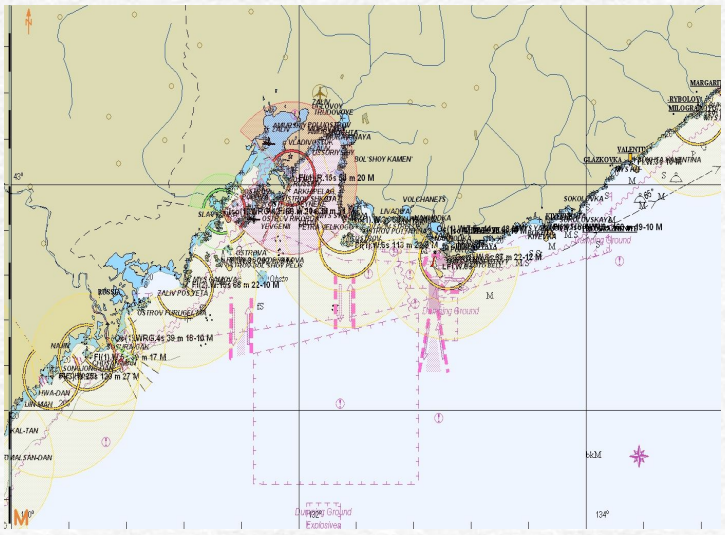


Рис. 4.5 – Пути движения судов на подходах к Корсакову/Приэродному (вариант 3)

26

MERRAC Expert Meeting,Qingdao,
15-17 October 2013

Traffic routes of all vessels entering and departing to the port of Vladivostok



MERRAC Expert Meeting,Qingdao,
15-17 October 2013

International obligation

- MARPOL Convention
  - – Shipboard marine pollution emergency plan for Noxious Liquid Substances
  - International Pollution Prevention Certificate for the carriage of noxious liquid substances in bulk
- HNS Convention
  - insurance or other financial security of liability (the guarantee of a bank or other credit organization)

International obligation

- HNS Convention – 20 March 2000

The Russian Federation, in accordance with paragraph 1 of Article 5 of the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996, declares that this Convention does not apply to ships:

- which do not exceed 200 gross tonnage; and
- which carry hazardous and noxious substances in packaged forms only; and
- whilst engaged on voyages between ports or facilities of the Russian Federation."

National legal and institutional frameworks on HNS pollution prevention from ships

FEDERAL LAW

- About continental shelf of the Russian Federation № 187- FS, 1995
- "About the exclusive economic zone of the Russian Federation" № 191-FS
- About internal marine waters, territorial sea and adjoined zone of the Russian Federation. № 155-FS , 1998
- About environment protection № 7-FS, 2002
- About industrial safety of dangerous manufacturing objects. № 116-FS, 1997
- Merchant shipping code of the Russian Federation, No. 81-FS, 1999
- On sea ports of the Russian Federation and on changing particular legal acts of the Russian Federation, No. 261-FS, 2007

DECREE OF THE GOVERNMENT OF THE RUSSIAN FEDERATION

- About adopting the Regulations about the Federal Agency of Maritime and River Transport № 371, 2004, as amended № 600, 2006
- About the declaration of safety of industrial objects of the Russian Federation. № 675, 1995
- About a unified state system of prevention and combating emergency situations, № 794, 2003

National legal and institutional frameworks on HNS pollution prevention from ships

- Bylaws of the sea ports are developed according to

- Federal law of November 8, 2007 No. 261-ФЗ «On sea ports of the Russian Federation and on changing particular legal acts of the Russian Federation»,
- Federal law of April 30, 1999 No. 81-ФЗ «Merchant shipping code of the Russian Federation»,
- order of Ministry of Transport of Russia of August 20, 2009 No. 140 «On estimation of general rules for ships navigation and anchorage at the sea ports of the Russian Federation and approaches to them» (registered by Ministry of Justice of Russia on September 24, 2009, registration No. 14863) with changes made by order of Ministry of Transport of Russia of March 22, 2010 No. 69 (registered by Ministry of Justice of Russia on April 29 2010, registration No. 17054) .

National legal and institutional frameworks on preparedness and response for chemical incident at sea area

Instructions on the order of transmission of announcements about marine environment pollution. 1999.

Registered by the Ministry of Justice №598 from 14.06.94

1.2. The instruction establishes the general procedure of the message transmitting, stipulated by the laws of the Russian Federation, as well as by the international agreements of the Russian Federation on oil discharge or possible oil or other hazardous substances discharge into the sea from vessels and other objects.

1.3. Regulations of this Instruction are compulsory for persons supervising work on artificial islands and structures, operated or created within the limits of territorial sea or economic zone of the Russian Federation.

2.1. Messages about marine pollution should be transmitted in cases of:

- Incident with a vessel or other object, resulted in or may result in oil and other hazardous substances discharge ;
- Detection of oil and other hazardous substances spill from vessel (irrespective of flag) or other objects in violation of applicable international or National rules;
- Detection in sea of oil or other hazardous substances spill.

Thank you for your attention

Session 2

Response methods of HNS spill incidents in the NOWPAP region

Chair : Mr. Chunchang ZHANG

Speaker

- Prof. Qingfeng XU
  Functional resins with high efficient oil- adsorption and their application in waste-water disposal
- Mr. Ichiharu TANAKA
  Response methods of HNS spill incidents in Japan
- Mr. Jae-Hoon JEE
  Technical review on chemical recovery vessels
- Mr. Sergei PAK
  Response methods of HNS spill incidents in Russia

Functional Resins with High Efficient Oil-Adsorption and Their Application in Wastewater Disposal

Prof. Qingfeng Xu

Professor

Soochow University

Oil-absorbing resin is a porous sponge-like absorbing composite material made of polymer materials. Till now, there's no good method to deal with the oil or toxic organic matter accident in the whole world. Our group took 20 years to study this problem and recently succeeded in synthesis of one polymer absorbent sheet. This product can float on the water and has a less specific gravity, high adsorption capacity (5-15 times its own weight) and fast adsorption rate (absorb at one contact). Besides absorbing oil and heavy oil, our product can also absorb various types of toxic and refractory organic substances fast and efficiently. In addition to high adsorption capacity and speed, our product has a favorable oil-holding capacity and can firmly lock the absorbed organic pollutants and oils to prevent pollutants from expelling, which is generally caused by extrusion. Furthermore, our product has an outstanding adsorptive selectivity in water system (selectivity absorbs oil and organic substances) overcoming common oil-absorbing sheets' shortcomings. And most important of all, this product can also be recycled after the adsorption. Oil-absorbing polymer sheets can repeatedly be used for about 100 times.

◆ *Profile of the presenter*

Education

- PhD, Organic Chemistry, Soochow University, China

Biography

Qingfeng Xu obtained her PhD degree from Soochow University in 2004 with a major in functional materials and their applications. From 2011, she has been appointed as a full-time professor in Soochow University and is currently working as a core member of New Materials Group of Soochow University which is leading an important research project on new oil adsorption technology for waste water.

She had also acted as a project leader for the National Nature Science Foundations and a major project on environmental protection of Jiangsu Province.

UNTO A FULL GROWN MAN

Oct. 15th / 2013 NOWPAP MERRAC EXPERT MEETING

Functional Resins with High Efficient Oil- adsorption and Their Application in Wastewater Disposal (oil spill)

Qing-Feng Xu

Soochow University，Suzhou，China

蘇州大學 SOOCHOW UNIVERSITY

Outline

1. Background
2. Research progress
3. Application cases
4. Conclusion

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1 Research Background

Pollution are making our environment (including water, air and soil) worse.

Toxic organic pollutants — **Our focus**

Heavy metal ions

Eutrophication

Oil spill

Toxic organic pollutants in water are dangerous for livings.

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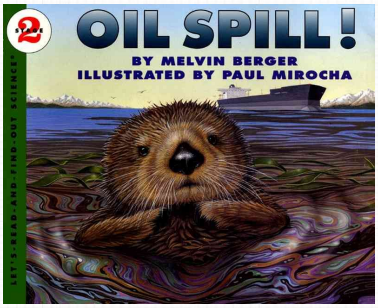
How to removal oil and other organic pollutants from water?

Source of oil: daily seaborne and Oil spill,



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Commonly used methods

Oil dispersant → Secondary pollution

Oil water separating equipment → inefficient

Oil adsorbent mat → low adsorption capacity

Is there any method to removal oil from water surface quickly and efficiently? NO

Find new solution

adsorption techniques by using adsorbent resin is promising.

Advantages of synthetic resins
- High adsorption capacity
- Rational design for different utility

Shortcomings of previous synthetic resins
- Slow adsorption speed
- Expensive
- Hard to be recycled

Challenges of adsorbent resins Applied in Oil spill and Oil-film Disposal

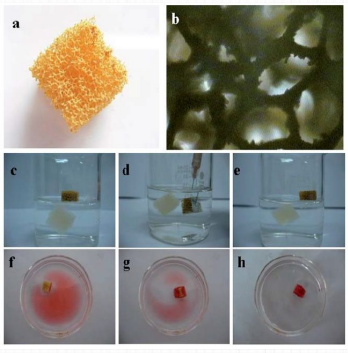
(1) Usually , particles of resins is hard to be processed;

(2) The adsorption speed should be improved.

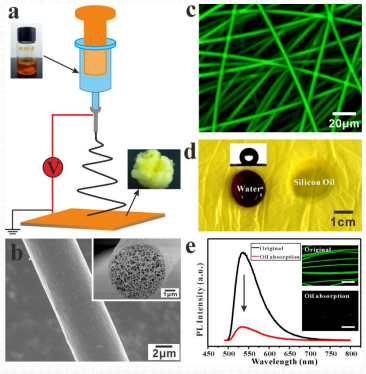
(3) How to recycle the oil and reuse the resins?

Recent progress in superhydrophobic microporous polymers for oil separation and adsorption

The reported adsorption capacities reached to 90 g oil/g resin.

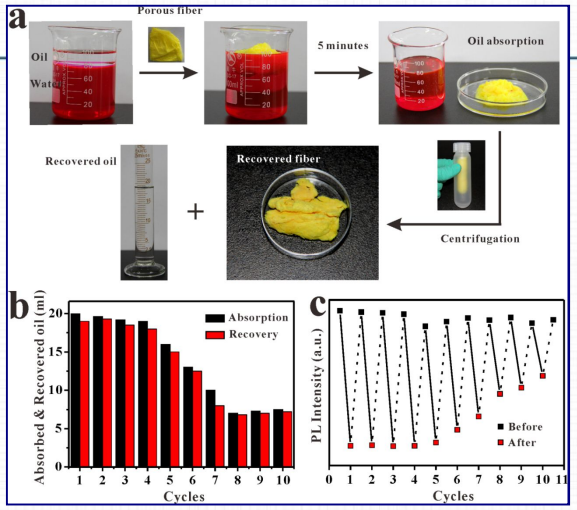


A. Li, W. Q Deng et al, Energy Environ. Sci., 2011, 4, 2062–2065



Porous Polystyrene nanofibers prepared in our lab

Superhydrophobicity and microporosity is important to improve the adsorption speed.



Problem：reversible use is difficult

2 Research Progress in our group

(1) Synthesis of resins

(2) Advantages of resins

(3) Commercialization

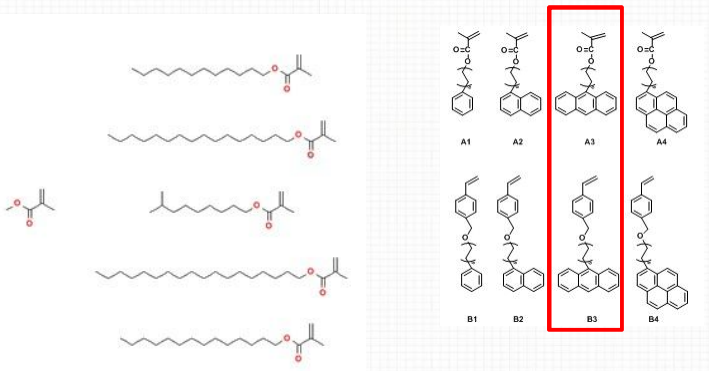
(1) Synthesis of resins

Problems need to be solved:

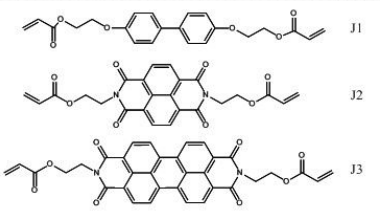
- **High adsorption speed and capacity;**
- **Easy desorption and reusable.**
- **Variable products for different utilities.**

(a) Monomer---key of the adsorption speed

Several hundred monomers were applied in the past three decades considering their different properties

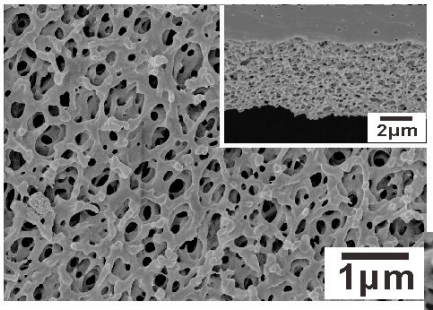


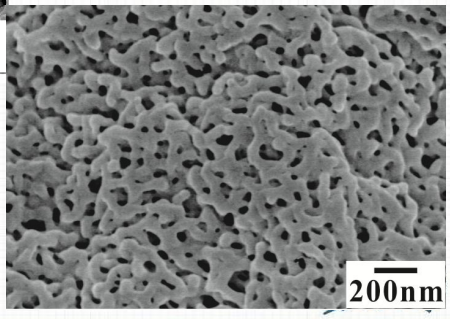
(b) cross-linkers --- adjustor of the network



Cross-linker makes the network more flexible and ensure the mechanical strength of resin

(c) pore making agent





Tune the pore size according to the requirements.

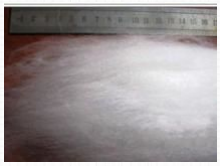
(d) Preparation processing

- Suspension polymerization for particles;
- Spinning for fiber;
- Grafting polymerization for sponge.

(e) Products for oil disposal

Adsorption particles

Adsorption fibers



→ **Oil film**

Adsorption sponges

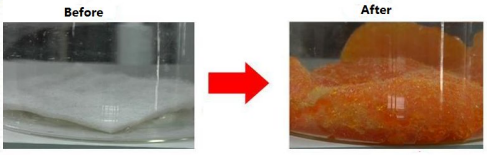
→ **Oil spill**

(2) Advantages of products

(a) Fast adsorption speed

The usual adsorption mat

(b) Adsorbing various organics with high absorption capacity

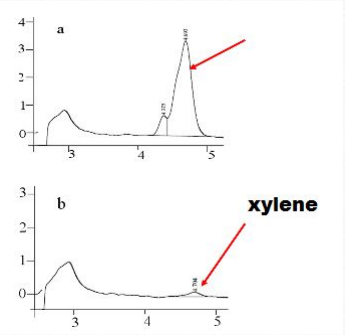


Organics	Capacity (g/g resin)
Benzene and derivatives	13-15
Chloroform and derivatives	15-30
ester	12-15
Oil (gasoline etc)	15-20
Rude oil	20-30

(c) High selectivity of adsorption

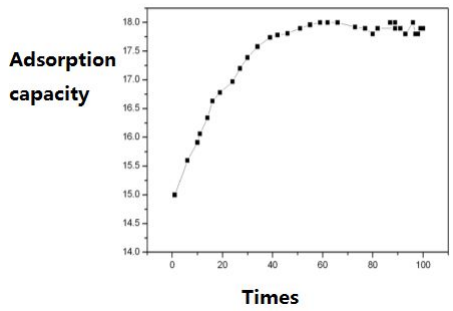
Water and organics

Glucose and xylene



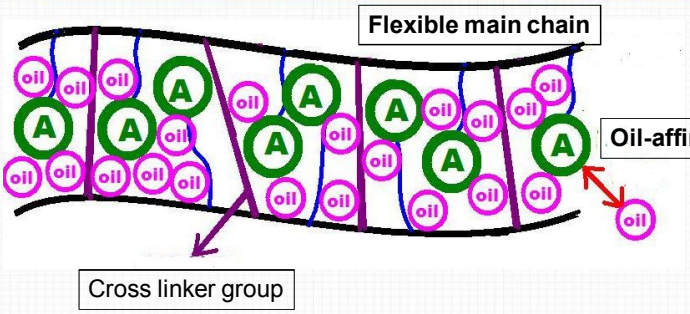
HPLC result

(d) reuse



Oil-saturated resins can be reused after simple regeneration.

Possible mechanism



$$Q^{5/3} \cong [i/2 \bullet V_u S^{1/2})^2 + (1/2 - X_1)/V_1]/(V_e/V_0)$$

- We have published 33 Chinese patents and 1 US patent.

(3) commercialization

From 2009, the resin has been commercialized. Now the production reaches to 250,000m^2/year

3 Application cases of resin products

Oil spill-1, **July 2010，Dalian, China**

Our products

Oil sorbent mat

Oil spill(2)

Jiangsu, April 2010

adsorption equipment

Chemical pollutants (HNS)

A traffic accident in Suzhou at Dec. 22, 2010.

Xylene poured into the river

Traffic accident results into chemicals spill in Xuzhou (Jiangsu) in 2012.

Extended works

Treatment of organic solvents from industrial exhaust

ethyl acetate---volatile organic solvent

Adsorption Resin for copper(II) removal

For electroplating factory wastewater

蘇州大學

SOOCHOW UNIVERSITY

Professor Lu Jian-Mei and her group

蘇州大學

SOOCHOW UNIVERSITY

Prof. Lu Jian-Mei

Research focus:

Study of novel absorbent resins and applied in Waste water disposal.

Electronic Memory device based on organic materials

Email: lujm@suda.edu.cn

Prof. Lu is the vice president of Soochow University. She had an experience in design and synthesis of functional resins almost 30 years.

Other group members

Prof. Xu Qing-Feng

Prof. Ge Jian-Feng

A/P Li Hua

A/P Li Na-Jun

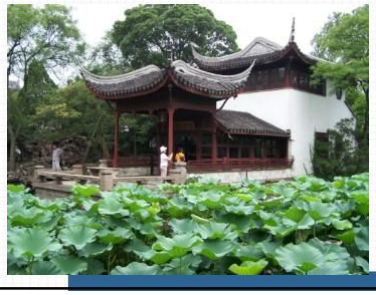
Dr. Chen Dong-Yun

A/P Wang Li-Hua

4 Conclusion

1. A series of adsorption resins were synthesized. Their different applications in oil spill and other wastewater treatment were discussed.
2. Using these adsorption materials and equipment, the pollutants can be recollected for avoiding environment pollution and reused with simple purified.
3. Due to the reversible use of resins, the cost was decreased obviously.
4. Our functional materials and equipment hope to become a new method to oil or HNS disposal.

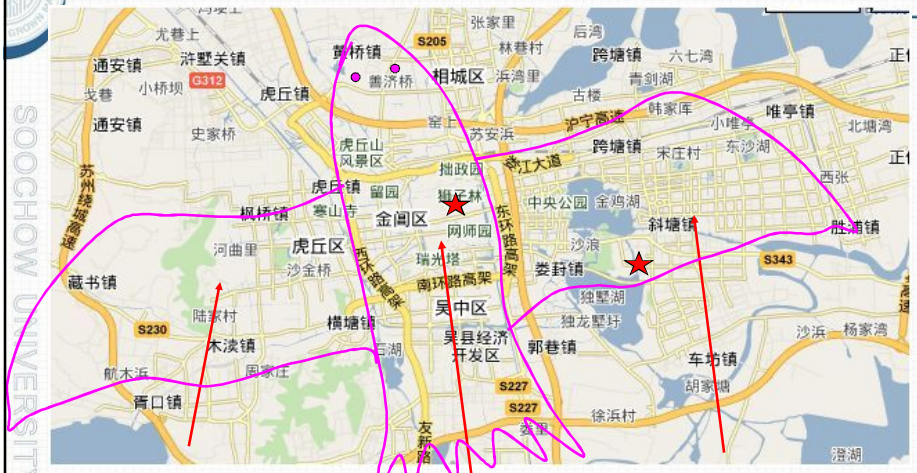
City view of Suzhou



Located in **Suzhou**, an ancient city with a history of 2500 years, popularly called "**the Paradise on Earth**".

Suzhou is one of the key cities in the Yangtze River Delta, the most prosperous region in China. It is a renowned cultural, historic and tourist city.

36



Suzhou High-Tech Developing Area

Original City Area

China-Singapore Suzhou Industrial Park

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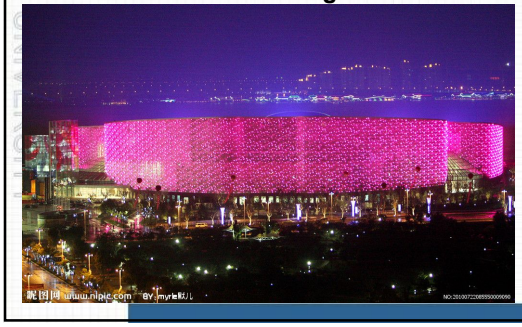
Suzhou has a history of 2500 years.
The Old gardens and Modern City in Suzhou.



Centennial Tradition

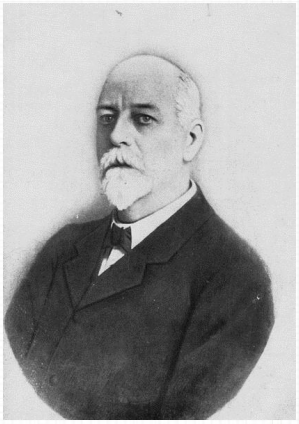
Soochow University

Founded in 1900, Soochow University is a comprehensive University of Jiangsu Province .

SOOCHOW UNIVERSITY

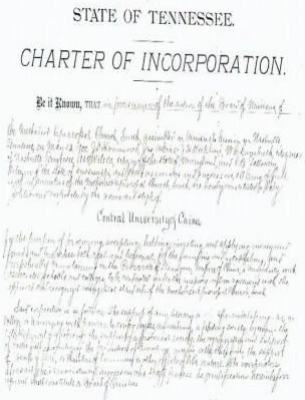
Centennial Tradition

The first University of western style in China



D. L. Anderson（孙乐文博士）

First President of Soochow University



STATE OF TENNESSEE.

CHARTER OF INCORPORATION.

Registration file of Soochow University in the state of Tennessee, USA

SOOCHOW UNIVERSITY

40

Today's Soochow University

- *A university with 113 years history*
- *A key comprehensive provincial university in Jiangsu Province*
- *One of China's top 100 universities under the "Project 211" and "2011"*

蘇州大學

41

Thank you for your attention!

SOOCHOW UNIVERSITY

Response methods of HNS spill incidents in Japan

Mr. Ichiharu Tanaka
Team Leader
Japan Coast Guard (JCG)

1. Introduction of the Operations of the National Strike Team (NST)

1.1. Organization and Duties of the NST

The NST, based in Yokohama, is staffed with 18 personnel including the chief and is comprised of four teams, each with four persons, for round-the-clock response to incidents occurring throughout Japan.

The Team's main operations fall into the basic categories of "incident response operation" and "ordinary time operation." The "incident response operation" dispatches the NST based on a request from the on-site department of the Japan Coast Guard (JCG) in case of a marine oil spill incident, the marine spillage of HNS or a fire on ship.

1.2. HNS Spill Response

In the event of a HNS spill incident, the gas detection of the spilled HNS shall be performed and a Controlled area shall be set up based on the results and operations of safety checking before proper removal activities are conducted. Once a HNS spill incident occurs the NST is first dispatched to the accident site, until the polluter makes preparation and set the removal activities, and performs the site investigations.

1.3. Ordinary Time Operation

Removal methods in accordance with the type of HNS spilled shall be established as the basis for preparation in the event of unexpected incidents, and survey and research on incident cases and training on the handling of resources and equipment shall be performed.

The NST as an actual working force trains members to maintain and improve their physical abilities. Team members shall act as instructors at workshops held across the

country, providing education on disaster prevention and also provide training for the officials of the JCG and operators of the private sectors.

All the members of the NST have been registered as the "Japan Disaster Relief Team," and accordingly they shall serve as the experts of the Japan Disaster Relief Team in case a large-scale spill incident occurs overseas. International cooperation shall be provided, including the provisions of technical guidance for oversea trainees.

2. Response to HNS Incidents

2.1. Essentials of initial response of JCG at the time of the HNS spill incidents

The NST of JCG is the special team responding to HNS incidents that occur in the Japanese sea area. The team is dispatched to the incident site at the time of the incident.

2.2. Generate flow chart for a HNS incident in accordance with the "HNS incident response manual of JCG"

2.3. Controlled area, No-go area, Movement restricted area

In determining the Controlled area, No-go area and Movement restricted area, the first priority should be safety such as prevention of secondary damage, and ensuring safety of the staffs involved in response activities.

2.4. Prediction of gas spreading

JCG uses the software "ALOHA" created by US Environmental Protection Agency (EPA) to simulate the spreading of HNS gas.

2.5. Personal Protective Equipment (PPE)

JCG has adopted the selection criteria set by Environment Agency of Canada.

2.6. Measuring equipment and detectors

The NST always maintains these equipment and detectors so that they would be ready to be used when an incident occurs.

2.7. The objectives of monitoring

Monitoring means observation or measurement conducted for the purpose of surveillance or tracking. Monitoring is also referred as continuous surveillance. It is mainly

conducted in order to understand the situation of incident site or status change, and to respond to the zoning.

2.8. Conclusion

The NST responds to maritime disasters safely, timely and quickly and carries out activities in order to protect the marine environment.

◆ *Profile of the presenter*

Education

- Graduated from Japan Coast Guard School
- Graduated from Officer Candidate Course, Japan Coast Guard Academy

Biography

Ichiharu Tanaka has joined JCG since 1986. He started his career as a rescue diver of a patrol vessel. Later he worked as a staff at Search and Rescue Division, Guard and Rescue Department, JCG. He currently belongs to the No.4 National Strike Team of the Yokohama National Strike Team Station of JCG and he has been a No.4 Team Leader since 2012. He is a qualified expert in maritime disaster prevention and works hard day and night to respond to public concerns over safety and marine environment.


National Strike Team
機動防除隊
JAPAN COAST GUARD
Oil spill incident
Hazardas and Noxious Substances incident
Maritime fire
National Strike Team
JAPAN COAST GUARD
Always Ready
1


JAPAN COAST GUARD
National Strike Team
2
NATIONAL STRIKE TEAM

April 1998: Establishment of Yokohama National Strike Team Station

April 1995: Establishment of National Strike Team (2teams, 8persons)

National Strike Team Station

Chief

- Administration Section
- National Strike Team No. 1
- National Strike Team No. 2
- National Strike Team No. 3
- National Strike Team No. 4

Each team consists of one captain, one vice-captain and two members, for a total of four persons.

3

Operation of National Strike Team

4

Incident Response

Oil-Spill Incident Response

5

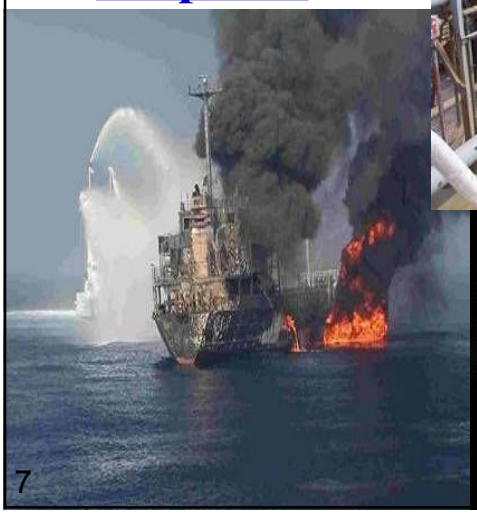
Incident Response

Hazardous and Noxious Substance Incident Response

6

Incident Response

Fire Incident Response



7

Ordinary Time Operation

Survey & Research

Training

Dispatch of Instructors to Workshops

International Cooperation

Japan Disaster Relief Team

8

Training ①

9

Training ②(HNS spill incident)

10


National Strike Team
機動防除隊
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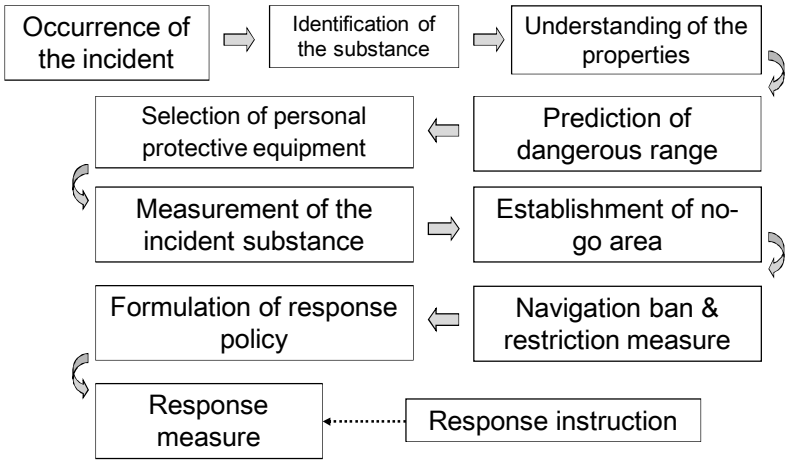
Thank you very much
for your attention
National Strike Team
JAPAN COAST GUARD
11

Flow Chart at the time of the incident



※This flow chart shows general initial activities to be conducted by the coast guard department, which is in charge of the incident site at the time of the HNS accident.

2

Controlled area

【Basic policy 】

The first priority is safety of human life such as prevention of secondary damage, and ensuring safety of the staffs involved with response work.

Alarm

Controlled area

Movement restricted area

No-go area

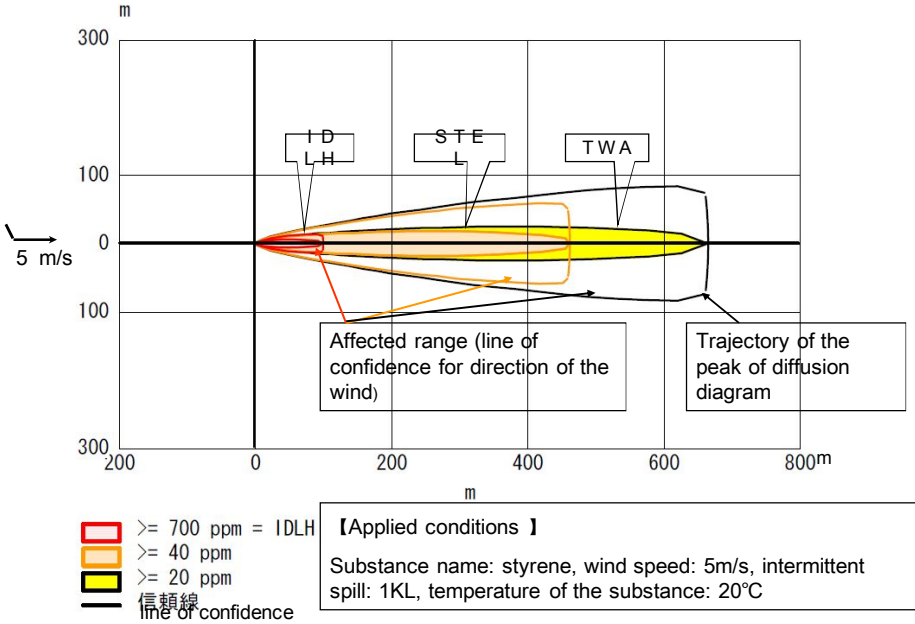
Controlled area

Controlled area = No-go area + Movement restricted area

TLV-TWA value　　TLV-STEL value

3

Prediction of gas spreading



【Applied conditions 】

Substance name: styrene, wind speed: 5m/s, intermittent spill: 1KL, temperature of the substance: 20℃

4

Personal protective equipment

Level A

Completely sealed chemical protective clothing
Self contained Breathing Apparatus (SCBA)

※ for gas and vapor. The said substance is unidentified,

Level B

Half sealed chemical protective clothing
Self contained Breathing Apparatus (SCBA)

※ for liquid

Level C

Half sealed chemical protective clothing
Full-face type of air purifying respirator

※ Gas concentration is 1% or below, Oxygen concentration is 18% or above,

Level D

Working cloth,
Protective glasses,

5

Equipment Level A

【Equipment to be used 】

- Completely sealed chemical protective clothing
- Two-way radio, auxiliaries,
- Face piece for breathing apparatus
- Self contained Breathing Apparatus (SCBA)
- Outer gloves (leather gloves)
- Inner gloves (cotton gloves)
- Chemical boats

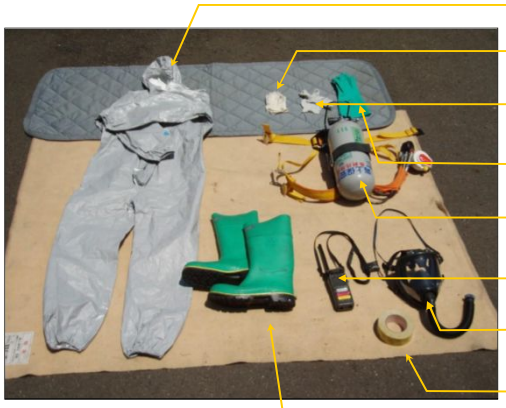
Butyl glove,

Socks boats with knee cap

6

Equipment Level B

【Equipment to be used 】



- Half sealed chemical protective clothing
- Inner gloves (cotton gloves)
- Inner gloves (rubber gloves)
- Outer gloves (chemical resistant)
- Self contained Breathing Apparatus (SCBA)
- Two-way radio
- Face piece for breathing apparatus
- Chemical tape
- Chemical boats

7

Equipment Level C

【 Equipment to be used 】

- Half sealed chemical protective clothing
- Outer glove (chemical resistant)
- Inner glove (rubber glove)
- Inner glove (cotton glove)
- Chemical tape
- Two-way radio
- Direct mounting type of gas mask
- Cartridge for gas mask
- Chemical boats

8

Selection of personal protective equipment

- Chemical resistant nature of apparatus
- Degree of pollution and oxygen concentrations of the site
- Time and details of activities at the site
- Conditions of the site
- Temperature, humidity (heat stress)

  Visibility constraints, narrow space or dark space (mental stress)

- Easiness of movement while wearing apparatus
- Weight of apparatus
- Age, degree of experiences, degree of training, of staffs

9

Measuring equipment and Detectors

Compound measuring equipment for flammable gas

Detection tube type of detector for noxious gas

Flammable gas measuring equipment for low concentrations

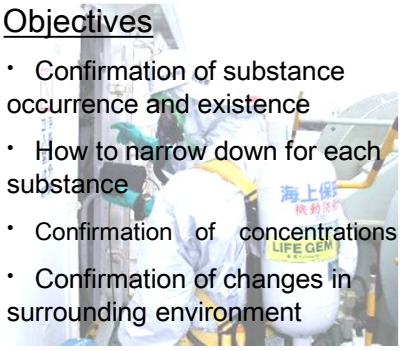
Thermal imaging equipment

10

Objectives of monitoring and what to be monitored

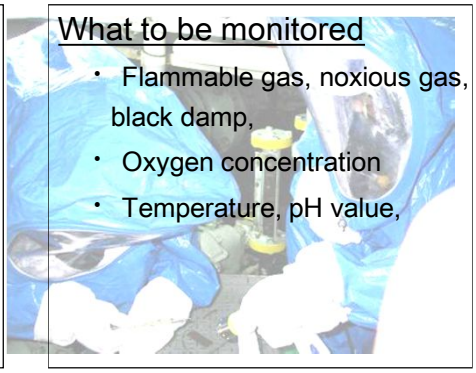
Objectives

- Confirmation of substance occurrence and existence
- How to narrow down for each substance
- Confirmation of concentrations
- Confirmation of changes in surrounding environment



What to be monitored

- Flammable gas, noxious gas, black damp,
- Oxygen concentration
- Temperature, pH value,

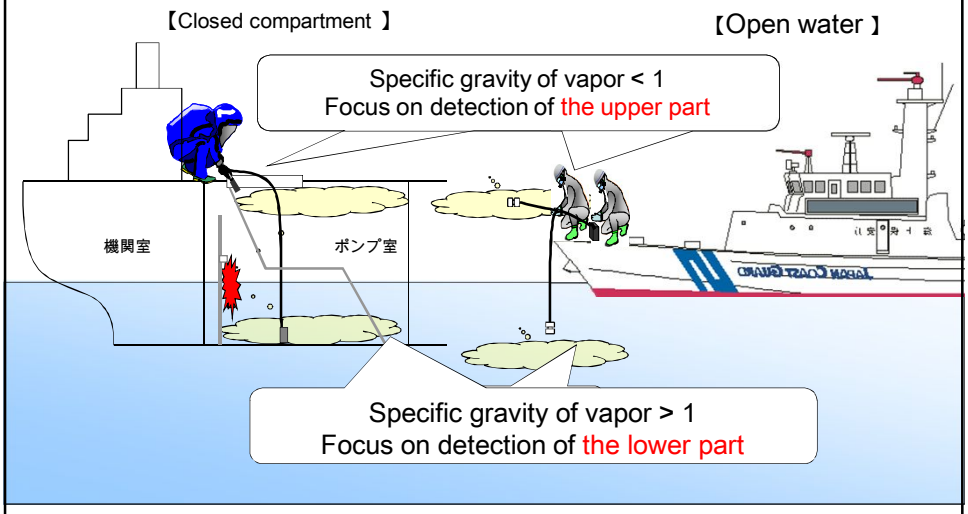


Understanding of the site conditions, Judgment on degree of danger,

Yes or No decision on implementation of activities

11

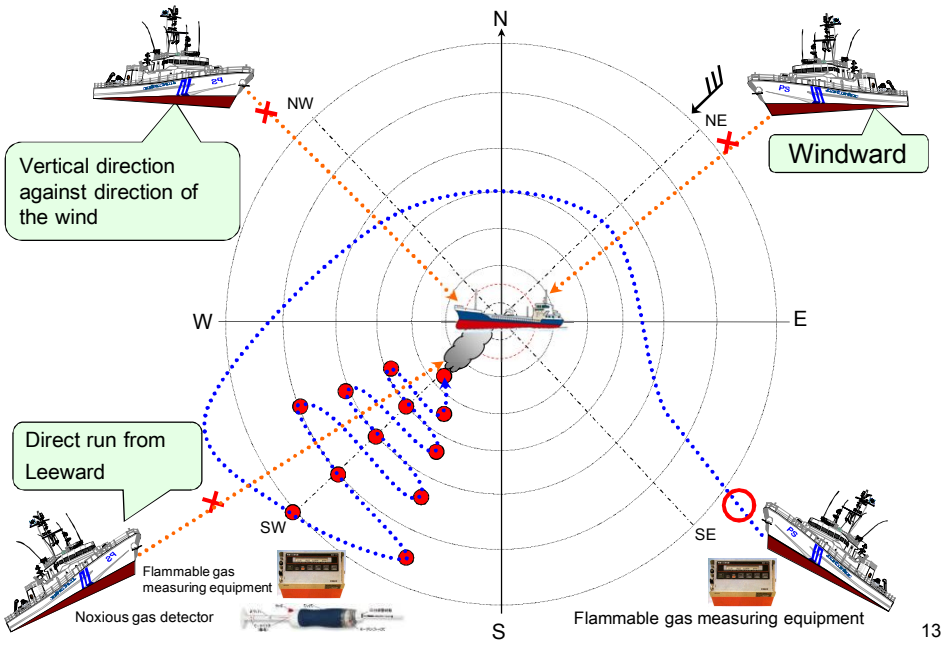
Common gas detection method



Principle of detection work is to detect at several locations at certain interval of time.

12

Example of gas detection approach on the sea



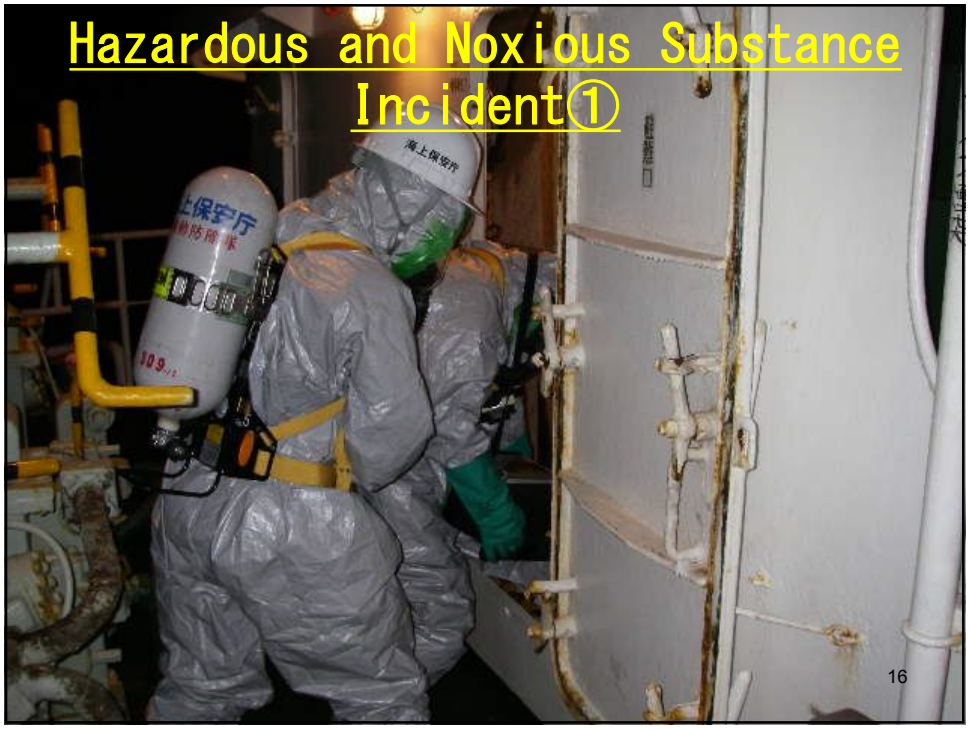
13

Common precautions for gas detection work

- Appropriate selection of measuring equipment and detectors
- Pre-inspection and adjustment of equipment, and confirmation on whether they work well or not
- Clarification of work assignments
- Strict time management
- No full reliance on previous detection results
- Clarification of evacuation criteria

14


Response to HNS Incident
Chemet
15


Hazardous and Noxious Substance Incident①
16


Hazardous and Noxious Substance Incident②
Fire at sea
17


Hazardous and Noxious Substance Incident②
Fire at sea
18


Response to HNS Incident
19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National Strike Team
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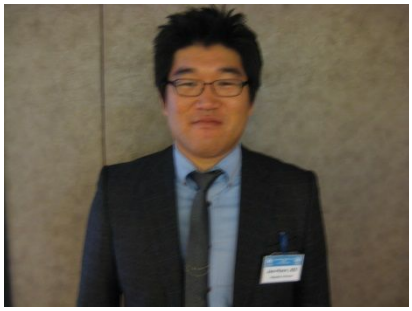
20

Technical review on chemical recovery vessels



Mr. Jaehoon Jee

Senior Surveyor

Korea Register of Shipping (KR)

Hazardous and Noxious Substances (HNS) are defined in the HNS Convention, and they are also mentioned in other conventions. Oil substances are defined in the MARPOL Annex I, Chemical and Noxious substances are defined in the MARPOL Annex II, and HNS by packaged form are defined in the IMDG Code and so on. There are more than sixty thousand substances. Most HNS are carried by bulk by ships. The IBC Code is developed to carry HNS cargoes by bulk form. Therefore, the IBC Code is made based on the technical requirement review of chemical recovery vessels.

This presentation introduces how to make policies and to manage a responding provision for HNS spill incidents in Europe. Finally, this presentation also introduces various types of chemical recovery vessels, which are made to assist in the rescue operations, provide medical assistance to the casualties, and mitigate environmental and ecological impacts caused by HNS spills. To implement the above objectives, chemical recovery vessels should satisfy all the requirements to be able to respond to the following categories of HNS - 1) fire hazard, 2) flammable or explosive hazard, 3) health hazard & toxic, 4) cryogenic/gases under pressure, and 5) corrosive hazard.

◆ *Profile of the presenter*

Jaehoon Jee obtained a bachelor degree in Marine Engineering in Korea Maritime University in 2001, after that, he worked as the 2nd Engineer of Ships in Hyundai Merchant Marine for 3 years. In 2004, he entered into a graduate school of Korea Maritime University, and 2 years later, he was awarded the master degree in Marine Engineering. At present, he works for Korean Register of Shipping, focusing on technical part of the Chemical Recovery Vessels.

NOWPAP MERRAC Expert Meeting Oct. 15~17. 2013.

Technical Review for Chemical Recovery Vessels

KOREA COAST GUARD

Index

Part 1 Background of Research

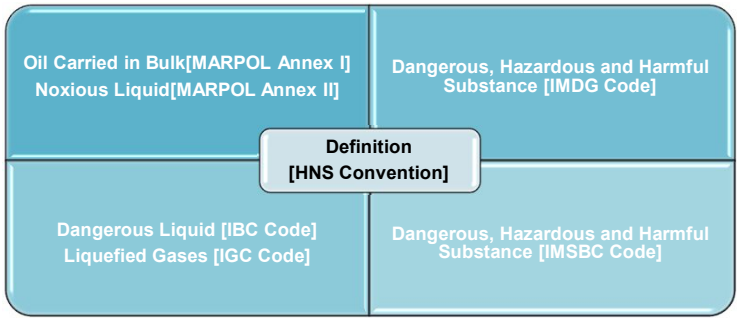
Part 2 Policy and Operational Response Capacities for EU

Part 3 General Information for Chemical Recovery Vessels

Part 4 Requirement for Chemical Recovery Vessels

Background of Research : Classification and Dangerousness of HNS

- Hazardous & Noxious Substances for the Sea
  - Affect harm to the Ship's crew and Ship's Safety, as well Marine Environmental Protecting
  - Definition on the Convention[HNS Convention]



Background of Research : Classification and Dangerousness of HNS

- IBC Code [The International Code for the Construction and Equipment of Ships Carrying Dangerous Chemical Bulk]
  - Adoption as Res.MEPC19(22) on the MEPC Committee of IMO
  - IBC Code Chapter 17 : Summary of Minimum Requirements related to Ship's Construction, Equipments and Piping to carry HNS or other chemical cargo on the Ship(Tanker)

[Summary of Minimum Requirements]

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Acetic acid	Z	S/P	3	2G	Cont	No	T1	IIA	No	R	F	A	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.19.6, 16.2.9
Acetic anhydride	Z	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	A	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.19.6
Acetochlor	X	P	2	2G	Open	No			Yes	O	No	A	No	15.19.6, 16.2.6, 16.2.9
Acetone cyanohydrin	Y	S/P	2	2G	Cont	No	T1	IIA	Yes	C	T	A	Yes	15.12, 15.13,15.17, 15.18, 15.19, 16.6.1, 16.6.2,16.6.3
Acetonitrile	Z	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	A	No	15.12, 15.19.6
Acetonitrile (Low purity grade)	Y	S/P	3	2G	Cont	No	T1	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Acid oil mixture from soyabean, corn (maize) and sunflower oil refining	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Acrylamide solution (50% or less)	Y	S/P	2	2G	Open	No			NF	C	No	No	No	15.12.3, 15.13, 15.19.6, 16.2.9, 16.6.1
Acrylic acid	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	A	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.12.4, 15.13, 15.17, 15.19,16.2.9, 16.6.1
Acrylonitrile	Y	S/P	2	2G	Cont	No	T1	IIB	No	C	FT	A	Yes	15.12, 15.13, 15.17, 15.19
Acrylonitrile-Styrene copolymer dispersion in polyether polyol	Y	P	3	2G	Open	No			Yes	O	No	AB	No	15.19.6, 16.2.6
Adiponitrile	Z	S/P	3	2G	Cont	No		IIB	Yes	R	T	A	No	16.2.9
Alachlor technical (90% or more)	X	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Alcohol (C9-C11) poly (2.5-9) ethoxylate	Y	P	3	2G	Open	No			Yes	O	No	A	No	15.19.6, 16.2.9
Alcohol (C6-C17) (secondary) poly(3-6)ethoxylates	Y	P	2	2G	Open	No			Yes	O	No	A	No	15.19.6, 16.2.9

Background of Research : Classification and Dangerousness of HNS

Symbol		Symbol	
a	Product name	h	Tank Environmental Control(Inert, Pad, Dry, Vent and No)
c	Pollution Category(X, Y, Z and OS)	i	Electrical Equipment - Temperature Classes(i') : T1~T6 - Apparatus group(i'') : IIA, IIB or IIC - Flashpoint(i''') : Yes(FP exceeding 60℃), No and NF
d	Hazards("S" : Safety Hazards "P" : Pollution Hazards	j	Gauging(O, R and C)
e	Ship Type(I, II and III)	k	Vapour detection(F, T and No)
f	Tank Type(1, 2, G and P)	l	Fire Protection
g	Tank vents(Cont. and Open)	n	Emergency Equipment

Part 1 Background of Research

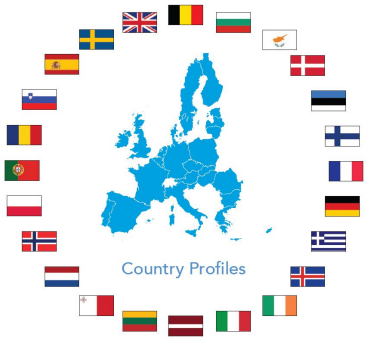
Part 2 Policy and Operational Response Capacities for EU

Part 3 General Information for Chemical Recovery Vessels

Part 4 Requirement for Chemical Recovery Vessels

Policy and Operational Response Capacities for EU

- "Inventory of EU Member States' Polices and Operational Response Capacities for Hazardous and Noxious Substances Marine Pollution 2013" prepared by EMSA
- Type of equipment commonly used in marine incidents involving HNS is not as straightforward as in oil pollution response
- There are a vast number of chemicals that could potentially be encountered in a marine HNS incident
- Since each chemical may behave in a different way once released in the marine environment, a variety of monitoring and response equipment and tools may be needed



Policy and Operational Response Capacities for EU - Finland -

❖ Monitoring Capability

- Aerial surveillance : Two surveillance aircraft with remote sensing equipment
- Vessel surveillance : Oil detection radar which might have capability to detect also other floating substances
- Devices for measuring toxic atmosphere : Gas detection systems on board vessels
- Other measuring devices(e.g. oxygen meter, pH meter, flash point meter, etc) : portable meters
- Sampling devices : Available vessels can take air and water samples, also sediment sampling
- Other devices : Sonars for location of sinkers and packaged sinkers

❖ Special Safety Equipment

- Specialized Safety Equipment, vessel and special storage devices for responding to HNS incidents
- Specialized vessels for dealing with marine incidents involving HNS
- Newest vessel has been constructed according to the chemical recovery rules

Policy and Operational Response Capacities for EU
- Finland -

[Vessels and special storage devices/storing arrangements in place for recovered HNS]

Equipment	Quantity	Characteristics	Contact point
MERIKARHU	1	Possibility of being over-pressurised for one or two hours to work with evacuation of the crew and other important tasks in the vicinity of a chemical spill. Devices for detection of CHX gases.	SYKE duty officer
TURSAS	1	Possibility of being over-pressurised for one or two hours to work with evacuation of the crew and other important tasks in the vicinity of a chemical spill. Devices for detection of CHX gases.	SYKE duty officer
UISKO	1	Possibility of being over-pressurised for one or two hours to work with evacuation of the crew and other important tasks in the vicinity of a chemical spill. Devices for detection of CHX gases.	SYKE duty officer
YAG Louhi	–	Vessel is outfitted for service in a hazardous atmosphere. Permanently installed gas detection and alarm system for the detection of flammable and toxic gases and vapours in the outside atmosphere. CO2 and O2 measurement inside the ship	–

[M/V UISKO : Chemical Recovery Vessel]

➢ SYKE : The Finish environment Institute, under the Ministry of Environment

Response capacities					
Monitoring capability	Response capability	Specialised safety equipment	Specialised response vessels	Specialised response teams	Scientific support
Yes	Yes	Yes	Yes	Yes	Yes

Policy and Operational Response Capacities for EU
- Germany -

❖ Monitoring Capability

- Vessel surveillance : ZMGS (German part of Safe Sea Net)
- HNS forecasting models : Gas clouds, some drifters
- Devices for measuring toxic atmosphere
- Other measuring devices (e.g. oxygen meter, pH meter, flash point meter)
- Sampling devices (including bottom sampling devices) : only air and water sampling devices

❖ Specialized Safety Equipment

- Four gas-protected multipurpose vessels can do sampling of air and water and in situation monitoring of the atmosphere
- Specialized vessels for dealing with marine incidents involving HNS

Policy and Operational Response Capacities for EU
- Germany -

[Vessels and special storage devices/storing arrangements in place for recovered HNS]

Equipment	Quantity	Characteristics	Contact point
Gas-protected multipurpose vessels: NEUWERK, MELLUM, SCHARHORN, ARKONA	4	They are all equipped with detection, recovery and storage devices for hazardous substances and accommodation and equipment facilities for additional strike units of 30 persons each	CCME
GSS GUSTAV MEYER and GSS BAUMRÖNNE	2	Assisting vessels with gas protection, but without recovery and storage capacity etc.	CCME

[M/V ARKONA : Chemical Recovery Vessel]

➢ CCME : The Central Command for Maritime Emergencies (CCME), under the Federal Ministry of Transport, Building and Urban Development

Response capacities					
Monitoring capability	Response capability	Specialised safety equipment	Specialised response vessels	Specialised response teams	Scientific support
Yes	Specialised	Yes	Yes	Yes	Yes

Policy and Operational Response Capacities for EU
- France -

❖ Monitoring Capability

- HNS behavior and drifting models
- Devices for measuring toxic atmosphere and other (e.g. oxygen meter, pH meter, flash point meter)
- Sampling devices (including bottom sampling devices)

❖ Specialized Safety Equipment

- Stockpiles including specific safety equipment for team in charge of operations for HNS pollution response : suits and specific equipment for intervention in toxic atmosphere, containers for leaking barrels, tools and equipment for leaking containers, etc
- Two of the four emergency high-sea tug boats chartered by the French Navy
- Capable of cross a toxic Atm. During half an hour

Response capacities					
Monitoring capability	Response capability	Specialised safety equipment	Specialised response vessels	Specialised response teams	Scientific support
Yes	Specialised	Yes	Yes	Yes	Yes

Policy and Operational Response Capacities for EU
- Spain -

❖ Monitoring Capability

- Spain does not have any specialized equipment for the monitoring of marine spills of HNS
- However, it has aerial and vessel surveillance available

❖ Specialized Safety Equipment

- Spain does not have a specialized response team for marine incidents involving HNS
- But it has four multipurpose vessels and seven tug vessels, which have pressurized bridges and gas detector systems for HNS
- Addition to above, Two of new multipurpose vessels, which have pressurized bridges and gas detector systems for HNS

Policy and Operational Response Capacities for EU
- Spain -

[Vessels and special storage devices/storing arrangements in place for recovered HNS]

Equipment	Quantity	Characteristics	Contact point
Multipurpose vessels: PUNTA MAYOR and PUNTA SALINAS	2	Bollard pull of 81 MT; Bollard pull of 98 MT; 240 m³ of storage capacity each one.	Directorate General of the Merchant Marine (DGMM)
MARIA DE MAEZTU MARIA PITA MARIA ZAMBRANO MARTA MATA SAR GAVIA SAR MASTELERO SAR MESANA	7	Bollard pull = 60 MT which have pressurised bridges and gas detector systems for HNS.	Directorate General of the Merchant Marine (DGMM)

[M/V PUNTA MAYOR : Multipurpose Vessel]

➢ DGMM : The Directorate General of the Merchant Marine(DGMM), part of the Ministry of Transport and Public Works

Response capacities					
Monitoring capability	Response capability	Specialised safety equipment	Specialised response vessels	Specialised response teams	Scientific support
Limited	Limited	No	Yes	No	Yes

Policy and Operational Response Capacities for EU
- Sweden -

❖ Monitoring Capability

- Aerial surveillance
- Devices for measuring toxic atmosphere
- Other measuring devices: one vessel is equipped with devices for measuring gases outside the ship
- Sampling devices : Sampling equipment for some HNS incidents

❖ Specialized Safety Equipment

- Safety Equipment for HNS response : protective suits, breathing apparatus, and decontamination stations on board our response vessels
- Several of the oil response vessels have an overpressure system and a special gas filter for use in hazardous atmosphere (hydrocarbons)
- The vessel KBV 003 is classified as a Chemical Recovery vessel

Policy and Operational Response Capacities for EU
- Sweden -

[Vessels and special storage devices/storing arrangements in place for recovered HNS]

Equipment	Quantity	Characteristics	Contact point
Vessel KBV 003	1	Stainless steel tanks with 250 m^3 of storage capacity	NCC Swedish Coast Guard

[M/V KBV 003 : Chemical Recovery Vessel]

➢ SCG : Competent national authority responsible for marine pollution by HNS : The Swedish Coast Guard

Response capacities					
Monitoring capability	Response capability	Specialised safety equipment	Specialised response vessels	Specialised response teams	Scientific support
Specialised	Yes	Yes	Yes	Yes	No

Policy and Operational Response Capacities for EU
- United Kingdom -

❖ Monitoring Capability

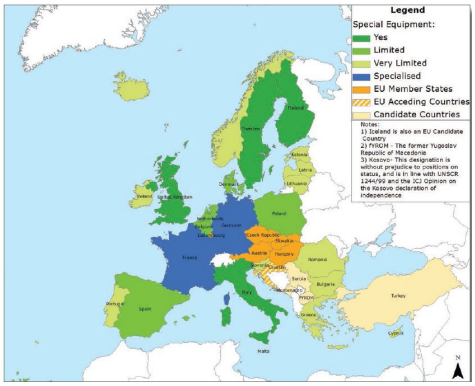
- Aerial surveillance : infrared/ultraviolet (IR/UV)
- HNS forecasting models : CHEMSIS spill model for fate and trajectory and access to ALOHA for gaseous HNS trajectory modeling
- Devices for measuring toxic atmosphere: access to contract laboratories
- Other measuring devices (e.g. oxygen meter, pH meter, flash point meter, etc): access to contract laboratories
- Sampling devices (including bottom sampling devices): Only through contract laboratories

❖ Specialized Safety Equipment

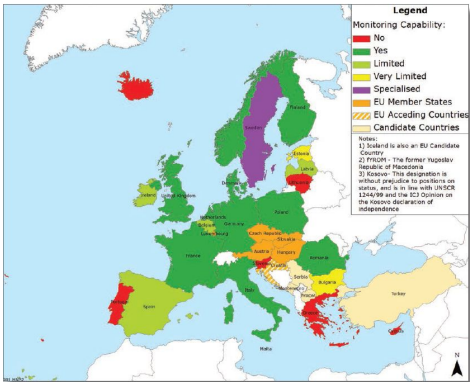
- Commercial responders maintain a range of specialist HNS response equipment
- The United Kingdom does not have any specialized vessels for dealing with marine incidents involving HNS, Response would be provided via industry, through a combination of recognized chemical hazard experts, salvage companies, and UK accredited responders

Response capacities					
Monitoring capability	Response capability	Specialised safety equipment	Specialised response vessels	Specialised response teams	Scientific support
Yes	Yes	Yes	No	Limited	Limited

Policy and Operational Response Capacities for EU



[HNS Response Capability]

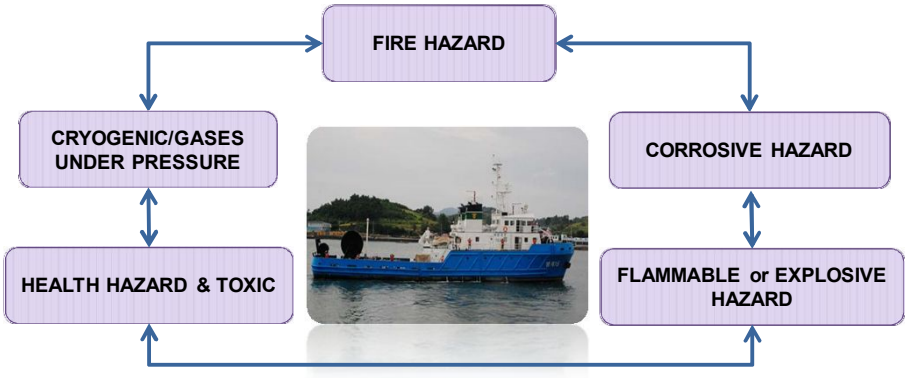


[HNS Monitoring Capability]

Part 1	Background of Research
Part 2	Policy and Operational Response Capacities for EU
Part 3	General Information for Chemical Recovery Vessels
Part 4	Requirement for Chemical Recovery Vessels

General Information of Chemical Recovery Vessels

- To assist in the saving of lives
- To provide medical assistance to casualties
- Mitigate environmental and ecological impacts
- Reduce Loss



Part 1 Background of Research

Part 2 Policy and Operational Response Capacities for EU

Part 3 General Information for Chemical Recovery Vessels

Part 4 Requirement for Chemical Recovery Vessels

Requirement for Chemical Recovery Vessels : Fire Hazard

- Goal
  - ✓ To provide self-protection for the responding vessel to prevent a fire on the casualty vessel causing an adverse effect on the responding vessel when it approaches
  - ✓ To provide equipment to allow the responding vessel to actively support fire fighting on the casualty vessel
- Self-Protection
  - ✓ All vertical superstructure and deckhouses without obscuring wheel house or monitor control station visibility
  - ✓ Water spray of at least 10liter/min/m3 of the areas being protected should be provided
  - ✓ Pumps and pipe work are to be capable of supplying the complete system during operation
- Additional Protective Equipment
  - ✓ SOLAS Reg.II-2/10.1 and FSS Code Ch.3/2.1
  - ✓ Four sets of fire fighting outfits and safety equipment should be provided to assist fire fighters or other personnel boarding the casualty vessel
    1. One self-contained air-breathing apparatus
    2. Protective clothing, boots, gloves and tight-fitting goggles
    3. Steel-cored rescue line with belt
    4. Explosion-proof lamp

Requirement for Chemical Recovery Vessels : Fire Hazard

Class Society		DNV (Reference 10)	LR (Reference 11)	GL (Reference 12)	BV (Reference 13)	ABS (Reference 14)
Criteria ↓	Term for Notation →	Fire Fighter 3	Fire-Fighting Ship 3	FF3	Fire-Fighting Ship 3	Fire Fighting Vessel 3
Number of Monitors		3/4	4	4	4	4
Capacity of each monitor		3200/2400	1800	2400	2400	2400
Number of pumps		2-4	2 (Minimum)	2-4	2	2-4
Total Pump Capacity m^3/h		9600	10,000	9600	9600	9600
Length of Throw (m)		180/150	150	150	150	150
Height of Throw (m)		110/90	70	70	70	70
Fuel oil Capacity in Hours		96	96	96	96	96
Number of Foam Monitors		2	Not Specified	2	2	2
Foam capacity of each monitor		5000 l/min	Not Specified	5000 l/min	At least 300 m^3/h	5000 l/min
Duration of supply (Min)		30	Not Specified	30	30	30
Height of throw (m)		At least 50	Not Specified	*	At least 50	50
Length of throw		*	Not Specified	At least 70	*	*

[Comparison o Fire Fighting Requirements for FiFi Class III]

Requirement for Chemical Recovery Vessels : Flammable or Explosive

- Goal
  - ✓ The goal for responding vessels when attending a casualty vessel which is, or may potentially, release a flammable and/or explosive substance, is to prevent the responding vessel from providing an ignition source
- Overview
  - ✓ Installation of Spark arresters which prevent the emission of spark which may ignite the hazardous atmosphere, EN 1834-1 : *Reciprocating internal combustion engines. Safety requirements for design and construction of engines for use in potentially explosive atmospheres. Group II engines for use in flammable gas and vapour atmospheres has guidance*
  - ✓ Installation of Flame Arrester which permit the transmission of a gas/air mixture but to prevent the passage of a flame. EN 1834-1 has guidance
  - ✓ Designs for engines and auxiliary engines to operate in hazardous environments EN1834-1 provides guidance
  - ✓ Explosion/Spark proof equipment-this is equipment particularly electrical designed to operate in an explosive environment with IEC 60079 *hazardous locations certification documents* giving guidance on the various methods available to achieve this.
  - ✓ Explosion roof manual equipment e.g. chain hoists, non-sparking hand tools etc..
  - ✓ Designs for EX/ATEX approved equipment

Requirement for Chemical Recovery Vessels : Flammable or Explosive

- Designs for Equipment operating in Explosive Atmospheres
  - ✓ "Certified as safe equipment" in that it is certified by an independent national test institution or competent body to be in accordance with a recognized standard for use in hazardous areas and in this instance explosive atmospheres.
  - ✓ Different regional requirements in classification of hazards can be seen as outlined.
    - North American NEC500-503
    - International Electro-technical Commission(IEC)
    - European Union "The Explosion Protection Regulations(ATEX)"

	Continuous Hazard	Intermittent Hazard	Hazard under abnormal conditions
This project Hazard Zones	Zone H	Zone M	Zone L
NEC500-503	Division 1	Division 1	Division 2
IEC	Zone 0 (Zone 20 dust)	Zone 1 (Zone 21 dust)	Zone 2 (Zone 22 dust)
ATEX	Category 1	Category 2	Category 3

[Comparison between NEC based divisions, IEC based zone, ATEX equipment]

Requirement for Chemical Recovery Vessels : Health Hazard & Toxic

- Goal
  - ✓ To provide and ensure a safe, toxic free atmosphere for the responding vessel crew and any additional responders transported to the incident to assist the casualty vessel.
  - ✓ To provided a safe refuge for casualties
  - ✓ To provide a means to remove contamination from responders and casualties

- Overview

Depending on the zone the vessel will be required to operate in either a full gas tight protective air pressurized citadel or a positively pressurized interior may be appropriate dependent on the level of risk from the spilt cargo and the zone of operation the responding vessel is required to enter.

  - ✓ Gas Tight Citadel

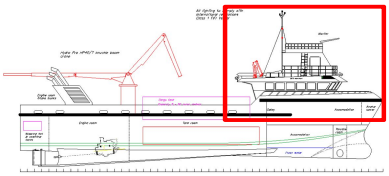
DNV	LR	GL	BV & ABS
NBC-zone(citadel) is to be able to maintain a 0.5kPa over-pressure for a 24 hour period	Pressure in the compartment is to be brought to 0.015bar and supply isolated.	NBC protection plants shall be so designed that an overpressure of 5mbar in relation to the atm. Pressure	Not Available on line
	The fall in pressure after 10min is not to be greater than 0.0013bar		

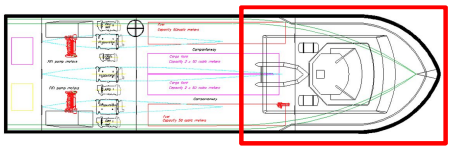
[Comparison of Citadel Requirements]

Requirement for Chemical Recovery Vessels : Health Hazard & Toxic

✓ Pressurized Accommodation / Engineering Spaces / Vessel

1. To be separated from atmosphere by gas-tight A-60 bulkhead
2. Air intakes into accommodation, engine compartments or other areas where crew may be exposed to toxic vapors or gas should be installed so that rapid and efficient gas and vapor tightening can be ensured to protect the occupants. (IBC Chapter 3.2.3)
3. The gas-free zone should be capable of maintaining a positive pressure over the external atmospheric conditions to ensure no gas or vapor can enter. Entrance and egress is to be managed by the use of airlocks.
4. A minimum overpressure of 5Pa (0.25 mbar) with respect to the adjacent hazardous space or area is provided at all points inside the space and its associated ducts at which leaks are liable to occur, all doors and windows being closed.
5. Ventilation should ensure 30-35 changes of air per hour and be temperature controlled to maintain habitability levels at a reasonable level.
6. A separate air purifying system should be provided to maintain air quality over prolonged periods.

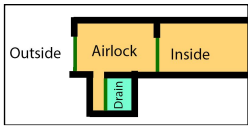




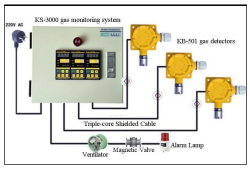
Requirement for Chemical Recovery Vessels : Health Hazard & Toxic

✓ Airlocks

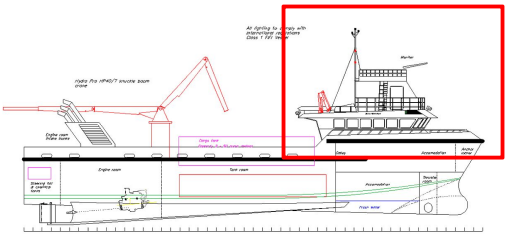
1. Airlocks should comply with The International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC) 3.6 and have two gas tight doors, sized for entry and transport of stretcher with casualty and accompanying medical personnel through the airlock and into the pressurized areas of the response vessel.
2. The doors should be self-closing and should have warning alarms to indicate when one door is open to prevent simultaneous opening compromising the gas tight boundary of the gas-safe zone.
3. Airlocks should be monitored for contamination using a gas detection system appropriate to the type of HNS contamination.
4. Airlocks should be capable of being purged with clean air to prevent contamination entering the gas-safe areas.



[Typical Air-Lock system]



[Typical Gas Detection System]



Requirement for Chemical Recovery Vessels : Cryogenic / Gases under Pressure

- Goal
  - ✓ To protect the responding vessel and its crew from any potential blast effects or high pressure discharges
  - ✓ When LNG or other substances with potential cryogenic effects are present the goal is to protect the vessel and crew from the potential effects

- Designs for Cryogenic / Gases under Pressure

Gases under pressure classified by their physical state once they are packaged and Include

- ➢ Compressed Gas
- ➢ Liquefied Gas
- ➢ Refrigerated Liquefied Gas
- ➢ Dissolved Gas

- ✓ Designs for protection from toxic/health hazard events might be applicable for cryogenic incidents, however these are unlikely to offer full protection to the responding vessel crew against cryogenic hazards
- ✓ Unless specific cryogenic protective equipment such as specialist gloves, aprons full face shields over safety glasses and the use of emergency self-contained breathing apparatus (SCBA) etc. can be provided.

Requirement for Chemical Recovery Vessels : Corrosive Hazard

- Goal
  - ✓ To provide effective decontamination of personnel or the vessel in contact with a corrosive substance

- Designs for Corrosive

Corrosive substances and mixtures fall into two categories encompassing physical and health hazards. These include ;

- ➢ Corrosive to metals
- ➢ Skin corrosion / irritation(causes severe skin burns and eye damage)

- ✓ Appropriate Personal Protective Equipment (PPE) dependent on the substance would be required to mitigate effects of skin burns and eye damage for responders leaving the security of protective areas on the vessel
- ✓ Corrosive effects of a substance can be significantly mitigated by dilution of the substance with water.
- ✓ This will reduce the severity of any effects to the vessel structure and to contact with personnel
- ✓ The response vessel will require self-protection which it is expected can be provided locally using on-board hoses to wet the decks
- ✓ Personnel can initially be treated by diluting the substance by washing it off with any subsequent treatment provided either by on-board first aid trained people or by evacuation to hospital facilities either on larger response vessels with medical facilities or by helicopter evacuation to hospitals


Thank you

Response methods of HNS spill incidents in Russia

Mr. Sergei Pak
Deputy General Director
Ecoshelf Ltd.

Oil and gas sector is the most rapidly developing industry in Russia. In the Far East Region, mineral production takes 64% of all industrial output, and this figure reaches 92% in Sakhalin region - due to rapid development of Sakhalin oil and gas projects operated by Exxon Neftegas Limited, Sakhalin Energy Investment Company, Gazprom and Rosneft. The development of those projects draws close attention for many factors; they are the first Russian continental shelf development project, with very difficult remote sub-Arctic conditions.

Those oil and gas projects boosted all related activities, including the shipments of HNS and also risk of the incidents.

HNS Cargoes may be transported in two ways: either in bulk (both liquids and solids) or in packaged form. Main shipment in bulk in the Sakhalin region is LNG and the chemicals which are used in oil and gas activities (mainly for drilling, but also completion and production-treating) are transported in packaged form.

There are some similarities and differences between oil and HNS spill response methods. Response tools including the management, command system, contingency planning and tiered approach for the oil spills can be applied to the HNS spills. But at the same time the fundamental differences such as the hazardous levels (flammability, toxicity, corrosion, etc.), fate and behavior (sink, float, evaporate, dissolve) between the oil and HNS should be considered.

<u>The Prevention methods:</u>

- Use the high-tech LNG carriers;
- Use of ice breaker is chartered 50 days / year to help the LNG carriers and oil tankers to pass during the ice freezing period;

- Use newly built supply vessels, capable of working in harsh Arctic conditions year-round, to transport HNS in packaged form;
- Make compliance with IMDG code, proper labeling and manifesting, segregation of the containers, and stowing all containers in one layer;
- Use of special containers to transport the chemicals. The containers are certified by Russian Register. Every year they receive air test and full hydrotest once in 2.5 years. Each container has designated set of slings.

Unfortunately the level of preparedness and response to HNS spills is still not able to catch up with the increased demand for chemicals. Russia does have rescue capability at sea, oil spill response and firefighting but still lacks of knowledge on the behavior of HNS spilled in water, and experience to respond to HNS spills.

Response methods are found in different papers such as ITOPF technical paper - Response to Chemical Incidents, IMO manual on Chemical Pollution, CEDRE operational guide - Containers and Packages lost at sea or Behavior of Oil and other reports related to HNS spill incidents in Arctic waters. It gives instructions such as:

- For LNG incident: Immediate reporting, initial assessment of the nature of the incident, protection of people onshore – the vessel should be removed away from the shore either by its own power or by tug boats, establishing safety zone around the vessel, monitoring of situation and making decision if the LNG can safely be back loaded to plant storage reservoir or released to open air, etc.
- If HNS in packaged form is lost – then again immediate reporting, assessment – identification of the content using ships manifests, load plan should be made. If the package is floating – attempt to recover from sea surface if safe to do so and if the package sank at sea – mark the spot and see if it is feasible to recover it from the bottom using ROV or with the divers.

Non-mechanical response methods (dispersants and in-situ burning) are not allowed without approval of governmental agencies even in case of oil spills.

It is said that: “Good planning comes from our experiences and many of those experiences were a result of bad planning”. In order for the industry to be able to promptly respond to any significant pollution event, they must work in coordination with the Government in a pre-planned, organized and unified manner.

Todays’ ground work and preparation will allow us to be able to respond in a well-planned, well equipped and unified manner in the future.

◆ *Profile of the presenter*

Education

• Mechanical Engineer, State Oil and Gas Academy named after I.M. Gubkin, Moscow, Russia

Biography

Sergei Pak began working in Ecoshelf Ltd as Oil Spill Response Specialist at shelf projects in 1998. As OSR specialist, he worked both offshore (onboard OSRV – standby for marine drilling and production platforms at Sakhalin and Chukotka shelf) and onshore (Onshore Production Facility, LNG and Oil Terminal construction site, north Sakhalin OSR base). In 2007, he was promoted to Deputy General Director position, responsible for Oil Spill response, HazMat response (onshore) and Industrial services/ Tank cleaning operations. He also participated in response to “Cristoforo Colombo” dredging vessel grounding incident in 2004, onshore pipeline oil spills in 2006 and onshore HazMat spill in 2010.

Response methods of HNS spill incidents in RUSSIA

2013 NOWPAP MERRAC Expert Meeting
15-17 October 2013
Qingdao, People's Republic of China

OPRC-HNS Protocol

HNS is defined as any substance other than oil which, if introduced into marine environment is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of sea.

Image courtesy Sakhalin Energy Investment Company

Far East Region of Russia

Mineral production

- Far East – 64% of industrial output
- Sakhalin – up to 92% of industrial output
  - 2012 oil production -14.1 mln. tonnes
  - 2012 gas production – 26.8 billion cu.m.
  - 2012 Sakhalin-2 LNG production 10.9 mln.tonnes

Shipping of HNS

- Bulk (liquids and solids) - LNG
- Packaged form – drilling activities

Shipping of HNS

Product name & use	Components	%	Product name & use	Components	%
Bactron K-95 (biocide)	Tetrakishydroxymethylphosphonium sulphate	60-90%	Cleartron ZB-172 (emulsion breaking agent Water clarifier)	Ammonium chloride	1-10%
Cortron R-2378 (corrosion inhibitor)	1,2,4-trimethylbenzene	1-10%		Distillates (petroleum), hydrotreated light	30-60%
	4-methylpentan-2-ol	1-10%		ethanediol	1-10%
	Acetic acid	1-10%	Defoamer V-158 (defoamer)	Naphthalene	1-10%
	Cumene	1-10%		Solvent naphtha (petroleum), heavy aromatic	10-30%
	Diethylamine	10-30%	Flotron M-45 (solvent)	Toluene	30-60%
	Methanol	10-30%		Solvent naphtha (petroleum), light aliph.	30-60%
	Petroleum naphtha	10-30%	Flotron M-146 (paraffin inhibitor)	Toluene	60-90%
	Toluene	10-30%		Xylene	1-10%
	Xylene	1-10%		Alkylated phenol	1-10%
Cortron KRN-301W (corrosion inhibitor)	2-butoxyethanol	1-10%		DDBSA salt	1-10%
	Ammonium thioglycolate	1-10%		Organic acid	< than 1
	Methanol	30-60%		Petroleum naphtha	< than 1
Cortron KRU-209 (oxygen scavenger)	Ammonium bisulphite	30-60%		Cumene	< than 1
				Propane -2-on	< than 1
Cortron R-2498 (corrosion inhibitor)	2-Butoxyethanol	10-30%		1,2,4 trymethyl benzol	< than 1
	Butanol bottoms	30-60%			
	Fatty acid-amine condensate	10-30%	Flexoil WM-1740 (paraffin inhibitor)	2,2 -oxybisethanol	10-30%
	Methanol	10-30%		2-ethylhexan-1-ol	30-60%
	Thioglycolic acid salt	10-30%			

Shipping of HNS

Product name & use	Components	%	Product name & use	Components	%
Emulsotron X-1329 (defoamer)	1,2,4-trimethylbenzene	10-30%	Surfatron DN-87 (cleaning substance)	1,2,4-trimethylbenzene	10-30%
	Cumene	1-10%		Cumene	1-10%
	Ethylbenzene	1-10%		DDBSA salt	30-60%
	Naphthalene	1-10%		Ethylbenzene	1-10%
	Petroleum naphtha	30-60%		Petroleum naphtha	10-30%
	Solvent naphtha (petroleum), heavy aromatic	10-30%		Propan -2-ol	1-10%
	Xylene	1-10%		Xylene	1-10%
Cortron KG-42 (corrosion inhibitor)	Amine C6	1-10%	Assure HI-41W (hydrate inhibitor)	1,2,4-trimethylbenzne	< than 1
	Fatty amide	1-10%		2-butoxyethanol	30-60%
	Fatty amide	1-10%		Betaine	< than 1
	Methanol	10-30%		Naphthalene	1-10%
	Naphthalene	1-10%		Solvent naphtha (petroleum), heavy aromatic	10-30%
	Solvent naphtha (petroleum), heavy aromatic	30-60%	55% monoethylene glycol	Monoethylene glycol De-ionized water	55% 45%
Methanol	Methanol	99-100%	80% monoethylene glycol/	Monoethylene glycol De-ionized water	80% 20%
TEG (Triethylene Glycol)	Ethanol 2,2 1,2ethanediylbis(oxy)bis Ethanol 2,2 Oxybis	95-99% 1-2.99%	Amerisite 2		
			Enviroplus 325		

Oil Spill Response vs HNS Spill Response

- Contingency planning
- Management
- 3 tiered approach
  - Tier 1 – local
  - Tier 2 – regional
  - Tier 3 – national
- Lack of experience and knowledge
- Hazards (flammability, explosivity, toxicity, reactivity, corrosivity, etc.)
- Fate and behaviour (SEBC 12 groups)

HNS Incident Prevention

State of art LNG carriers

Image courtesy Sakhalin Energy Investment Company

HNS Incident Prevention

- Ice management – ice breaker on charter 50 days/year for Prigorodnoe port

Image courtesy Sakhalin Energy Investment Company

HNS Incident Prevention

Supply vessel to carry packaged HNS cargo

- State of the art Icebreaking Platform Supply vessel
- 4 x 4320 kW = 17280 kW

Image courtesy Sakhalin Energy Investment Company

HNS Incident Prevention

- Special containers for chemicals (300 and 500 gallons)
  - Certified by Russian Register
  - 1 / year – air test
  - 1 / 2.5 years – complete hydrotest
  - Designated set of slings

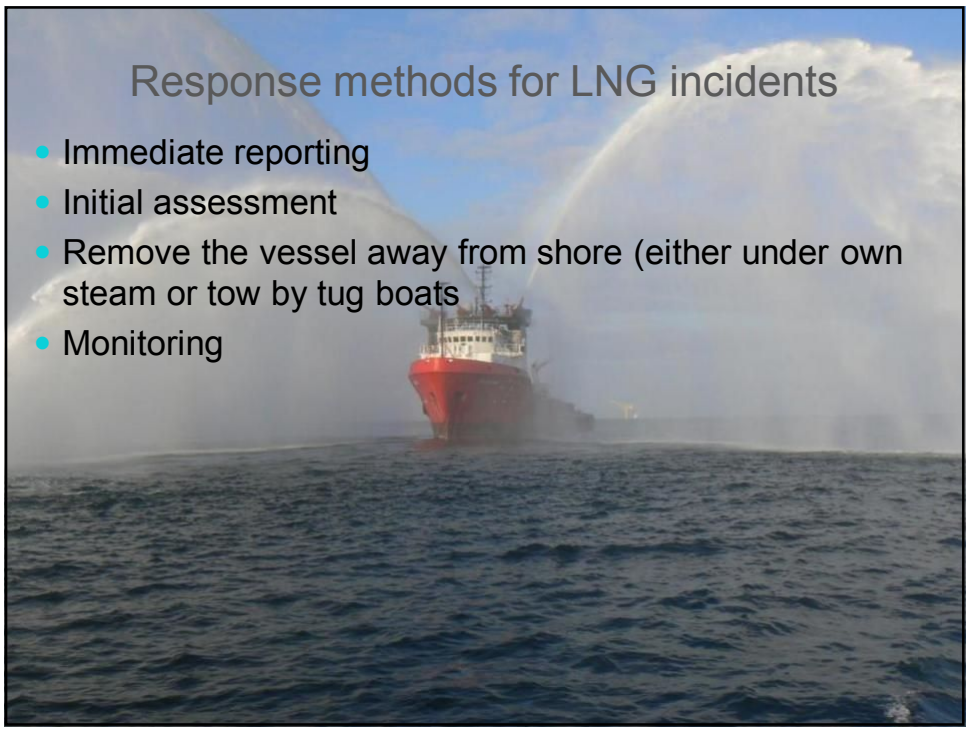
In spite of prevention… Accidents Do Happen

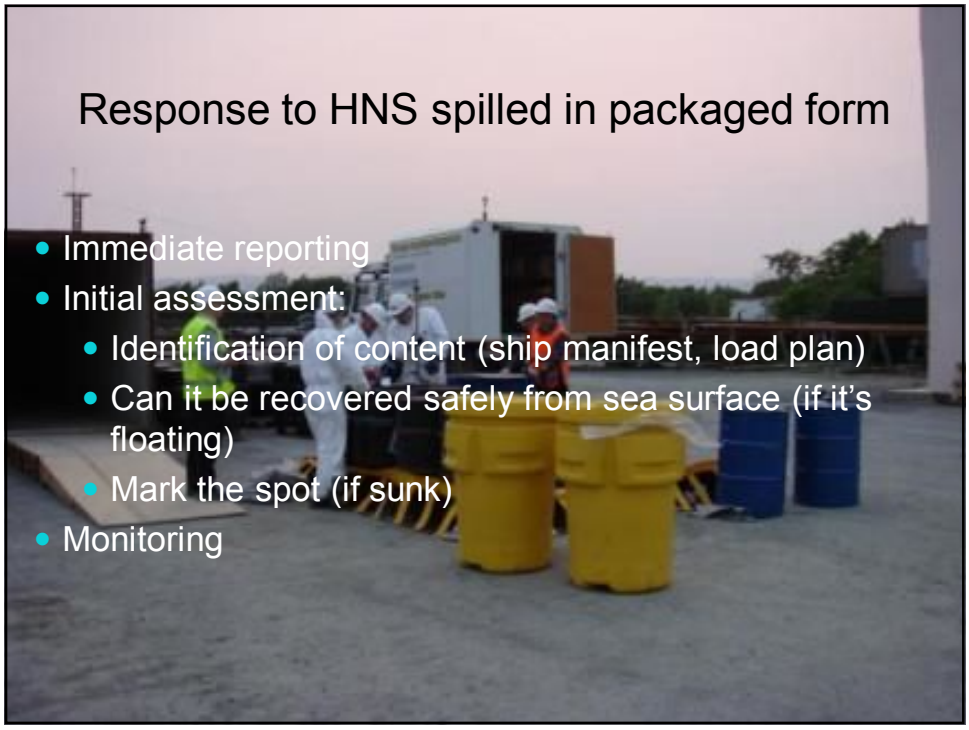
- "Strategy of social and economic development of Far East and Baikal region for period up to 2025" – Sakhalin shelf development is Center of oil and gas production on FE RF
  - Rosneft / ExxonMobil – LNG plant by 2018 (Sakhalin) 5 mln. ton capacity.
  - Gazprom – LNG plant (Vladivostok) 15 mln. ton total capacity. 1st train by 2018 – 5 mln.t.
  - Sakhalin 1 project – new platform Arkutun Dagi (gravity base installed, topside

Response methods for LNG incidents

- Dedicated vessels:
  - Tug boats x 4
  - Standby OSR vessel x 1
- Supply vessel:
  - IBSV x 4
- Other companies vessels:
  - IBSV x 3
- SMPCSA

Image courtesy Sakhalin Energy Investment Company


Response methods for LNG incidents
Immediate reporting
Initial assessment
Remove the vessel away from shore (either under own steam or tow by tug boats
Monitoring

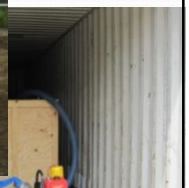

Response to HNS spilled in packaged form
Immediate reporting
Initial assessment:
Identification of content (ship manifest, load plan)
Can it be recovered safely from sea surface (if it's floating)
Mark the spot (if sunk)
Monitoring

Response to HNS spilled in packaged form

- In-situ burning and dispersant
  - Not approved in Russia
  - Equipment exist in OSR stockpiles

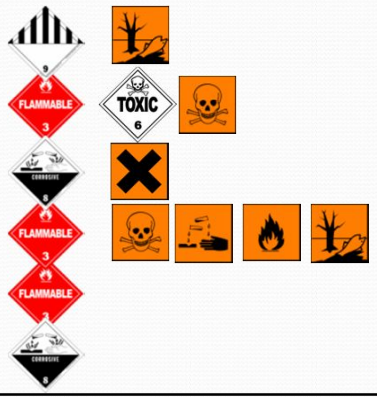
Response to HNS Spilled in packaged form (onshore)

- July 29, 2010 – request to respond on chemical leak
  - 2 x 40' container on flatbed trucks
  - 9 x 1 cu.m. IBC tote in each 40'
  - Product – Assure HI-41W (hydrate Inhibitor)
- HAZMAT truck and crew dispatched
- 5 (3+2) IBC totes were found damaged – product transferred
- Container cleaned by universal sorbents



Response to HNS Spilled in packaged form (onshore)

- 10 more trucks on road – all stopped, Hazmat truck with personnel to escort to base for inspection
  - 12 x 40' container total
  - 106 x 1 cu.m. IBC tote total
  - 6 different products:
    - Assure HI-41W (Hydrate Inhibitor)
    - Cortron KRN-310W (Corrosion Inhibitor)
    - Cortron KRU-209 (Oxygen Scavenger)
    - Cortron R-2378 (Corrosion Inhibitor)
    - Emulsotron X-1162 (Emulsion Breaker)
    - Enviroplus 325 (Corrosion Inhibitor)



Response to HNS Spilled in packaged form (onshore)

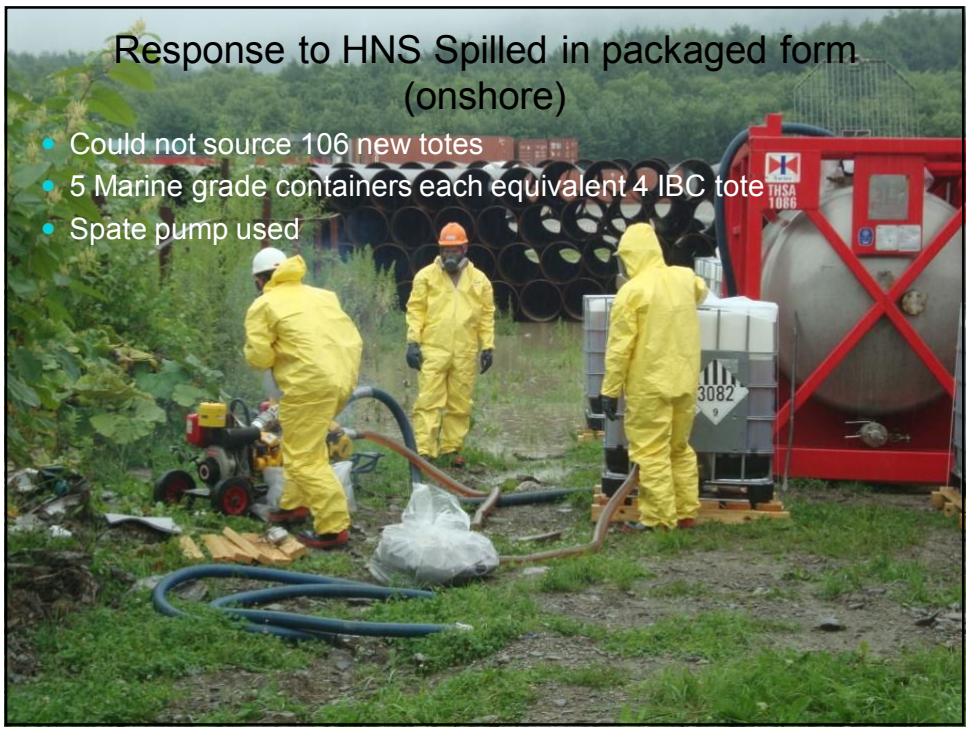
- Root cause:
  - Ship these deck loaded containers of chemical had been transported on had suffered an engine failure and was held in a "Mexico" port for repairs for nearly month. Daytime temperatures were in excess of 30 deg Celsius – interior temperature in containers – more.
- Leakage:
  - Top fill caps leaked due to overpressure
  - Blown gaskets due to overpressure
  - Heavy leakage due to no O-ring in the top cap (apparent loading error)
  - Vaccuum when cooled – tote corner cracking
  - Bottom valve seal leakage


Response to HNS Spilled in packaged form (onshore)
All 106 totes were inspected
Decision made to transfer products to new totes


Response to HNS Spilled in packaged form (onshore)
Gravity transfer
Spate pump used for Assure HI41-W only – failed for other chemicals. Had to replace:
4 sets (4 pcs in set) of priming annulus
3 sets (2 pcs in set) of actuator valves
1 actuator seal
1 suction port plate - corroded

Response to HNS Spilled in packaged form (onshore)

- Could not source 106 new totes
- 5 Marine grade containers each equivalent 4 IBC tote
- Spate pump used



Summary

- Contingency planning
  - Information on types and quantity of HNS
  - Risk assessment
  - Response tactics for specific product
- Equipment purchasing to complement existing OSR stockpiles
- Extensive specific training and exercises


Thank you

Session 3

Prevention and preparedness of HNS spill incidents in the NOWPAP region

Chair : Mr. Chunchang ZHANG

Speaker

- Mr. Xuan CHEN
  HNS spill response procedures and key techniques at sea
- Mr. Ryohei YAMASAKI
  Prevention and preparedness of HNS spill incidents in Japan
- Mr. Jong-Wook CHOI
  Korean preparedness and response system for HNS spill
- Mr. Andrey BRYKSIN
  Activities of State Marine Pollution Control, Salvage & Rescue Administration of the Russian Federation

HNS Spill Response Disposal Procedures and Key Techniques

Prof. Xuan Chen

Professor

China Academy of Transportation Science (CATS)

China carried researches on HNS Spill Response Disposal Procedures and Key Techniques at sea. According to the characteristics of HNS spills and HNS spill response disposal principles, response disposal procedures are analyzed and the issue of personnel safety is taken into consideration, especially in the key steps of analysis & decision of the procedures. Key response disposal techniques have been developed and the followings are five of them which were introduced:

1. Response Level Grading Standard

A comprehensive and accurate Response Level Grading Standard is necessary. We set up eight indicators for response level grading and pay particular attention to the indicator - water pollution. A Response Level Grading Standard was developed, in which HNS with different toxicity have different grading standard on spill quantity.

2. Classification Disposal Method

HNS are divided into five categories, namely, gas, evaporator, floater, dissolver and sinker. And each category has its own individual disposal method different from others.

3. Emergency Decision Support

For the decision-making, emergency decision support system is very helpful. The system should have the following functions: Incident forecasting, Inquiry and management of environmental resources and emergency resources, management of emergency plans and cases, help developing employment plan of emergency resources, and so on. We are trying to develop a system called, "Ship Pollution Incidents Emergency Decision Support System Based on WEBGIS".

4. Monitoring and Removal of Sinker

Ever since the Gulf of Mexico oil spill, the monitoring and removal techniques for sunken oil received a lot of attention from the public. Through comparative analysis, it has been discovered some techniques used for sunken oil can also be applied for HNS.

5. HNS Spill Emergency Response Disposal Technical Manual

For quick inquiry and decision-making, we have compiled a manual, which includes the five parts: user guide, basic theory, emergency procedures, disposal technique and the Appendix. In order to make quick assessment, we also established a number of databases.

◆ *Profile of the presenter*

Education

• Bachelor in Maritime Administration, Dalian Maritime University, Dalian, China

• Master in Shipping Pollution Prevention and Dangerous Cargo Transportation, Dalian Maritime University, Dalian, China

Biography

Xuan Chen, senior engineer, works in China Academy of Transportation Science in charge of water transport research department. He has long been engaged in the research on ship pollution risk management and ship pollution emergency response techniques. He also designed a number of marine pollution emergency equipment libraries. In recent years, he completed several research projects on HNS emergency management and compiled HNS Spill Emergency Response Disposal Technical Manual.

HNS Spill Response Disposal Procedures and Key Techniques

China Academy of Transportation Science

Octomber,2013

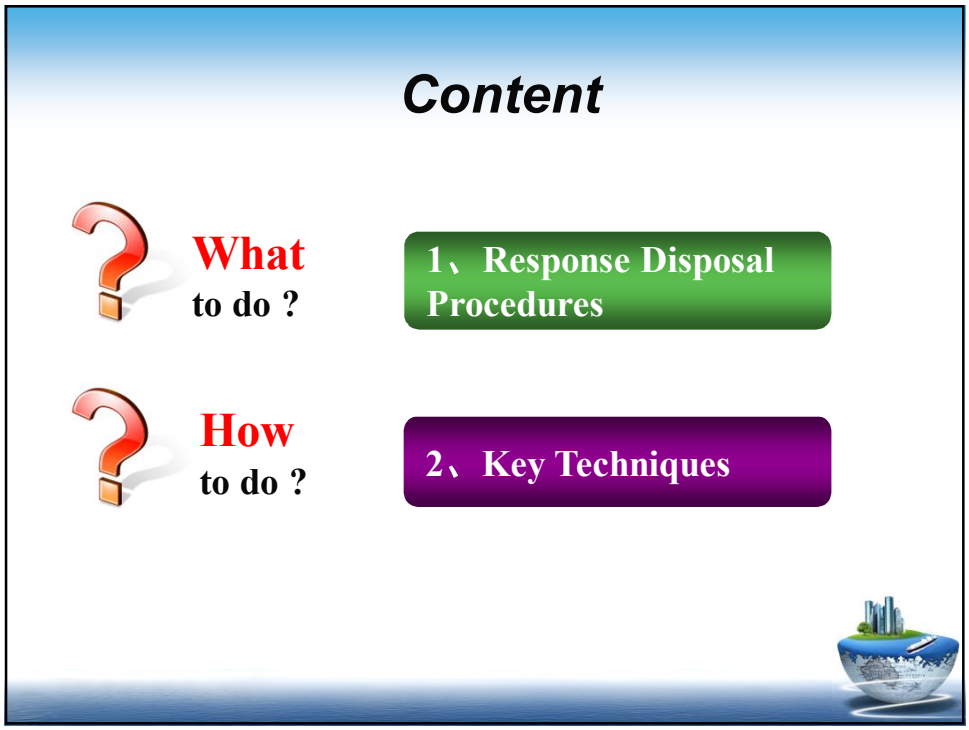
❖In 2012, there are more than 200 kinds, 82 million tons of liquid HNS in bulk transported at China coast.

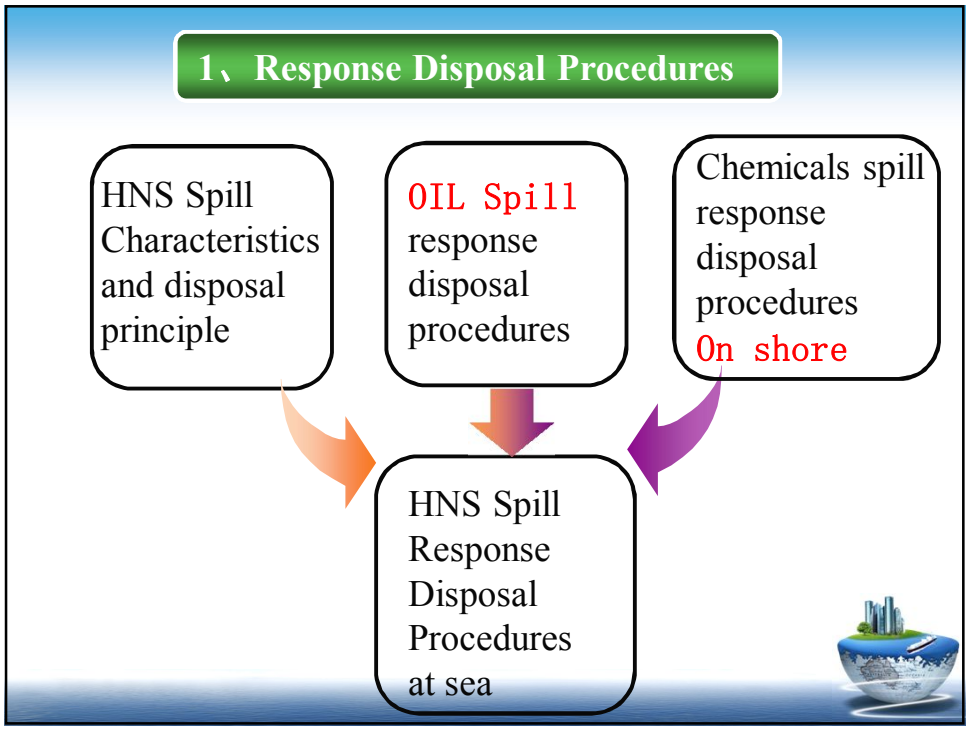
❖The HNS ship incidents frequently occurred.

❖2001，Shanghai, “Da Yong” ship spilled 700 tons styrene.

❖2012，“KENOS ATHENA” sank loaded with sulfuric acid。

❖What should we do when HNS spill occurs at sea?


Content
What
to do ?
1、Response Disposal Procedures
How
to do ?
2、Key Techniques


1、Response Disposal Procedures
HNS Spill Characteristics and disposal principle
OIL Spill response disposal procedures
Chemicals spill response disposal procedures On shore
HNS Spill Response Disposal Procedures at sea

Characteristics of HNS Spill

HNS spill VS **OIL spill**

- Wide variety and complex characteristics
- Diverse behavior after spill: evaporate, float, dissolve, sinking……

→ Classification disposal Rapid Response

- Colorless
- Endanger personal safety

→ Personal protection Throughout monitoring

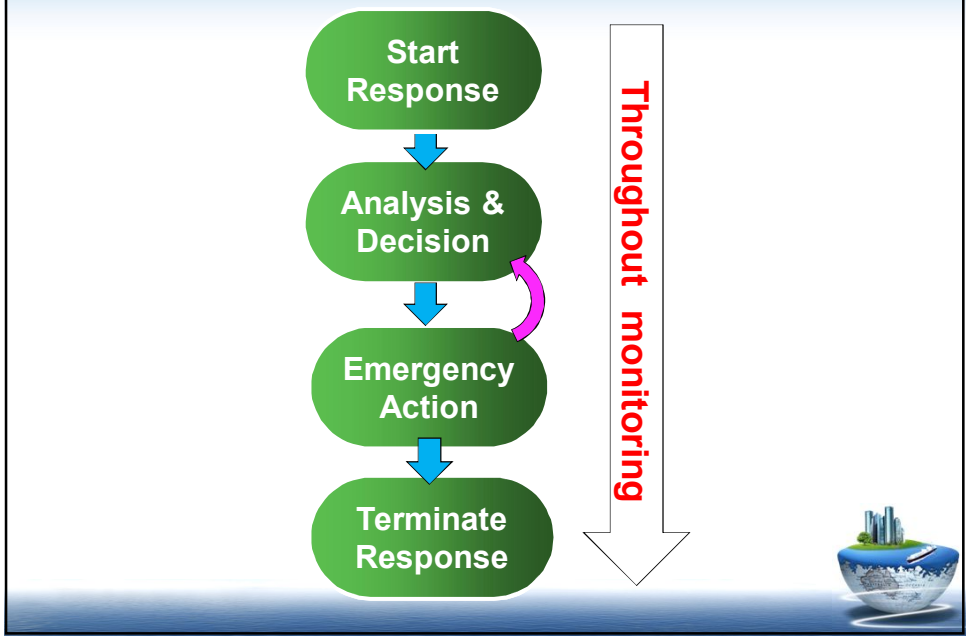
- Severe toxicity and pollution

→ Consider various factors when determining response level

HNS Spill Response Disposal Principles

- Safety first
- Rapid Response
- The source control
- Classification disposal
- Throughout monitoring
- Professional personnel
- Suitable equipment

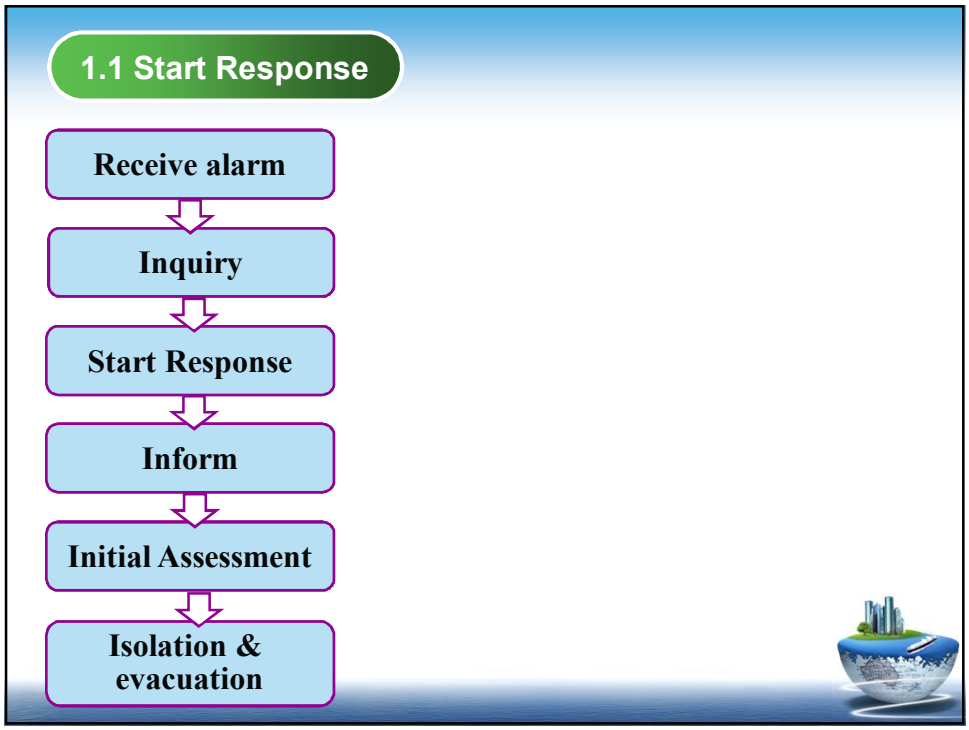
HNS Spill Response Disposal Procedures

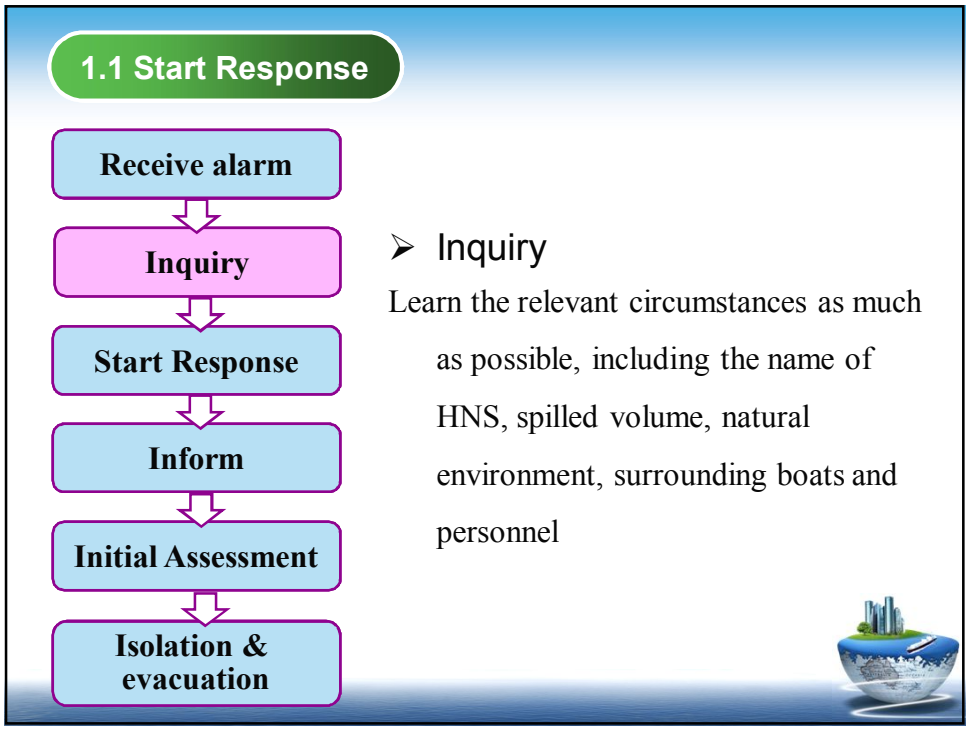


1.1 Start Response

Task:

- ➢Confirm the situation
- ➢Response quickly and exactly
- ➢Take initial action to avoid more casualties losses


1.1 Start Response
Receive alarm
Inquiry
Start Response
Inform
Initial Assessment
Isolation & evacuation


1.1 Start Response
Receive alarm
Inquiry
Start Response
Inform
Initial Assessment
Isolation & evacuation
➢ Inquiry
Learn the relevant circumstances as much as possible, including the name of HNS, spilled volume, natural environment, surrounding boats and personnel

1.1 Start Response

- Receive alarm
- Inquiry
- Start Response
- Inform
- Initial Assessment
- Isolation & evacuation

➢ Initial Assessment

- ◆ Analysis the nature and classification of the spilled HNS
- ◆ preliminary forecast on the incident
- ◆ Preliminary division on danger zone
- ◆ Determine the personnel protection level

1.2 Analysis & Decision

- Information gathering
- Analysis & Assessment
- Decision

1.2 Analysis & Decision

Information gathering

Analysis & Assessment

Decision

- Location and concentration information of HNS through detecting
- Surrounding personnel and ships
- environmental resources
- emergency resources
- ……

1.2 Analysis & Decision

Information gathering

Analysis & Assessment

Decision

- Simulate and forecast on the incident
- Analyze appropriate disposal techniques
- Assess whether there are sufficient and suitable emergency resources

1.2 Analysis & Decision

Information gathering

Analysis & Assessment

Decision

1） make decisions

➢**Further action?**

➢Improve the response level ?

➢Terminate response?

2） develop Response Disposal plan

➢Confirm the quantity of emergency resources

➢Determine Response Disposal techniques

➢Determine deployment plan of emergency resources

1.3 Emergency Action

Deployment of emergency resources

Spill source control

Contaminant removal

Reassessment

Classification disposal

1.2 Analysis & Decision

1.4 Terminate Response

Pollutants' harmless treatment

↓

Decontamination

↓

damage assessment

↓

Determine the final incident level

How to do ?

2、Key Techniques

2、Key Techniques

2.1 Response Level Grading Standard

2.2 Classification Disposal Method

2.3 Emergency Decision Support

2.4 Monitoring and Removal of Sinker

2.5 《HNS Spill Emergency Response Disposal Technical Manual》

2.1 Response Level Grading Standard

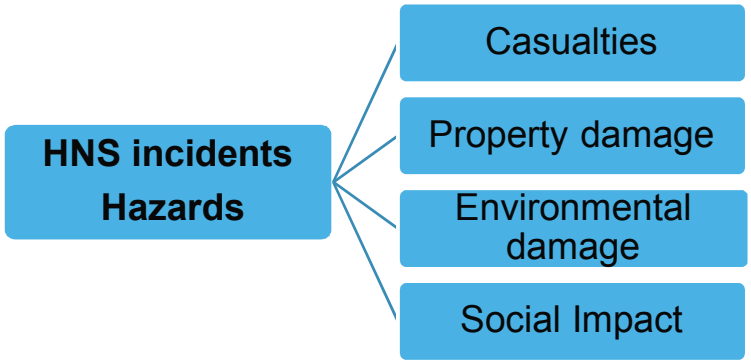
When starting response, a **comprehensive** and **accurate** **Response Level Grading Standard** is necessary.

Response level Grading

↑ too high → Waste of resources.

↓ too low → Response may be not effective.

2.1 Response Level Grading Standard



Response Level Grading Indicator

Category	Indicator
Casualties	Deaths / number of life-threatening
	Injuries number (including poisoning)
	Evacuate persons number
Property damage	Direct economic losses
Safety risk	The possibility of occurrence of fire and explosion
Social Impact	Social Impact
Environmental damage	Pollution sensitive resources
	Water pollution

Water Pollution Grading Standard

Different hazard character → **Different grading standard on spill quantity**

- Hazard Character select: **Toxicity**

Analogy with standard of oil spill

- Toxicity grading standard: **The Revised GESAMP hazard evaluation procedure**

Water Pollution Grading Standard

Response Level = f (Spill quantity, Acute toxicity)

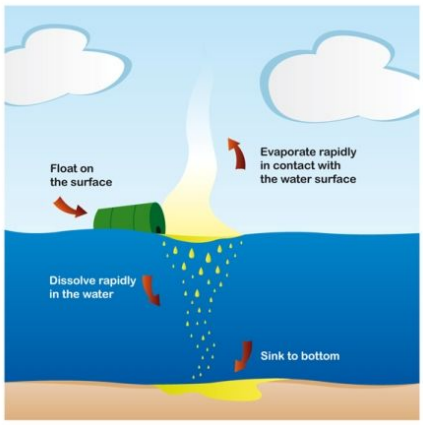
The Revised GESAMP hazard evaluation procedure		Aquatic Toxicity level grading criteria (Spill quantity: ton)				
level	Acute toxicity	Emergency response level				Calculation method
	LC/EC/IC$_{50}$ (mg/l)	I	II	III	IV	
0	>1000					10 times
1	>100-≤1000					5 times
2	>10-≤100					2 times
3	>1-≤10	≥1000	≥500	≥100	<100	oil, reference value
4	>0.1-≤1					1/2
5	>0.01-≤0.1					1/5
6	<0.01					1/10

Acrylic acid

2.2 Classification Disposal Method

❖HNS classification

Gas	Water-insoluble gas (G)
	(GD)
Evaporator	Evaporated substances (E)
	(ED)
Floater	Floating (F)
	(FE)
	(FED)
	(FD)
Dissolver	Dissolved substances (D)
	(DE)
Sinker	Sunk substances (S)
	(SD)



Disposal Measures——Evaporator

Monitoring gas concentrations

↓

Set hazardous areas

↓

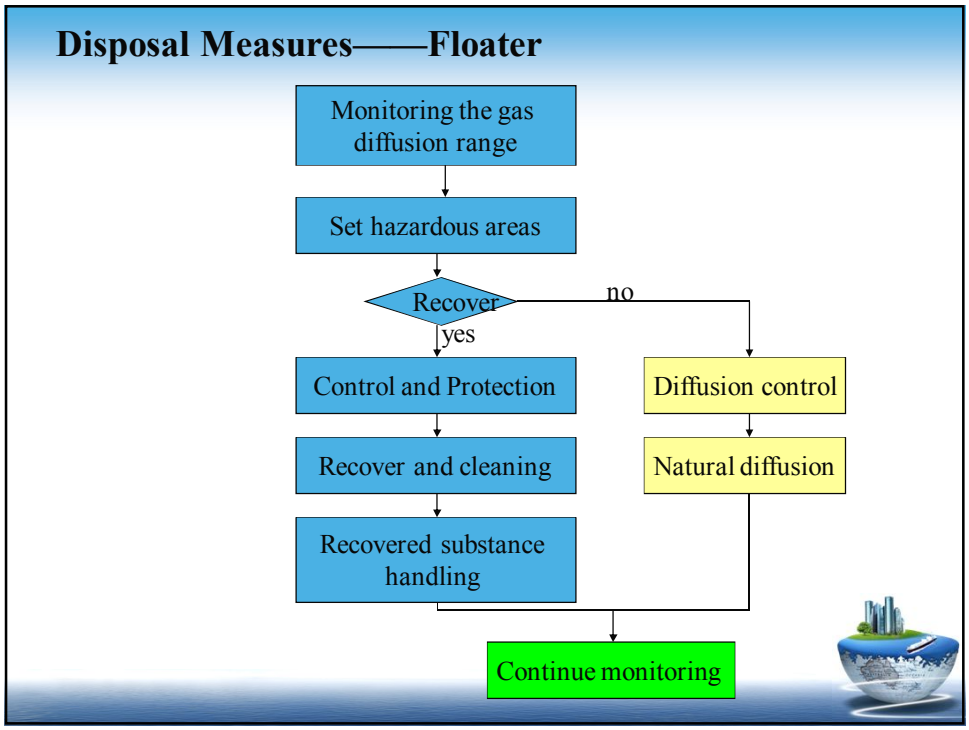
Fire,explosion and poisoning prevention

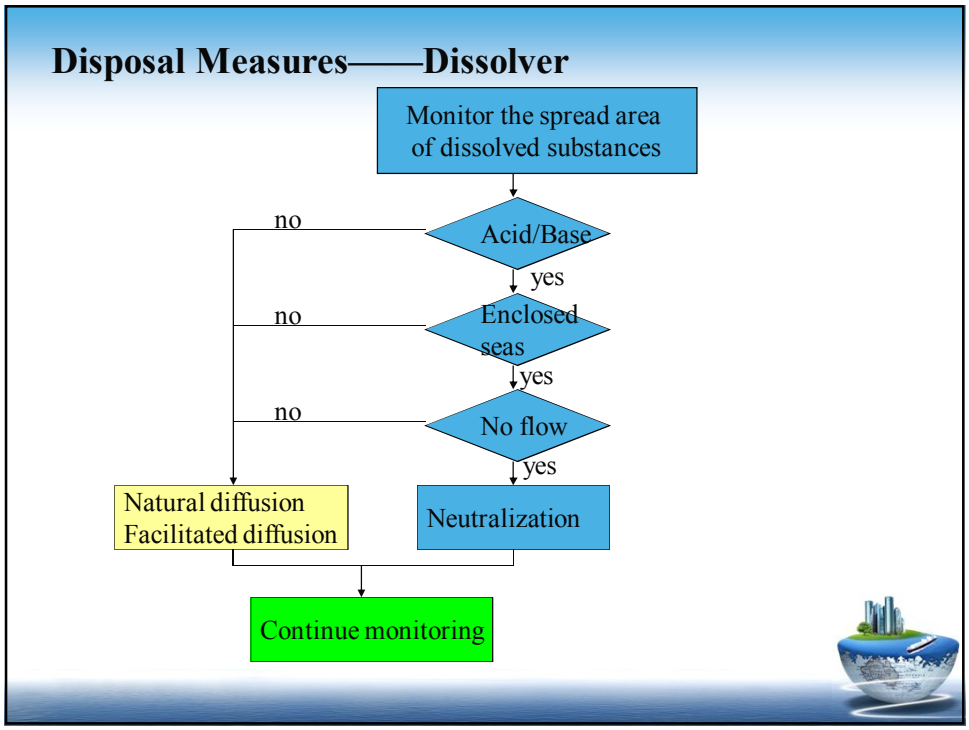
↓

Natural diffusion

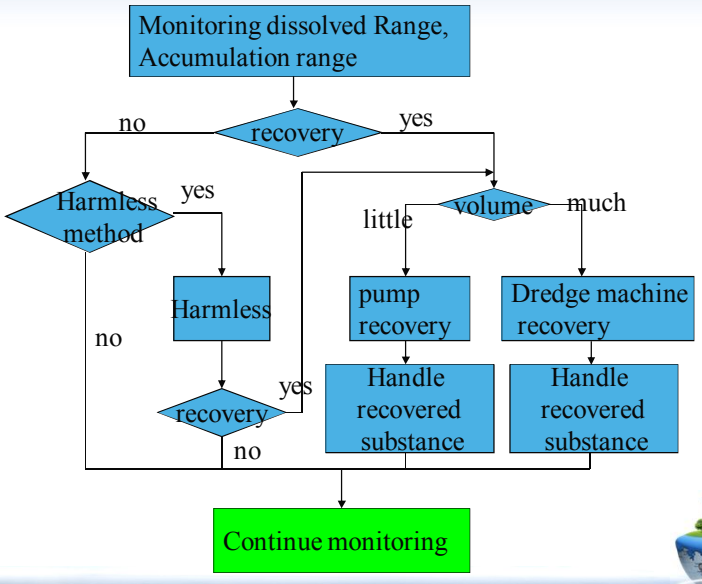
↓

Continue monitoring


Disposal Measures——Floater
Monitoring the gas diffusion range
Set hazardous areas
Recover
no
yes
Control and Protection
Diffusion control
Recover and cleaning
Natural diffusion
Recovered substance handling
Continue monitoring


Disposal Measures——Dissolver
Monitor the spread area of dissolved substances
no
Acid/Base
yes
no
Enclosed seas
yes
no
No flow
yes
Natural diffusion
Facilitated diffusion
Neutralization
Continue monitoring

Disposal Measures——Sinker



2.3 Emergency Decision Support

During HNS emergency response, the decision-making needs to consider a variety of factors:

- Incident Development
- Regional and personnel maybe endangered
- Potentially contaminated environmental resources
- Available emergency resources
- Safety of persons and property.....

Emergency Decision Support System

Emergency Decision Support System function:

- Incident forecasting
- Inquiry and management of environmental resources
- Inquiry and management of emergency resources
- management of emergency plans and case
- Help developing employment plan of emergency resources

Ship Pollution Incidents Emergency Decision Support System Based on WEBGIS

Features: Based on WEB， any network terminal can run the system, upload and download to achieve information sharing on emergency resources.

The main problems we encountered during System Development:

◆Forecasting model selection

◆Functional interface design

（1）Forecasting model selection

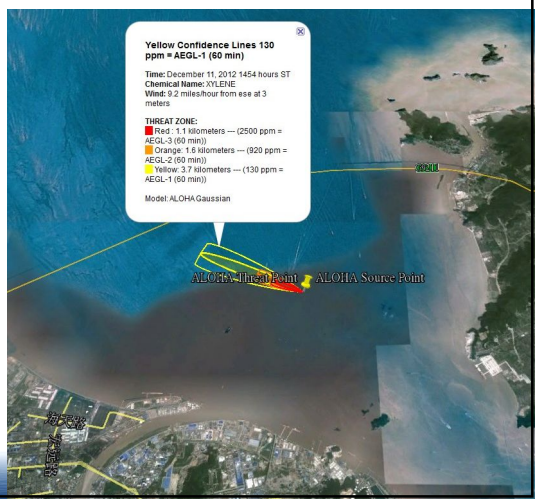
Select different forecasting model according to the behavior of HNS spilled

- **HNS behavior**
  - Gas diffusion
  - Floating
  - Dissolve
  - Sink

（1）Forecasting model selection

- **HNS behavior**
  - Gas diffusion
  - Floating
  - Dissolve
  - Sink

ALOHA

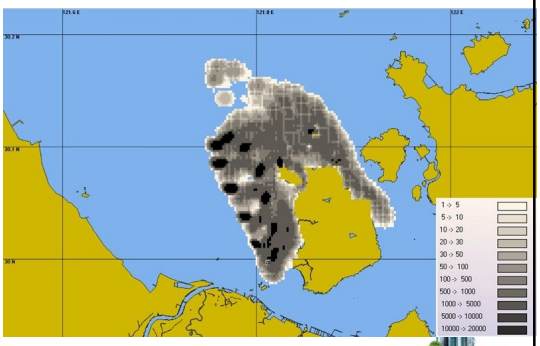


（1）Forecasting model selection

HNS behavior

- Gas diffusion
- Floating
- Dissolve
- Sink

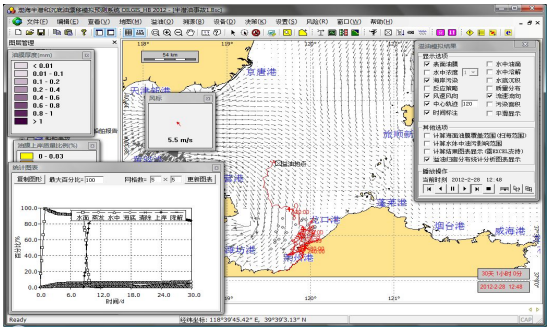
CHEMMAP



（1）Forecasting model selection

HNS behavior

- Gas diffusion
- Floating
- Dissolve
- Sink



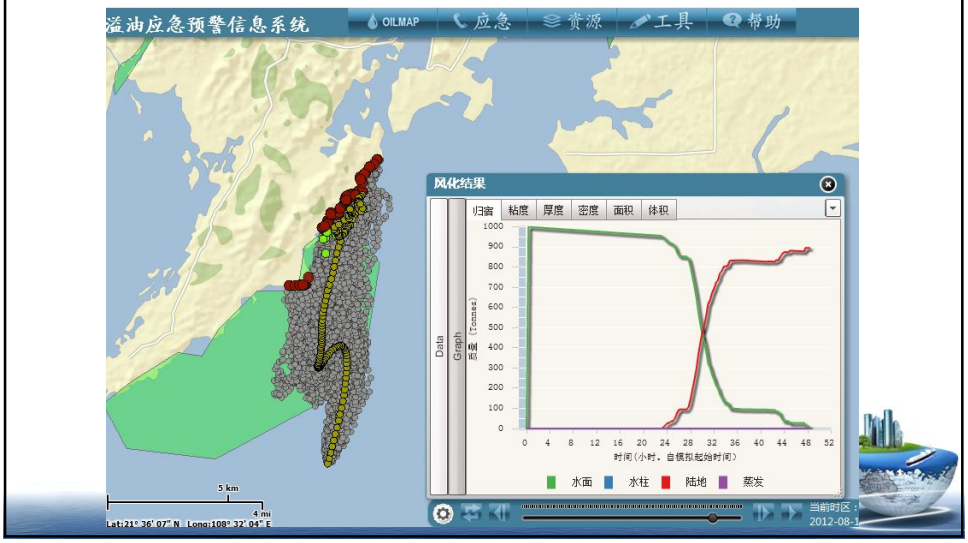
Submerged oil underwater 3D simulation software

（2）Functional interface design

Display Interface of environmental resources

（2）Functional interface design

Display Interface of incident forecasting



（2）Functional interface design

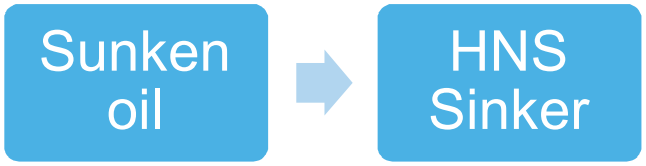
Quick Search and Statistical Analysis of emergency resources

（2）Functional interface design

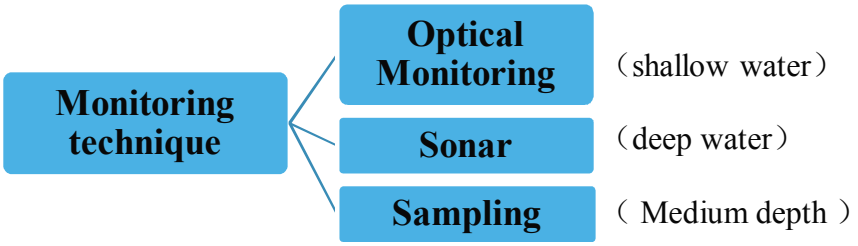
Help developing employment plan of emergency resources

2.4 Monitoring and Removal of Sinker

Ever since Gulf of Mexico oil spill, the techniques of monitoring and removal on sunken oil had got the people's attention.



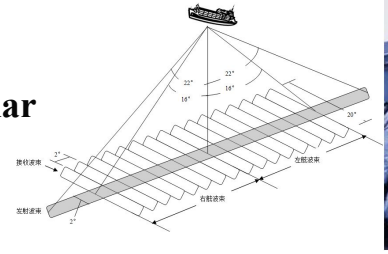
2.4 Monitoring and Removal of Sinker



2.4.1 Monitoring of Sinker

（1）Optical Monitoring

（2）Sonar



2.4.1 Monitoring of Sinker

（3）Sampling

➢Grab sample

➢Adsorption material

V-SORS（Vessel-Submerged Oil Recovery System）

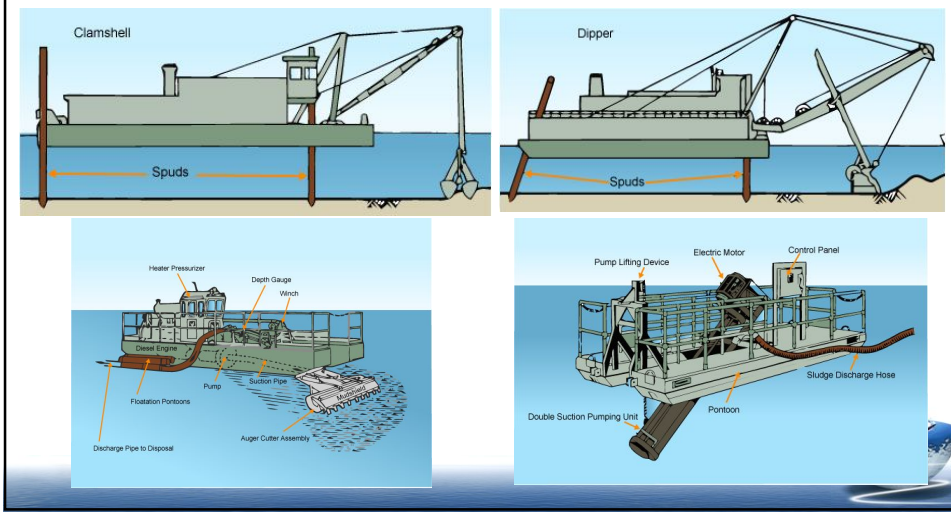
2.4.2 Removal of Sinker

Removal technique

- Dredging vessel — **Large incident**
- Underwater pump — **Small incident**

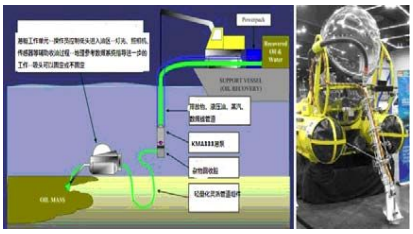
2.4.2 Removal of Sinker

（1）Dredging vessel

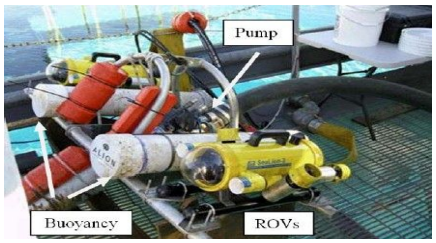


（2） Underwater pump

Remote Crawler recovery system



single operation recovery system

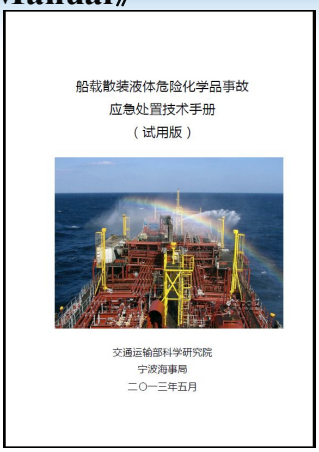


underwater robots

recovery divers

2.5 《Response Disposal Technical Manual》

- **Manual**
  - User Guide
  - Basic theory
  - Emergency procedures
  - Disposal technique
  - Appendix



Establishing databases and case base

2.5 《Response Disposal Technical Manual》

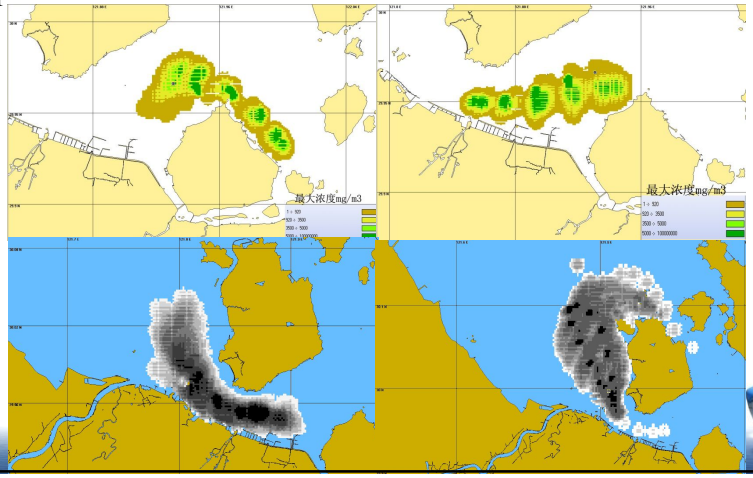
Fast classification——China coastal transport 101 kinds of major HNS's properties, classification and MSDS

散装液体化学品名	类别	1.挥发性	2.相对密度	3.溶解性	4.易燃性		5.易爆性		6.急性毒性	
		挥发饱和蒸汽压(kPa)	密度	辛醇-水分配系数的对数值	闪点（℃）	自燃温度（℃）	爆炸下限 %(V/V)	爆炸上限 %(V/V)	LC_{50}（半数致死浓度）	LD_{50}（半数致死量）
醋酸乙酯	DE	13.33(27℃)	0.9	0.73	-4	250.1	2	11.5	LC50：5760mg/m³，8小时(大鼠吸入)	5620 mg/kg(大鼠经口)；4940 mg/kg(兔经口
乙醇	D	5.33(19℃)	0.79	0.32	12	363	3.3	19	37620 mg/m3，10 小时(大鼠吸入)	7060 mg/kg(兔经口)；7430 mg/kg(兔经皮)
丙酮	DE	53.32(39.5℃)	0.8	-0.24	-20	465	2.5	13	无资料	5800 mg/kg(大鼠经口)；20000 mg/kg(兔经皮)
甲醇	DE	13.33(21.2℃)	0.79	1.242424242	11	385	5.5	44	83776mg/m3，4小时(大鼠吸入)	5628 mg/kg(大鼠经口)；15800 mg/kg(兔经皮)

2.5 《Response Disposal Technical Manual》

Quick Forecast - Simulate scene database

IN advance make a variety of simulation with various HNS and incidents scale, and compile into a database for reference when quick forecast.



2.5 《Response Disposal Technical Manual》

Hazardous Area Rapidly zoning – Control area setting table

In advance, through simulation with ALOHA, get control area radius of main HNS in different scale incident, in order to give reference at the initial response.

No.	Name / Control Area		Spill volume（tonnag）					Basis/ Calculate tool	Physical state
			1t	20t	50t	100 t	1000 t		
1	二氯甲醚 Bis-Chloromethyl ether	ERPG-3=0.5ppm	868 M	2.4 KM	7 KM	9.4 KM	>10 KM	ALOHA5.4.3	Liquid
		ERPG-2=0.1ppm	2.1KM	6 KM	>10 KM	>10 KM	>10 KM		
2	苯胺 Aniline	ERPG-3=100ppm	<10M	19M	28M	38M	76M	ALOHA5.4.3	Liquid
		ERPG-2=10ppm	19M	45M	67M	88M	172M		
3	氯 Chlorine	ERPG-3=20 ppm	2.0KM	5.4 KM	6.9 KM	>10 KM	>10 KM	ALOHA5.4.3	Gas
		ERPG-2=3 ppm	4.2KM	>10 KM	>10 KM	>10 KM	>10 KM		
4	丙烯腈 Acrylonitrile	ERPG-3=75 ppm	116M	251M	378M	881M	1.8KM	ALOHA5.4.3	Liquid
		ERPG-2=35 ppm	176M	385M	584M	1.5KM	2.9KM		
5	苯 Benzene	ERPG-3=1000 ppm	10M	22M	33M	44M	199M	ALOHA5.4.3	Liquid
		ERPG-2=150 ppm	37M	79M	116M	152M	692M		
6	1，3-丁二烯 1，3-Butadiene	ERPG-3=5000ppm	79M	165M	257M	356M	793M	ALOHA5.4.3	Gas
		ERPG-2=200 ppm	597M	1.2KM	1.8KM	2.4KM	4.9KM		
7	四氯乙烯 Tetrachloroethylene	ERPG-3=1000ppm	<10M	16M	44M	58M	118M	ALOHA5.4.3	Liquid
		ERPG-2=300 ppm	14M	36M	147M	194M	399M		

Epilogue

✓We are starting a long journey;

✓《Response Disposal Technical Manual》 is in modification.

✓ “Ship Pollution Incidents Emergency Decision Support System Based on WEBGIS” is in development.

✓Much more challenges lie ahead;

✓We hope that somebody who is interested in our research can come forward to have a co-research with our group in the near future.


Thank you !
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Prevention and preparedness of HNS spill incidents in Japan

Mr. Ryohei Yamasaki
Deputy Manager
Maritime Disaster Prevention Center (MDPC)

1. Organization and Duties of Maritime Disaster Prevention Center (MDPC)

MDPC was established as an authorized organization by the law for the prevention of marine pollution and maritime disaster. MDPC executes oil-removal and fire-fighting operations upon the occurrence of disasters at sea, such as spillage of oil or other noxious liquid substances and fires on ships. MDPC has entered into contracts concerning the execution of oil or HNS removal with 161 disaster prevention companies.

2. Establishment of Disaster Countermeasure Depot

An earthquake of magnitude 9.0 struck the pacific coast of Japan, Tohoku region on March 11 2011. Hit by Tsunami, MDPC's equipment at Tohoku region became unusable. MDPC wanted to deliver the equipment to the area but the region was not legally allowed to use equipment from other areas. MDPC established three Disaster Countermeasure Deports this year and now they are able to deliver equipment to the disaster area within 12 hours in case of a catastrophe.

3. Adoption of MDPC-ICS

ICS consolidates manpower, resources, and vessels owned by different organizations into one systematical organization and establishes efficient procedures and rules for the emergency response. MDPC officially adapted MDPC-ICS since 2009 and has already conducted MDPC-ICS training three times, and MDPC staffs and sub-contractors attended the training.

4. Disaster Prevention Training and Exercise

MDPC has a training center furnished with facilities to implement fire-fighting and oil spill control exercise with an objective to provide opportunities to gain basic knowledge

necessary in responding to marine disasters and practicing fire-fighting and other techniques to control spilled oil and other noxious liquid substance. The Hazardous substance control course provides knowledge on how to handle noxious substances, including the removal techniques, fire extinguishing, use of gas detector, etc.

◆ *Profile of the presenter*

Education

- Graduated from Japan Coast Guard Academy

Biography

Ryohei Yamasaki joined Japan Coast Guard (JCG) in 2003. He started his career as a captain of patrol vessel, 1st Regional Coast Guard Headquarter, JCG. He also worked as a section chief at International Shipping Division, Maritime Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT). Later he decided to be an expert for maritime disaster prevention and he is currently working for MDPC as a deputy manager of operation division. He is accumulating more experience on response activities for marine disasters on the site and acquiring skills and knowledge to become a more competent expert in the field.

Maritime Disaster Prevention Center

NOWPAP MERRAC Expert Meeting
～15th-17th October 2013～

Prevention and preparedness of HNS spill incidents in Japan

Ryohei Yamasaki
Maritime Disaster Prevention Center

Maritime Disaster Prevention Center

Outline

- General information of the Maritime Disaster Prevention Center (hereinafter “MDPC”)
- Establish of Disaster Countermeasure Depots
- MDPC-ICS
- YOKOSUKA Training Center

Maritime Disaster Prevention Center

General information of the Maritime Disaster Prevention Center

Maritime Disaster Prevention Center

Location

- Head Office — Yokohama Minato Mirai
- Training Center — Yokosuka Heisei-cho Dai-Ni-Kaiho (Manmade Island)
- 7 branch offices — Chiba, Nagoya, Osaka, Iwakuni, Mizushima, Shimonoseki, Kagoshima
- 44 stockpile bases and depots

Maritime Disaster Prevention Center

Roles of MDPC

➢**Not-for-profit,** public/private Oil & HNS spill response organization designed to make a "best effort" response to major maritime disasters at Japan coastal water.

➢Provide Oil & HNS spill response and Fire-fighting operations at sea.

➢Basically, MDPC makes a contract with aPolluter.（Responsible Party）

➢ **Stockpiling of Equipments**and materials for Oil & HNS spill incidents.

➢Implementation of **training and exercises** for fire-fighting and Oil & HNS spill response.

➢**Research and study** of equipment and techniques for fire-fighting and Oil & HNS spill response.

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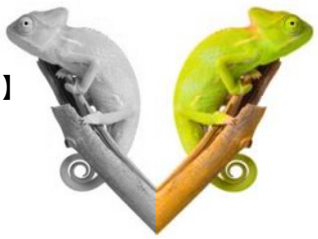
MDPC has Two faces

Occurring an incident, MDPC is a private company and makes a contract with S/F Owner.

Direction to MDPC by Japan Coast Guard (JCG) Commandant. In this case, MDPC changes into a government company.

【Ship/Facility Owner】

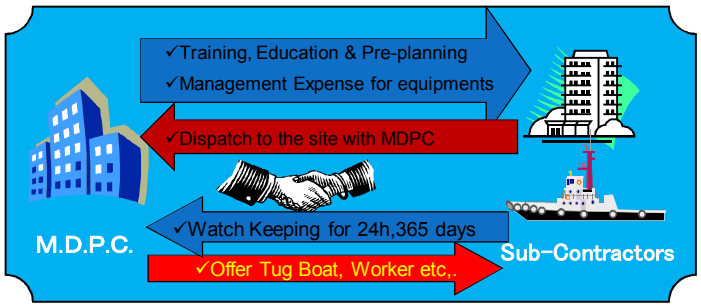


If the polluter does not take an action or the polluter's action is insufficient, JCG needs to direct MDPC to take measures for the incident.

Maritime Disaster Prevention Center

MDPC's Reasonable Response System

- **independent of management**
  →MDPC doesn't receive government management expense.
- **Reasonable Response System**
  →MDPC makes contracts with more than 161 Sub-Contractors.
  →MDPC prepares many Equipment and materials for incidents response.
  →SCs have many kinds of work boats, tug boats, workers and so on.
  →SCs' main business are tugboat, port service, agent, etc,.



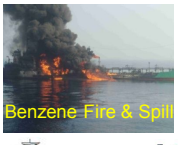
Maritime Disaster Prevention Center

Outline of the Japan's Maritime Disaster Prevention System

What does it mean "Maritime Disaster" ?:
It means incidents of the Oil & Hazardous Noxious Substances Spillage and/or Fire at sea.

Who has responsibility for ?:

Basically, Polluters Pay Principal is applied. Ship and/or Facility owners must take an action to respond oil or HNS spill and/or firefighting.



What is duty S/F Owner in peacetime?
S/F Owner should prepare appropriate equipment for incident response according to the domestic law.

Can the polluter respond by oneself ?

For small incident, it is OK. But in lager incident, the capability of S/F owner is not sufficient for response.
S/F Owner has made a pre-contract with MDPC.

S/F Owner's Equipment

Maritime Disaster Prevention Center

In case of Worst Case Discharge

➢Spilled oil drifts toward to out of responsible area.

The polluter is

- ✓Complained about oil/HNS odor/sheen from residents.
- ✓questioned by city halls, prefectural office, JCG.
- ✓complained about contamination from neighbor facilities such as ship yards, aquarium(s), seaside resort.
- ✓complained by facilities, which have seawater intake.
- ✓complained from fishermen's cooperation.

Maritime Disaster Prevention Center

Area Conference

Who is going ・・・・・・・・・・・

(1) To make a response Strategy & Tactics?
(2) To establish a response organizations?
(3) To make an Incident Action Plan?
(4) To achieve an Area Conference consensus?
(5) To make an roll of distribution of any relating information?

【Chairman】
Japan Coast Guard
JCG National Strike Team
【Participant】
Local Government
City／Town etc
Local Police
Municipal Fire Department
Harbor facilities manager
Fishermen's Cooperative
Ministry of the Environment
Ministry of the ・・・・・・・・・
Neighborhood Party
Non Profit Organization etc,.

Establish of Disaster Countermeasure Depot

Oil Pollution From Damaged Tanks & Sunken/Capsized Ships

The total amount of spilled oil has not been announced officially, but estimated amount of oil spill from the capacity of damaged tanks were abt. tens of thousands oil spilled.

MDPC's Equipment Base Loss of Function

MDPC's equipment bases located at Tsunami Hit Area were not able to use.

All infrastructures including but not limited to electricity, the gas and cellular phone were not able to use.

It was difficult to navigate the propeller boats. The wreckage obstructed the navigation.

Maritime Disaster Prevention Center

Necessity of Disaster Countermeasures Depot

Lessons Learned at 3.11

- Due to many equipments being washed away including MDPC Sendai/Kashima bases, it was almost impossible to get equipments at Tohoku.
- It didn't allow to use equipments designated by law from other area, from western Japan.
- Due to resource shortage at Tohoku, it was difficult to get equipments such as ropes, repair tools.

Necessity of…

- Backup base for disaster countermeasure.
- Storage space for all resources transported from whole of country.

It is only 12hrs to deliver resources.
(all areas of western Japan ／70% of eastern Japan been covered)

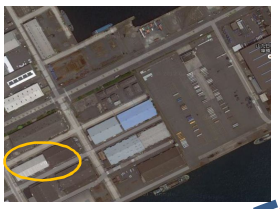
The Disaster Countermeasures Depot is Self-conclusion type of Base.

Disaster Countermeasures Depot

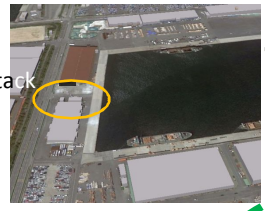
Lead-time within 12 hours

※Lead-time=Transport Time 6hrs + Loading Time 6hrs

Nearest of ….
・Freeway gate
・Harbor pier
and Safety Zone of TSUNAMI Attack

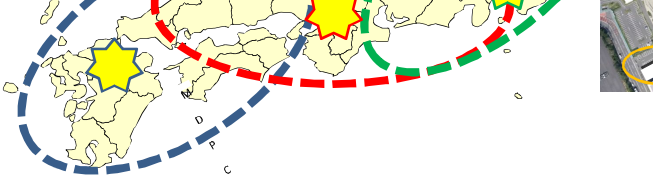


【Kitakyusyu Depot】



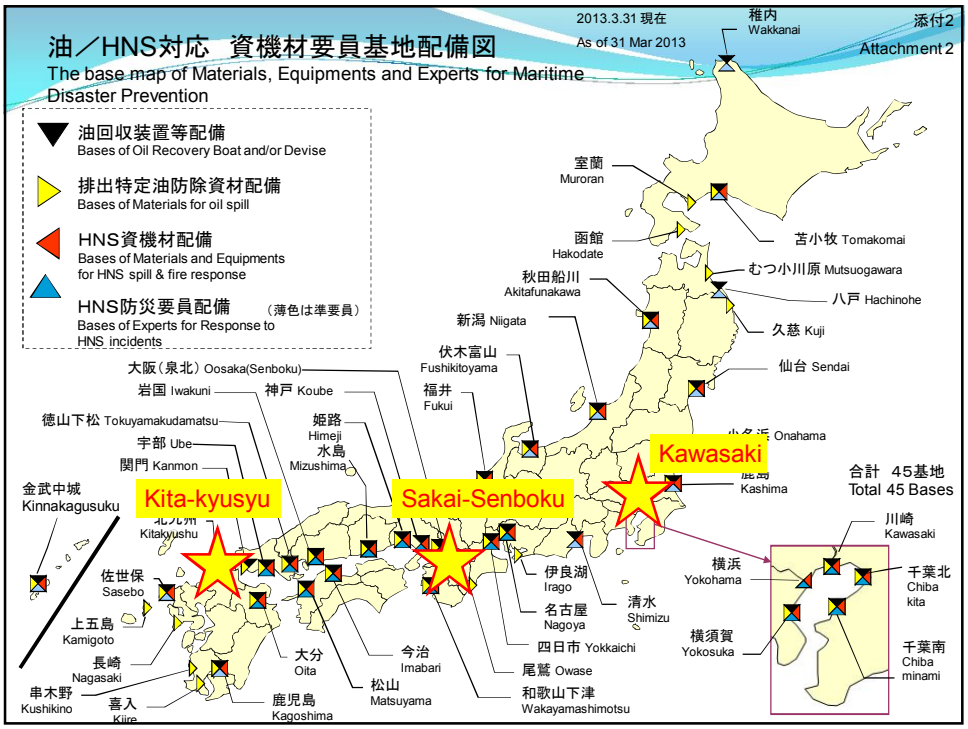
【Sakai-Senboku Depot】

【Kawasaki Depot】



Maritime Disaster Prevention Center

Disaster Countermeasure Depots



Maritime Disaster Prevention Center

MDPC-ICS

Maritime Disaster Prevention Center

MDPC-ICS

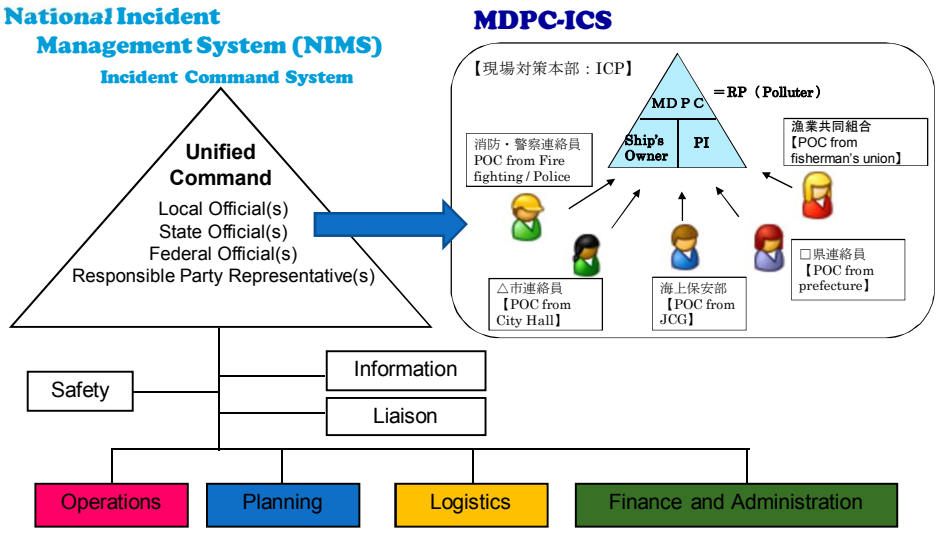
➢ What is MDPC-ICS ?

ICS is an emergency command system for various type of catastrophes including but not limited to marine pollution, fire, tsunami, earthquake and terrorism. ICS consolidates manpower, resources, and vessels owned by different organizations into one systematical organization and ICS establishes efficient procedures and rules for the emergency response.

MDPC officially adapted ICS from 2009 and sent staffs to a training for ICS in U.S.A on January 2012. They learned ICS knowhow and established MDPC-ICS. MDPC already has had “MDPC-ICS” training three times and MDPC staffs and sub-contractors attended the training.

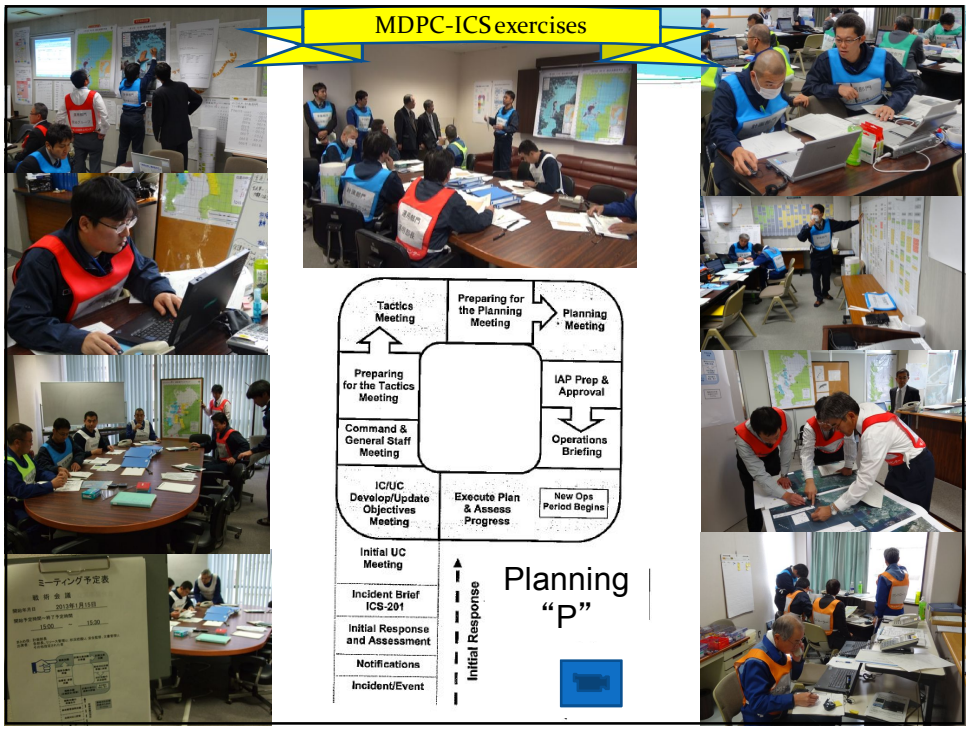
Maritime Disaster Prevention Center

MDPC-ICS



20

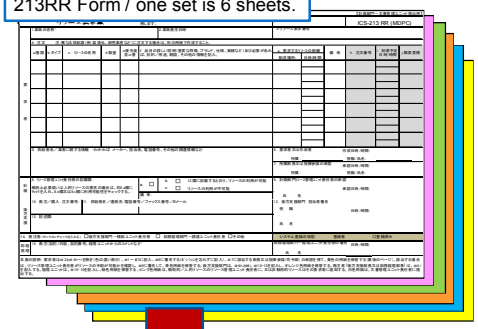

Maritime
Disaster
Prevention
Center
MDPC-ICS EXERCISES
MDPCと契防者によるICS演習の実施　2013.1.15
【MDPC-ICS exercises in Jan.15.2013 , MDPC & Sub Contractors】
沿岸/沖合現場
【Near Shore/ Off Shore】
後方支援部門
【Logistic Section】
指揮部門
【Command Section】
運用部門
【Operation Section】
計画部門
【Planning Section】
総務経理部門
【Finance Section】


MDPC-ICS exercises
Tactics Meeting
Preparing for the Planning Meeting
Planning Meeting
Preparing for the Tactics Meeting
IAP Prep & Approval
Command & General Staff Meeting
Operations Briefing
IC/UC Develop/Update Objectives Meeting
Execute Plan & Assess Progress
New Ops Period Begins
Initial UC Meeting
Incident Brief ICS-201
Initial Response and Assessment
Notifications
Incident/Event
Initial Response
Planning "P"

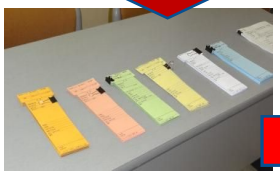
Maritime Disaster Prevention Center

MDPC-ICS
Resource Request

213RR Form / one set is 6 sheets.



- MDPC-ICS 213RR Form and procedure
- Resource Status display by “T-Card”
- Resource Information Sharing by system



“T-card” 6 color of each type

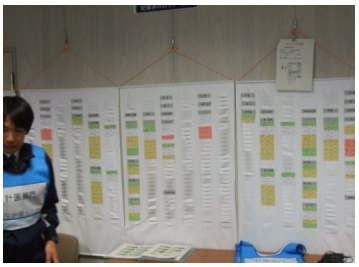
Clearly display : Ordered/During transport/Deployed

Maritime Disaster Prevention Center

MDPC-ICS
Resource Request “T-card”

T-card Sample

In peace time, MDPC is preparing, checking and updating resource status, which is available for use, for Japan wide by T-card.

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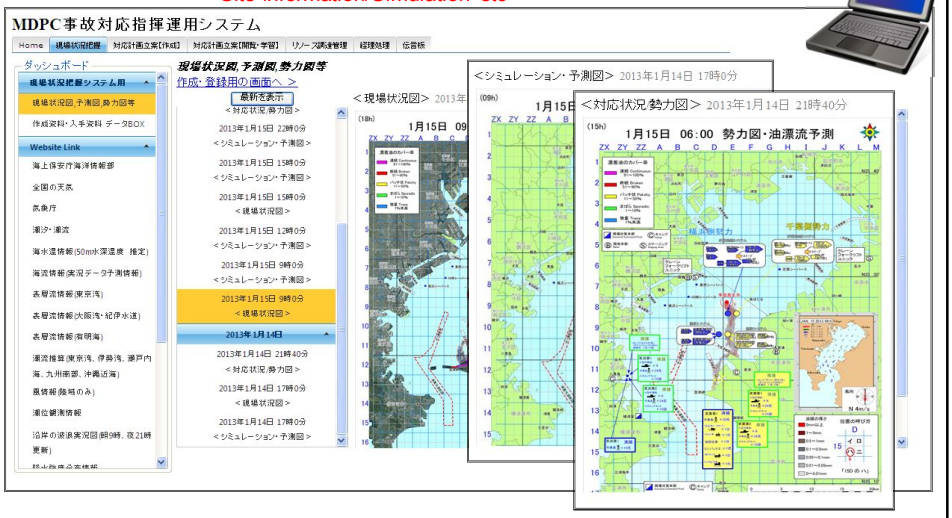
MDPC-ICS
Operating Web System
～Site information/Simulation～
～Create support of IAP（Incident Action Plan）～
～Resource management～
～Cost estimation～
HOME
MDPC事故対応指揮運用システム
費用集計と対応勢力
海上災害防止センターによる対応活動中の事故
対応中事故写真
☆現場写真情報
【Site information by photograph】


Maritime
Disaster
Prevention
Center
MDPC-ICS
Operating Web System
～Site information～
写真の整理(マップから)
【Photos, which are taken by cell phones with GPS or smartphone, are displaying on Google Map on real-time.】

Maritime Disaster Prevention Center

MDPC-ICS Operating Web System

～Site information/Simulation etc ～

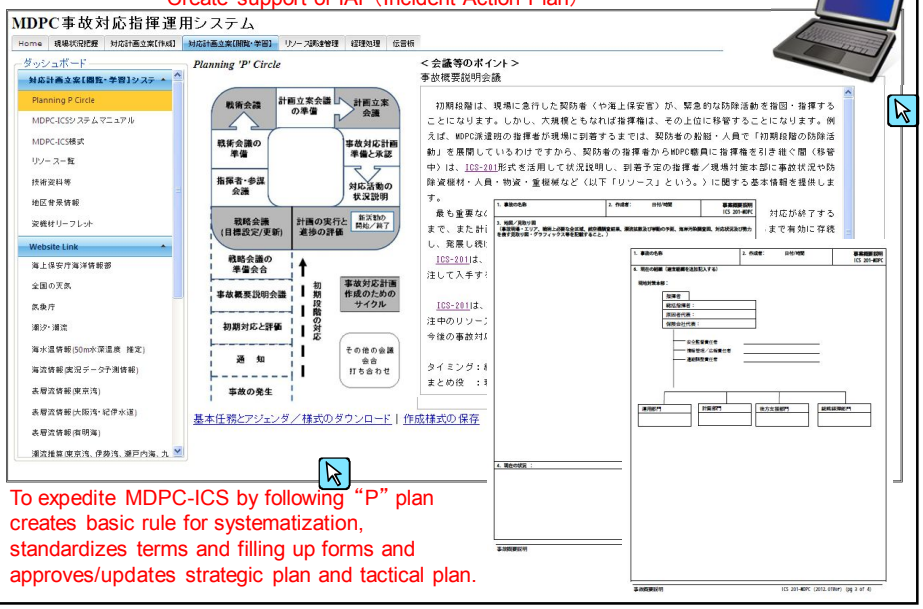


【The users share information regarding contamination status, oil drift simulation and response status by simplified maps through the system. 】

Maritime Disaster Prevention Center

MDPC-ICS Operating Web System

～Create support of IAP（Incident Action Plan） ～

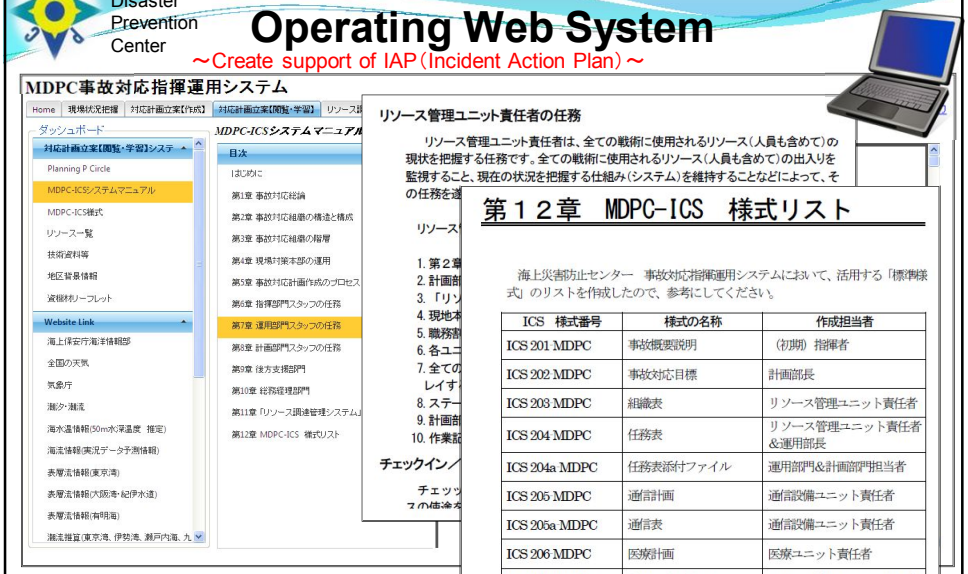


To expedite MDPC-ICS by following “P” plan creates basic rule for systematization, standardizes terms and filling up forms and approves/updates strategic plan and tactical plan.

Maritime Disaster Prevention Center

MDPC-ICS Operating Web System

～Create support of IAP（Incident Action Plan）～



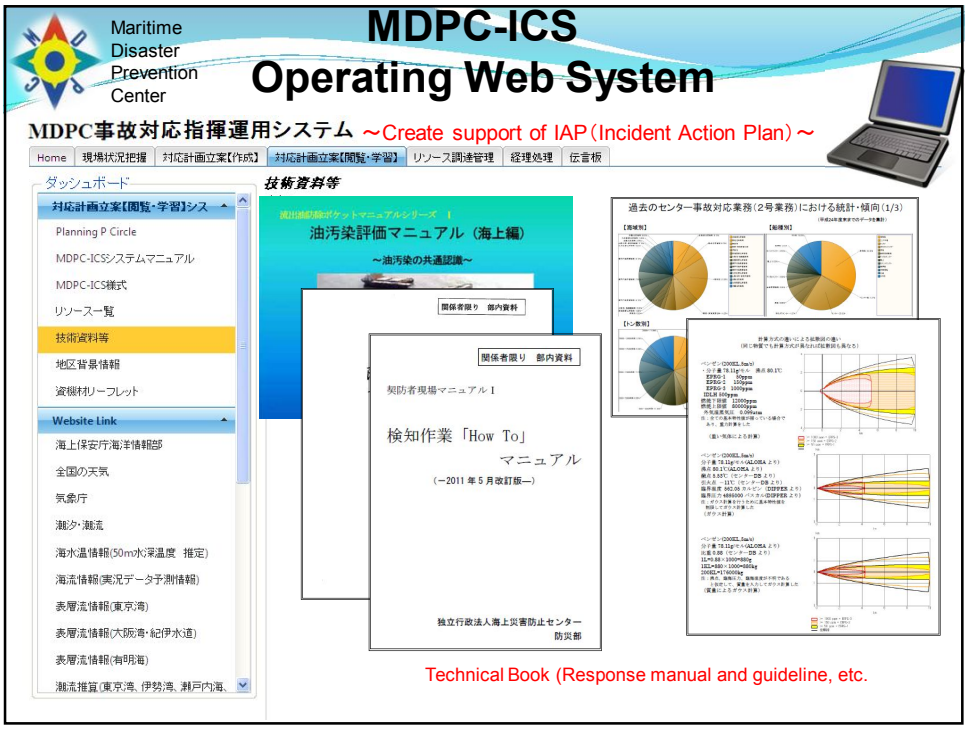
The users are available to get MDPC-ICS Manual, Forms, etc through the system.

Maritime Disaster Prevention Center

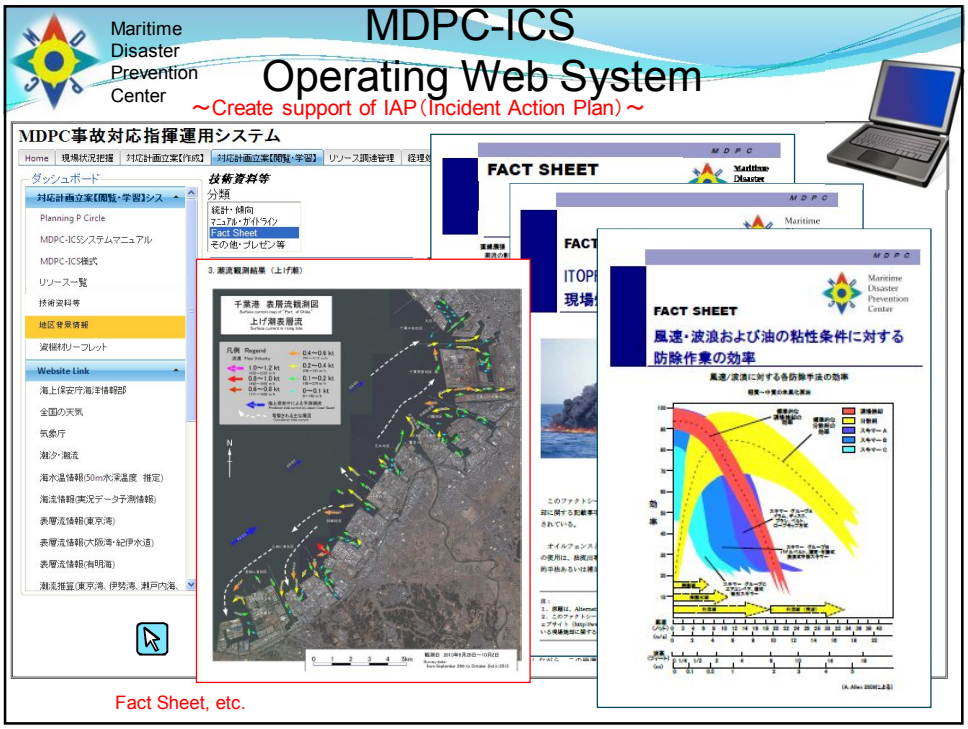
MDPC-ICS Operating Web System

～Create support of IAP（Incident Action Plan）】～

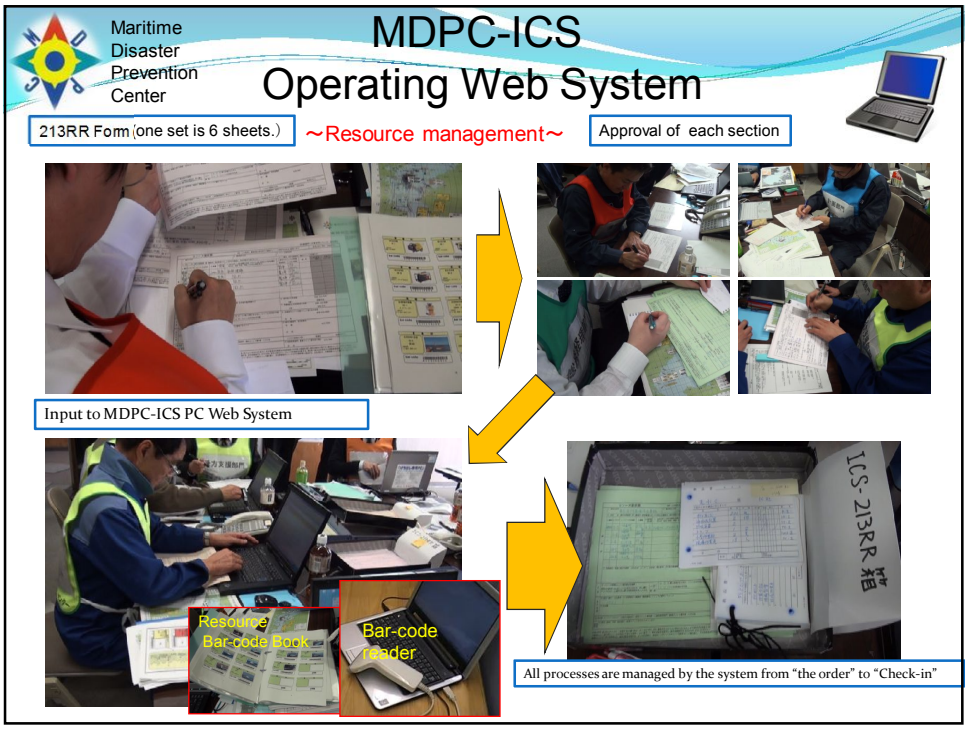
Resource list

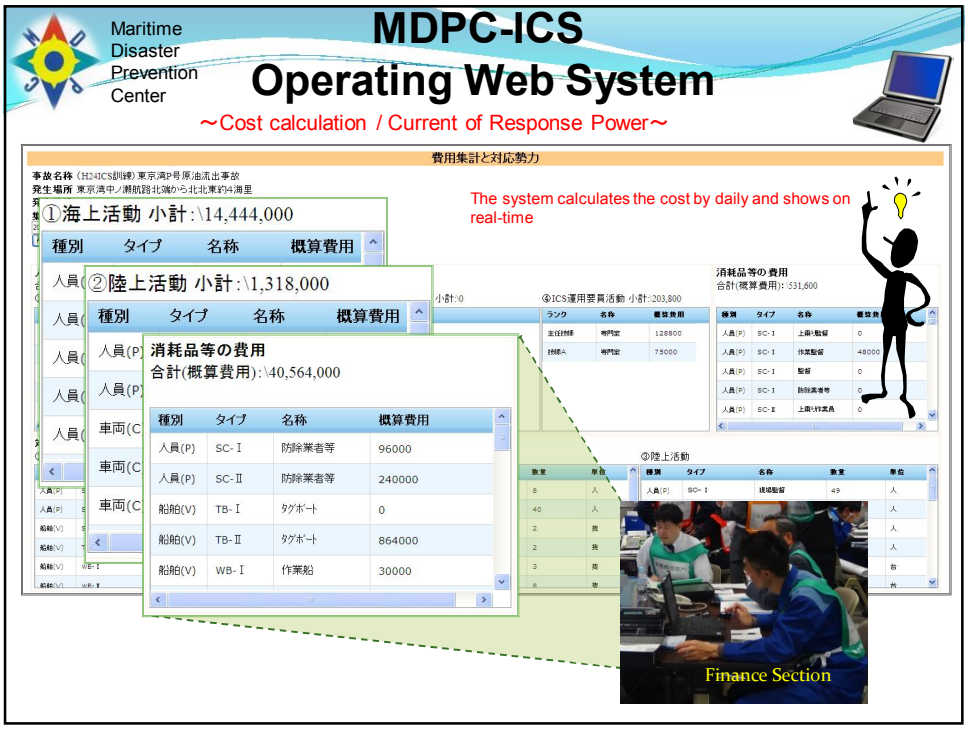


Technical Book (Response manual and guideline, etc.



Fact Sheet, etc.


Maritime Disaster Prevention Center
MDPC-ICS
Operating Web System
213RR Form (one set is 6 sheets.)
～Resource management～
Approval of each section
Input to MDPC-ICS PC Web System
Resource Bar-code Book
Bar-code reader
ICS-213RR 様相
All processes are managed by the system from "the order" to "Check-in"


Maritime Disaster Prevention Center
MDPC-ICS
Operating Web System
～Cost calculation / Current of Response Power～
費用集計と対応勢力
The system calculates the cost by daily and shows on real-time
①海上活動 小計：\14,444,000
②陸上活動 小計：\1,318,000
消耗品等の費用
合計(概算費用)：\40,564,000
種別 タイプ 名称 概算費用
人員(P) SC-Ⅰ 防除業者等 96000
人員(P) SC-Ⅱ 防除業者等 240000
船舶(V) TB-Ⅰ タグボート 0
船舶(V) TB-Ⅱ タグボート 864000
船舶(V) WB-Ⅰ 作業船 30000
Finance Section

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YOKOSUKA Training Center

Maritime
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Fire-fighting

Fire-fighting exercise at DAINI KAIHO locates in Tokyo Bay

Gas fire exercise

Facilities of Training department

Day 1th(Lecture)

- GAS detector and PPE
- Character of HNS

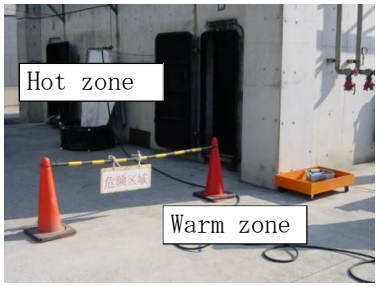
Day 2th(Lecture)

- The related laws and regulations
- Prevention of HNS
- Table top exercise

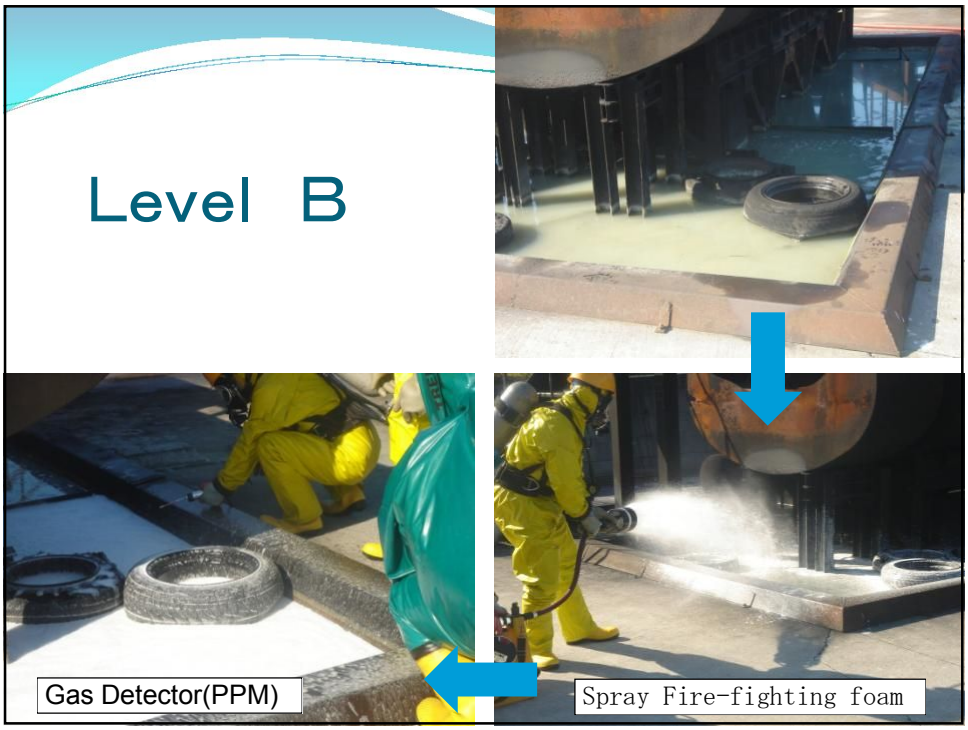
Day 3th (Exercise)

Table top exercise

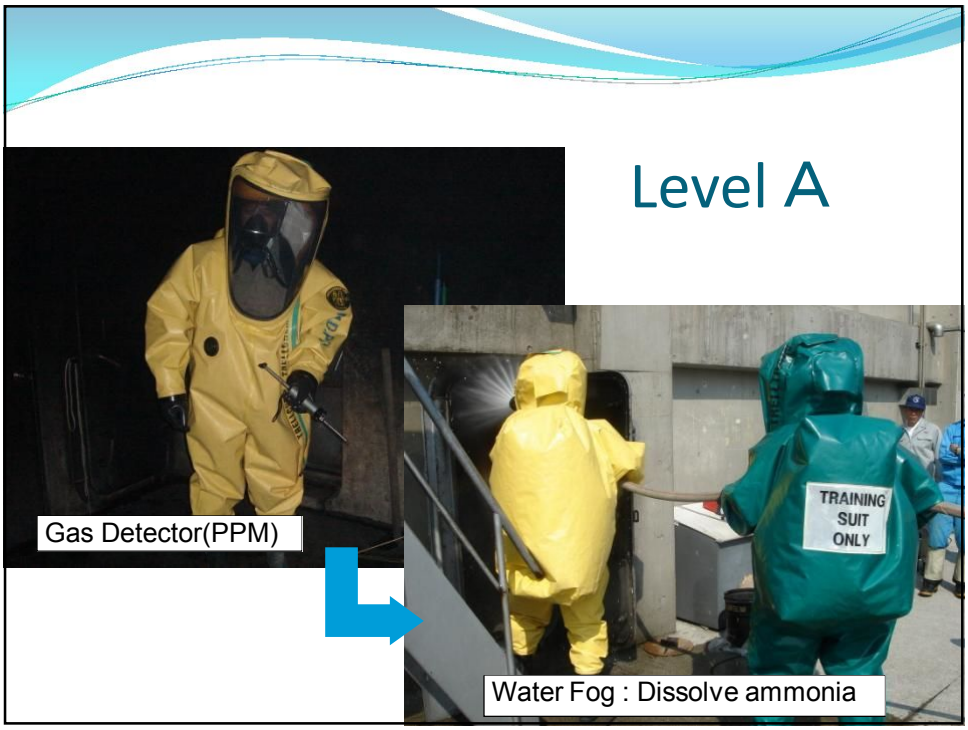
Training



Level C


Level B
Gas Detector(PPM)
Spray Fire-fighting foam


Level B
Water Fog : Dissolve Chemical
or Disperse


Level A
Gas Detector(PPM)
TRAINING SUIT ONLY
Water Fog : Dissolve ammonia


THANK YOU

Preparedness and response system for HNS spill accident in Korea

Mr. Jongwook Choi
Assistant Director
Korea Coast Guard (KCG)

Korea Coast Guard (KCG) has 16 stations and each station has its own response teams for HNS spill accidents. The teams are composed of marine pollution division, recovery vessels and a rescue team and they are run temporarily due to low frequency of HNS spills in Korea.

KCG has 3 information systems for HNS related accident response: CARIS, KISCHEM and MAMIS. CARIS is a fire explosion model or dispersion model. KISCHEM (http://kischem.neir.go.kr) is a web service which provides information on prompt initial response related to national disaster and accident response for organizations. Information on substances has been compiled through internal and external studies and it contains 3 times more detailed information than MSDS. Marine pollution accident response Mobile Information System (MAMIS) is a mobile application based on Android and iOS systems.

KCG launched an education course at KCG Academy in 2007 on preparedness and response of HNS incidents where they carried a 5 days course 2 times a year for 20 people at a time. The course has a practical training curriculum to acquire skills needed in response at a scene.

The first exercise for HNS accident response was conducted in Ulsan in 2005. Since KCG carried out 95 exercises. Currently, KCG is conducting 2 kinds of on-scene exercises. 10 KCG stations are carrying out private and public joint exercises in collaboration with other organizations such as fire stations, army, etc. 6 KCG stations are also carrying out team exercises on HNS response.

◆ *Profile of the presenter*

Education:

- Bachelor degree in environmental engineering, Kyonggi University, Korea

Biography

2004 KCG HQ, Mobile marine pollution response division

2009 KCG Donghae station

2012 KCG HQ, Mobile marine pollution response division

NOWPAP MERRAC Expert Meeting Oct. 15~17. 2013.

Preparedness and Response System for HNS Spill accident in Korea

KOREA COAST GUARD

Contents

- Response procedure
- R&D
- Information system
- Training and Exercise
- Equipments and materials
- Cooperation with others

HNS to be managed in priority

❖ Designated as 68 Substances to be managed in priority in National Contingency Plan

❖ Selection procedure

– 1st step : Gravity, Solubility, Vapor pressure

– 2nd step : Risk of exposure, bioaccumulation

※ HNS exceeding 1,000㎘ a year : 92 substances

– 3rd step : Amount of transported

* Liquid HNS exceeding 0.1 million ㎘ : 28 substances

* X.Y.Z Liquid HNS under 0.1 million ㎘ : 40 substances

Response Team

❖ 16 KCG stations

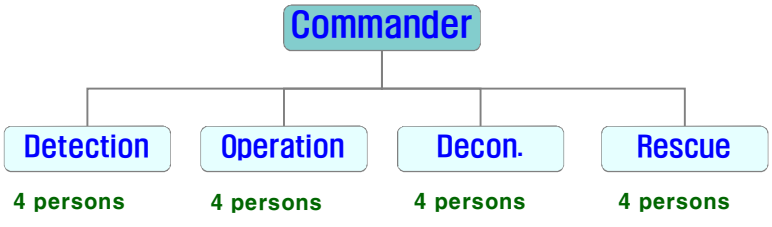
❖ 4 teams 17persons

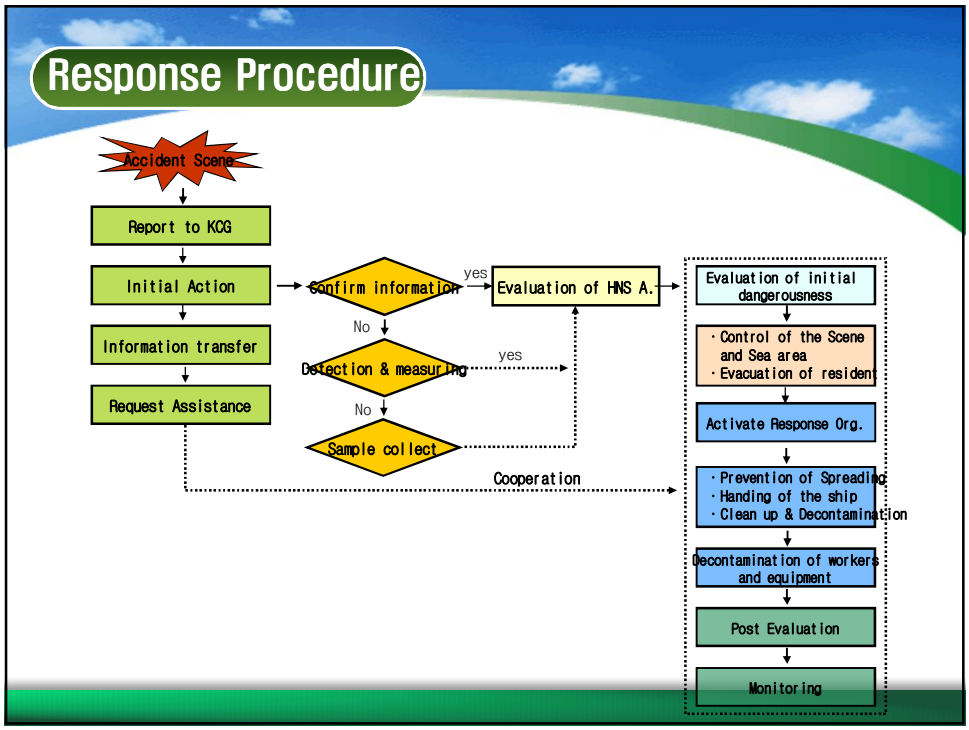
– a pair activity (2persons)

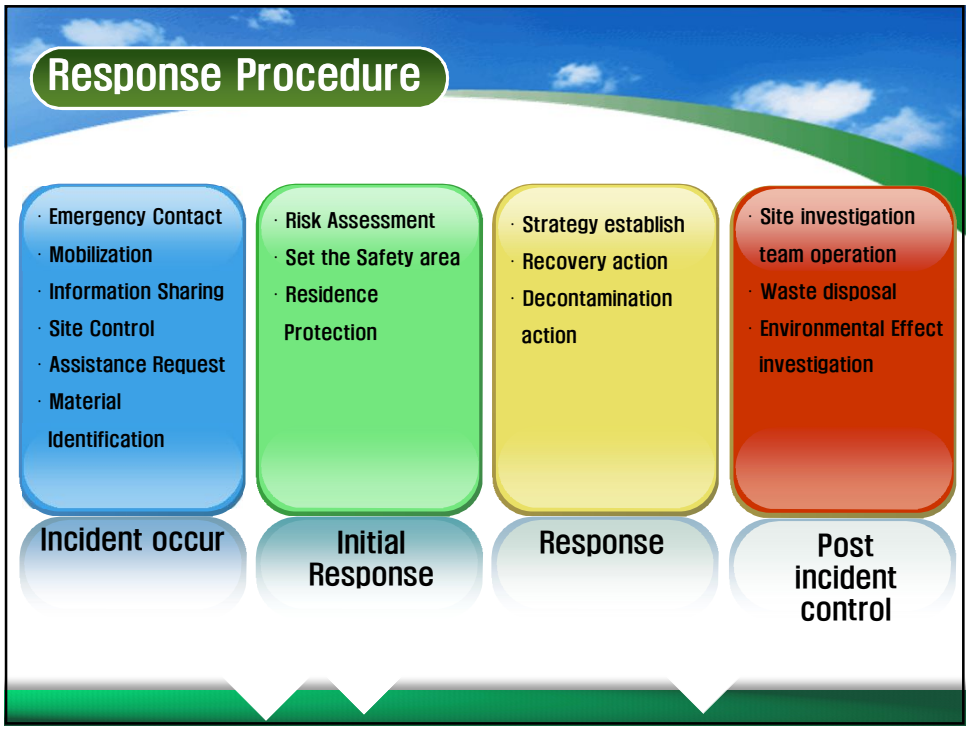
– minimum response principle for chemical accident

❖ Temporary body

– marine pollution division, vessel, rescue team




Response Procedure
Accident Scene
Report to KCG
Initial Action
Information transfer
Request Assistance
Confirm information
yes
Evaluation of HNS A.
No
Detection & measuring
yes
No
Sample collect
Cooperation
Evaluation of initial dangerousness
· Control of the Scene and Sea area
· Evacuation of resident
Activate Response Org.
· Prevention of Spreading
· Handing of the ship
· Clean up & Decontamination
Decontamination of workers and equipment
Post Evaluation
Monitoring


Response Procedure
· Emergency Contact
· Mobilization
· Information Sharing
· Site Control
· Assistance Request
· Material Identification
· Risk Assessment
· Set the Safety area
· Residence Protection
· Strategy establish
· Recovery action
· Decontamination action
· Site investigation team operation
· Waste disposal
· Environmental Effect investigation
Incident occur
Initial Response
Response
Post incident control

R&D

Year	Project title
'06	Development of HNS national response system
'06	HNS response technology and guide
'06	Effect of OPRC-HNS acceptance
'07	HNS SOP manual
'09	HNS training program
'10	HNS recovery technology
'11	Advancement of the National Preparedness Response System
'12	Development of MAMIS

R&D

- Accident Management on HNS Spill (2013)

❖ Development of Resource arrangement model according to accident risk assessment

- Chemical recovery vessel (2013)

❖Technical issue for Chemical recovery vessel

❖A feasibility study on the remodeling of oil recovery vessel

Information System

CARIS : Chemical Accidents Response Information System

❖Developed by the National Institute of Environmental Research in 2005

❖Real time reporting to fire station, police, etc

❖Provide information on about 2,000 HNS Substances for HNS accident response

❖Including of HNS harmful information at sea (2006)

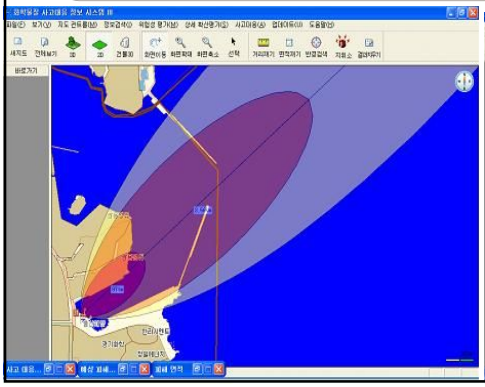
Information System

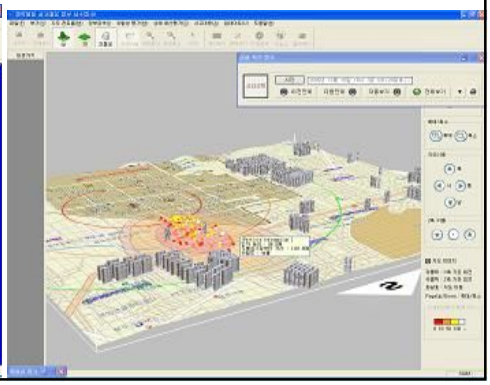
❖Fire/explosion model

- pool fire, jet fire, vapor cloud explosion(VCE), Bleve

❖Diffusion model

- Gaussian plume, Gaussian puff, slab





Information System

KISCHEM : Korea Information System for Chemical Safety Management

❖Established the System by the National Institute of Environmental Research (NIER) in 2012

❖Aim for offering the information to responders

❖3 times more than MSDS Information

Http://kischem.neir.go.kr

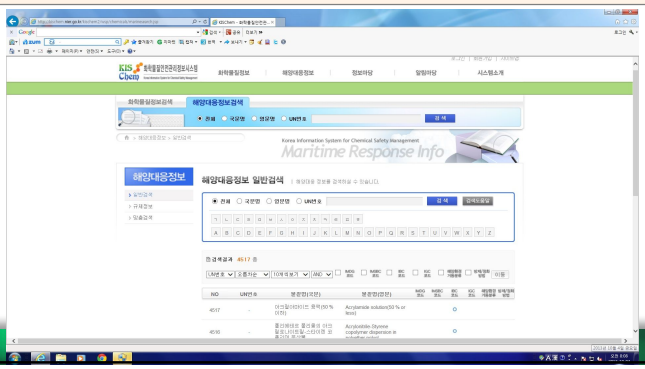
No login, no approval

Information System

❖ 6,000 HNS substances, 261 detail items

❖ Information on behaviors and response through the website

❖ International marine codes and marine transportation, etc



Information System

MAMIS : Marine pollution Accident response Mobile Information System

- ❖ Developed by Korea Coast Guard
- ❖ Enable confirm the information on HNS accident response by mobile at anytime and anywhere

Education

Korea Coast Guard Academy

- ❖ 2 times a year
- ❖ 20 persons a time
- ❖ 5 days
- ❖ since 2007, 355 persons

Education institute

- ❖ N I E R
- ❖ Inje. University
- ❖ 119
- ❖ KOMDI

International

- ❖ US EPA
- ❖ France CEDRE

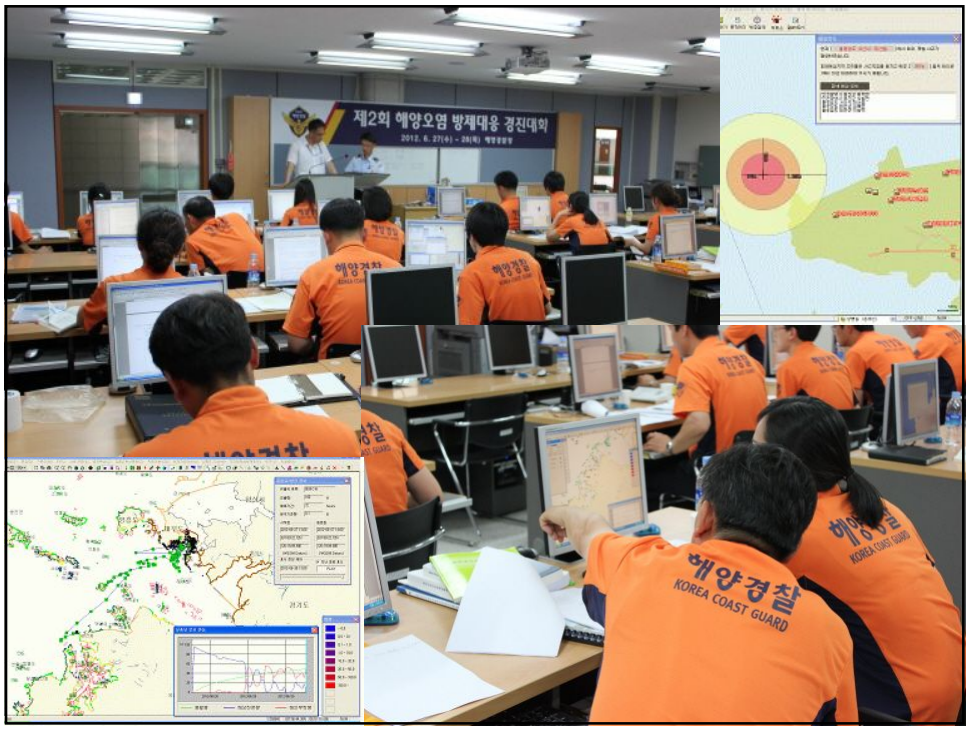

Exercise
On-scene Exercises
❖Joint Exercise
– 10 KCG stations
❖Team Exercise
– 6 KCG Stations


On-scene Exercise

Team exercise

Special Program

- **Strategy establishment contest (2007~2008)**
  - Realization of the Oil spread model using KOSPS and establishment of response strategy
- **Marine response contest (2011~1012)**
  - Establishment of response strategy using KOSPS and CARIS
  - On-site exercise using HNS response equipments


제2회 해양오염 방제대응 경진대회
해양경찰
KOREA COAST GUARD

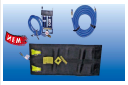

양오염 방제대응 경진대회
Cheong

Equipment and Materials

Con.	Products	Photo	Amount	Con.	Products	Photo	Amount
PPE	Chemical suits (Level A)		130	PPE	Mask		60
	Chemical suits (Level B)		120		Chemical boots		192
	Chemical suits (Level C)		1,612		Chemical gloves		521
	Respiratory		169		Bone conduction communication		124
	Extra bottle		241		Cooling jacket		152

Equipment and Materials

Con.	Products	Photo	Amount
Detector	Multi-Gas Detector		32
	Gas Tube		66
	pH Meter		17
	Wind speed		17
	Air sampler		17

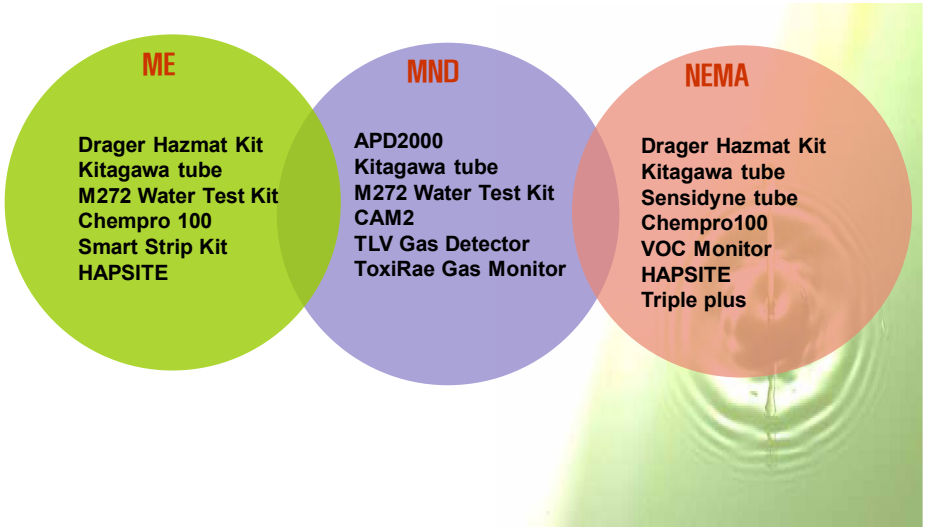
Con.	Products	Photo	Amount
Decon.	Wet shower		17
	Dry spray		17
	Portable spray		16
other	Leakage bandage		51
	Air Compressor		4

Equipment and Materials

Products	Photo
Emergency Respiratory	
Glue	
Bandage	
Air sample bag	
Detector tube	

Products	Photo
Hazmat smart strip	
Tonometer	
3-way paper	
Waste bag	
Chemical Resistance Tape	

Equipment and Materials



Cooperation

- **Organization of advisory members of SSU**
  - ❖ NIER, Inje University, etc. : 6 members from 6 other agencies
    - – SSU : Science Support Unit
- **Conclusion of MOU with other agencies**
  - ❖ Cooperation on training, exercise and accident response
    - – NIER, Inje Uni., COMDI, KIMFT
- **Keep cooperation system with other agencies**
  - ❖ Cross using of equipment with 122 agencies
    - – fire stations, local governments, private companies, etc
  - ❖ Jointed into 66 HNS specialist


Thank you

Activities of State Marine Pollution Control, Salvage & Rescue Administration of the Russian Federation

Mr. Andrey Bryksin

Chief Specialist

State Marine Pollution Control, Salvage & Rescue Administration (SMPCSA)

The report on “The current activities of State Marine Pollution Control, Salvage & Rescue Administration (SMPCSA) of the Russian Federation” provides information on general structure of SMPCSA, international cooperation of Russia on oil spill combating, new vessels and equipment for oil spill combating and oil spill combating exercises. It also pays special attention to one big oil spill combating operation which was conducted in Cape of Military Topographers in Chukotka (the Bering Sea). On November 14 2011, the fishing vessel freezer trawler “Oriental Angel” (Republic of Korea) caught fire, the vessel has been put on 2 anchors, and the crew left the trawler. On November 19 because of the stormy weather, a vessel was thrown on coastline in the area of Cape of Military Topographers in Chukotka (Bering Sea). The vessel was carrying cargoes and stocks, including: 1,689 tons of frozen pollack, 166 tons of diesel fuel and 942 tons of fuel oil. Most of vessel’s tanks were depressurized but there was no oil pollution on sea water area. To check the status of the vessel, a special expedition was organized and it was found impossible to remove the aground vessel and they took a decision to conduct operation to pump the fuel and unload the fish from the vessel directly. On September 8 2012, emergency operation on the fishing trawler «Oriental Angel» was completed. Oil was completely removed from the vessel; the tanks, holds and rooms were cleaned from oil residues; fishery products were removed and utilized.

- *Profile of the presenter*

Andrey Bryksin has worked at the State Marine Pollution Control, Salvage & Rescue Administration of the Russian Federation (SMPCSA) since 2010. He has experience in international co-operation related to marine environment protection and oil spill planning in

the framework of the activities of the Baltic Marine Environment Protection Commission (HELCOM) and the Arctic Council. He has been involved in the NOWPAP MERRAC activities since 2013. His current position is chief specialist of the oil spill combating Division.

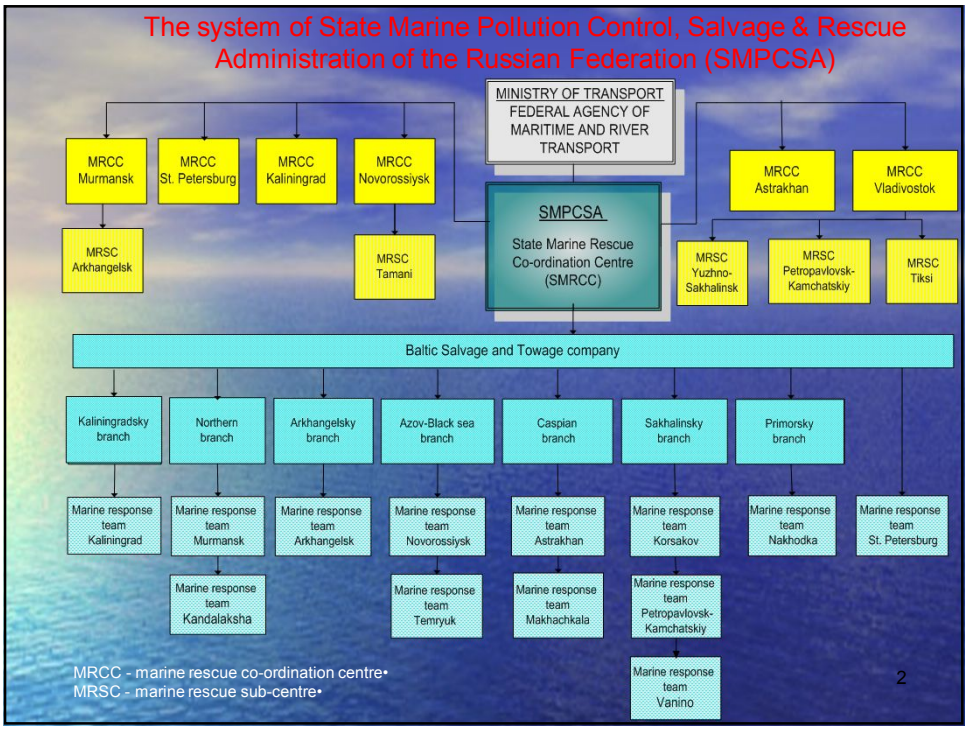
MINISTRY OF TRANSPORT OF RUSSIAN FEDERATION
FEDERAL AGENCY OF MARITIME AND RIVER TRANSPORT

State Marine Pollution Control, Salvage & Rescue Administration of Russian Federation (SMPCSA)

MOSCOW 2013

1

The system of State Marine Pollution Control, Salvage & Rescue Administration of the Russian Federation (SMPCSA)



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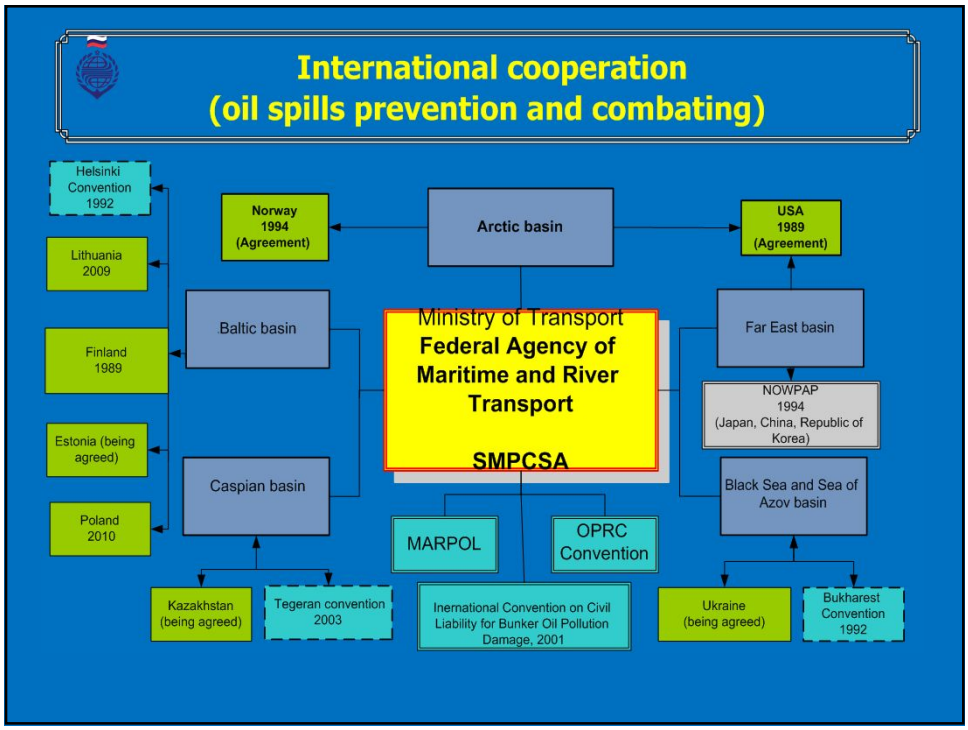
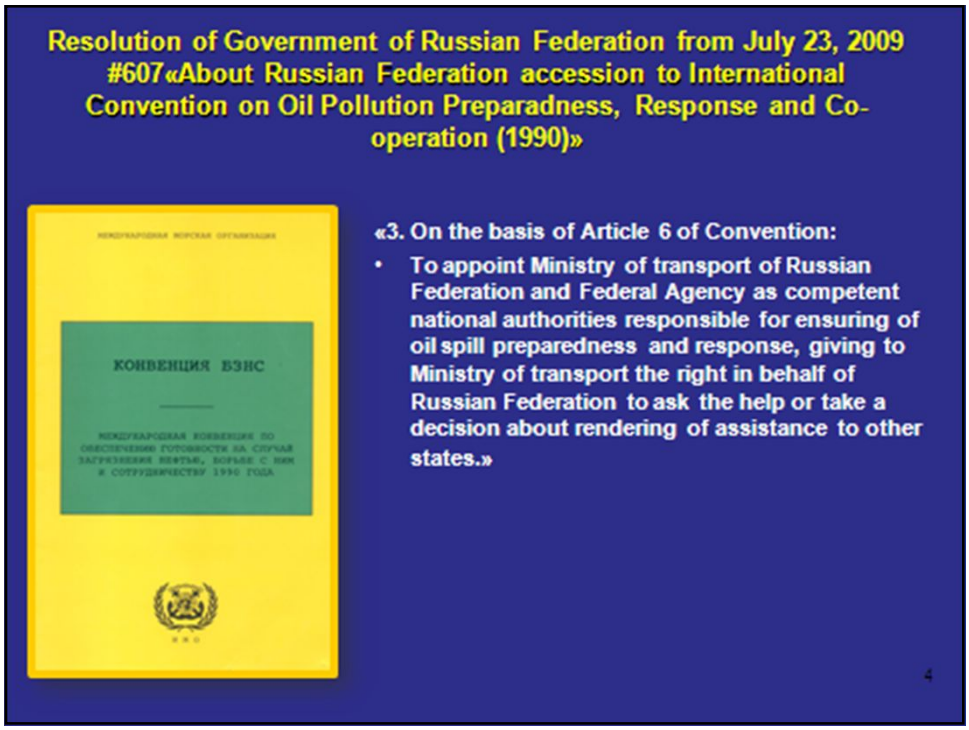

International cooperation
(oil spills prevention and combating)
Helsinki Convention 1992
Lithuania 2009
Finland 1989
Estonia (being agreed)
Poland 2010
Norway 1994 (Agreement)
Arctic basin
USA 1989 (Agreement)
Baltic basin
Ministry of Transport
Federal Agency of Maritime and River Transport
SMPCSA
Far East basin
NOWPAP 1994 (Japan, China, Republic of Korea)
Caspian basin
Black Sea and Sea of Azov basin
MARPOL
OPRC Convention
Kazakhstan (being agreed)
Tegeran convention 2003
Inernational Convention on Civil Liability for Bunker Oil Pollution Damage, 2001
Ukraine (being agreed)
Bukharest Convention 1992


Resolution of Government of Russian Federation from July 23, 2009 #607«About Russian Federation accession to International Convention on Oil Pollution Preparadness, Response and Co-operation (1990)»
КОНВЕНЦИЯ ВЗНС
«3. On the basis of Article 6 of Convention:
• To appoint Ministry of transport of Russian Federation and Federal Agency as competent national authorities responsible for ensuring of oil spill preparedness and response, giving to Ministry of transport the right in behalf of Russian Federation to ask the help or take a decision about rendering of assistance to other states.»

General view of multipurpose rescue vessel 7 megawatts

Multifunctional salvage and rescue vessel with power 7 MW, corresponds to Russian Maritime Register of Shipping *KM Icebreaker 6 2 AUT1-ICS OMBO FF2WS DYNPOS-2 EPP Salvage ship*

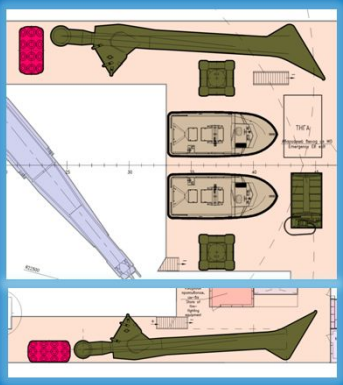
Oil spill combating equipment

Sweeping arms systems (2 board sweeps) with 2 cranes;
1 set with hard oil filter booms - 250 metres;
1 set with booms of permanent flotation - 250 metres;
2 brush type skimmers;
4 floating cranes;
2 boom-boats.

Salvage vessel with capacity of 4 megawatts

Multifunctional salvage and rescue vessel with power 4 MW, corresponds to Russian Maritime Register of Shipping: KM Arc 5 1 AUT1-ICS OMBO FF3WS DYNPOS-2 EPP Salvage ship

Board oil recovering system



Sweeping arms systems(2 board sweeps) with cranes;
1 set with hard oil filter booms - 250 metres;
1 set with booms of permanent flotation - 250 metres;
2 brush type skimmers;
4 floating cranes;
2 boom-boats.

Salvage boom-boat “Gennady Koghuhov”
Salvage boom-boat deployment project A40 – 2Б

Length extreme -19,9 m, Breath extreme – 4,7 m, the midship height of board – 2.96 m, drought – 1.62 m, Full speed – 20,6 knots, economic – 12 knots. Maximum distance by full speed – 205 miles, Independents period of sailing (by fresh water and foods) – 3 days, shipping characteristic – boat operates with sea roughness till 4 degree.

State Marine Pollution Control, Salvage & Rescue Administration of Russian Federation
(SMPCSA)

Address: 3/6 Petrovka Str., Moscow, 125993, Russia

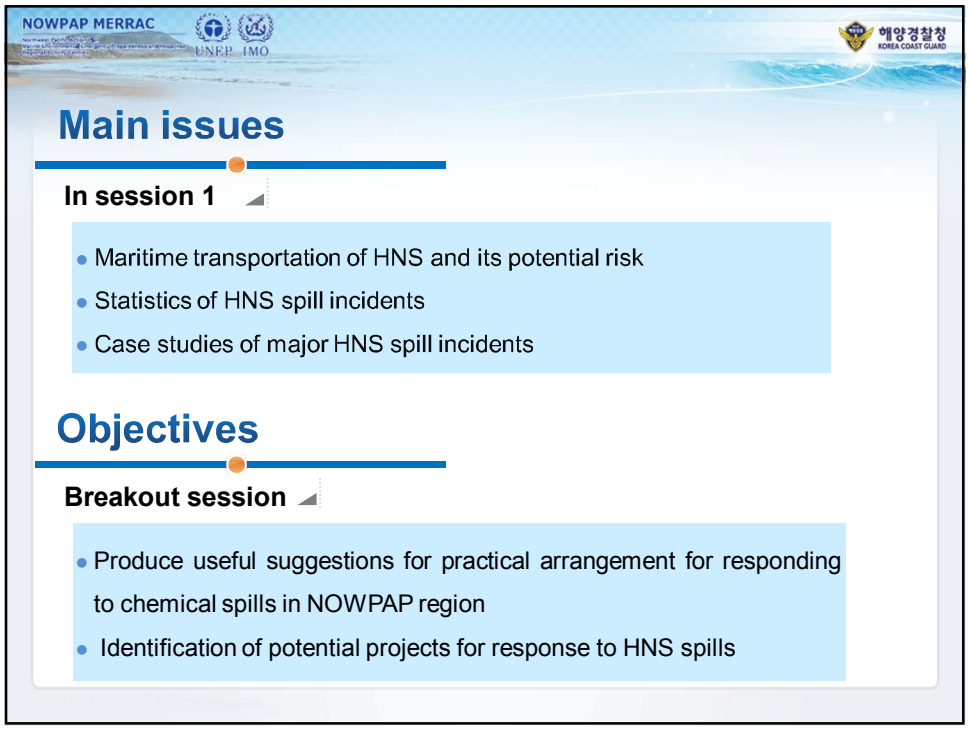
Phone: (495) 626-18-08 Fax: (495) 626-18-09

E-mail: mpcsa@smpcsa.ru

14

Results of the Breakout Session

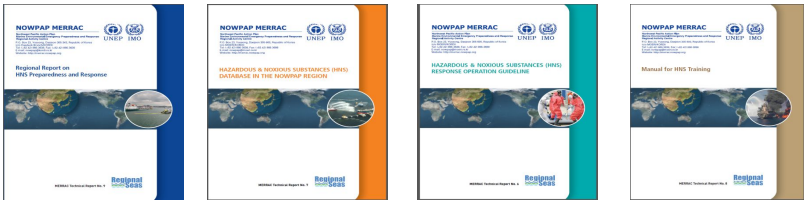

NOWPAP MERRAC
UNEP IMO
해양경찰청
Breakout session
(sub-meeting of session 1)
NOWPAP MERRAC Expert Meeting in China


NOWPAP MERRAC
UNEP IMO
해양경찰청
KOREA COAST GUARD
Main issues
In session 1
Maritime transportation of HNS and its potential risk
Statistics of HNS spill incidents
Case studies of major HNS spill incidents
Objectives
Breakout session
Produce useful suggestions for practical arrangement for responding to chemical spills in NOWPAP region
Identification of potential projects for response to HNS spills

NOWPAP MERRAC

Previous Efforts (1)

Technical Reports



- Regional Report on HNS preparedness and Response (2012)
  - The shipping routes for the navigation of HNS transport ship (1997)
  - Statistics of HNS spill accidents
  - Laws and regulation related to chemical incidents at sea
  - Institutional arrangements of member states
  - Framework for claims and compensation for HNS spills

NOWPAP MERRAC

Previous Efforts (2)

Technical Reports

- HNS Training Manual (2011)
- HNS database in the NOWPAP region (2010)
- HNS response operation guideline(2010)

Routine Tasks or Program

- Information exchange for the case study in NOWPAP FPM or CAN
- Statistics of HNS spills on the Annual basis

NOWPAP MERRAC UNEP IMO 해양경찰청 KOREA COAST GUARD

Results of Disscussion (1)

New Tasks

- Build up HNS DB as like as Oil response equipment in annual basis
  - Specific response vessels, Detectors, PPE and others
  - Within annual based database as a routine task
  - Arrangement in details at the next FPM by MERRAC

Items	Name	Photo	Performance capacity	Amount	Location
Response ship	HRV-1		-	2	Russia
PPE	Chemical suits (Level A)		-	130	Korea
Detector	Multi-Gas Detector		-	32	Japan
Response materials	Chemical Resistance Tape		-	200	China

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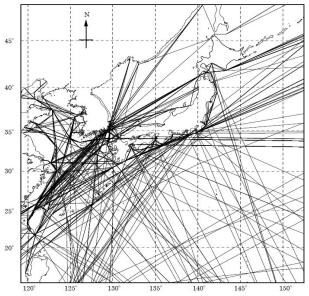
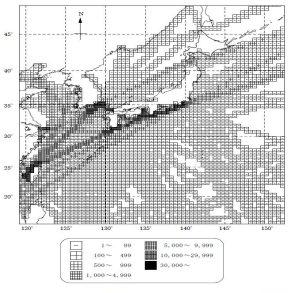
Results of Disscussion (2)

Specific project

- Updating the density or shipping route for the navigation of HNS transport vessels since 1997
  - Basic data for the assessment of potential risk of NOWPAP region





NOWPAP MERRAC UNEP IMO 해양경찰청 KOREA COAST GUARD

Results of Disscussion (3)

Information sharing

- HNS network system (MAR-ICE/EU, CANUTEC/Canada, CHEMTREC/ USA) for sharing information of chemical DB on land
  - Collecting more detail information on the existing Network by MERRAC

Prevention measures

- Focal points of MERRAC have different authority for the prevention issues
  - Prevention : Port State Control or inspection of facilities for SOPEP
  - Most of prevention processes are already formulated by International Conventions

Report of group discussion Session2:

-Response methods of HNS spill incidents in the NOWPAP region-

15-17 October 2013
Qingdao, the People's Republic of China

1

Contents

1. Brief overview and evaluation
   1. Current status at each NOWPAP member
   2. Weakness and challenges at the national and regional levels
2. Identification of the MERRAC activities to be taken in the future

2

1. Current status at NOWPAP region

- We discussed about current status in NOWPAP region
- Each country develops and has response method of HNS spills
- However, response method of HNS spill incidents is not still fully enough compared to response method of oil spill incidents.
  1. Ability to monitor the situation/ to detect hazardo us substances
  2. Responding equipment such as vessels, PPE.
  3. Disposal of HNS materials.

3

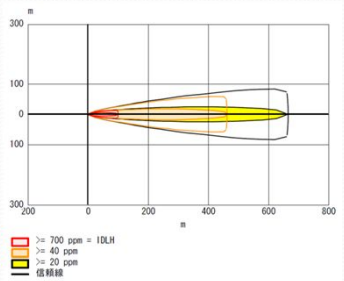
Weakness and challenges (1)

- Monitoring and detection capabilities
  1. There are many kinds of monitoring and detec ting devices
  2. We have to choose appropriate detector with c onsideration of characteristic/property of the HNS substances

4

Weakness and challenges (2)

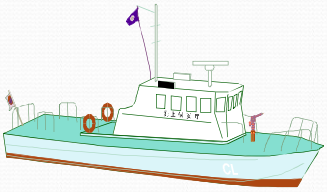
- Prediction model of gas spreading
  1. There are some kinds of prediction model
     - ALOHA, CARIS, 3D monitoring system etc.
     - Ex. ALOHA (USA), can detect only within 10km and within 1 hour after the spill.



5

Weakness and challenges (3)

- Dedicated chemical recovery vessels
  1. There is no recovery vessels or specialized vessels for responding to HNS spills.
  2. Dedicated chemical recovery vessels are effective for recovery activity.
  3. We can benchmark the EU policy on how we can manage the recovery vessels



6

Weakness and challenges (4)

- PPE
  1. We have to choose appropriate PPE with considering of property of the chemical substances for response
  2. However, it would be difficult for us to select appropriate PPE in case of minor chemical substances, because the data provided by the PPE company is not fully covered the existing all chemical substances.

7

Weakness and challenges(5)

- Specialized experts
  1. It would be difficult to educate all concerned personnel effectively
  2. It is more efficient to educate just specialized experts
  3. Having a specialized team such as National Strike Team is very practical to respond to HNS spill because specialized knowledge and skills would be required for responding.

8

Weakness and challenges(6)

- Disposal capabilities
  1. Doubt that we have enough disposal capabilities.
     ex. Facility

9

2. Identification of the MERRAC future activities

- Sharing of information among NOWPAP members on the HNS spill response methods
  - would be effective because we can analyze what we have and what we are missing, and we can develop for future plan.
- We came up the initial draft table during the group discussion in order to help members to know each other the status of the response level in NOWPAP region.

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2-1. Initial draft table

	Current status	Future plan
1. Monitoring/ Detection (measurement etc.)		
2. Prediction model for HNS (i.e. software, simulator) - ALOHA, CARIS, 3D software		
3. PPE		
4. Response (response policy, NCP, manuals)		
5. Measures (dedicated vessels, equipment, materials, sorbent, training of personnel etc.)		
6. Disposal method (facilities, company etc.)		

11

3. Recommendations

- HNS response Training by inviting HNS experts/ trainers from IMO or EU countries

12

4. Conclusion:

- Sharing of information among NOWPAP members on the HNS spill response methods would be effective because we can analyze what we have and what we are missing for future plan.
- The table we came up during the meeting will help members to know each other the status of the response level in NOWPAP region.

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Session 3

Prevention and preparedness of
HNS spill incidents

Session 3 -Prevention and preparedness of HNS spill incidents

Participants – representatives of China,
Japan, Korea and Russia
MERRAC Secretariat

Session 3 -Prevention and preparedness of HNS spill incidents

Brief overview and evaluation

- Three NOWPAP Member states are Contracting Parties to OPRC-HNS Protocol 2000
- All NOWPAP Member states have national competent body that responsible for Oil and HNS spill response: JCG, KCG, China MSA,SMPCSA.
- Only Japan has NST on HNS
- NCP – Japan and Korea have NCP, China – in the process, Russian – under consideration

Session 3 -Prevention and preparedness of HNS spill incidents

Weakness and challenges at the national and regional level

- each NOWPAP Members states have different level of national infrastructure for HNS spill response and different level of education and training as well as experience on HNS response
- not enough information on HNS spill response
- need for well-trained personals/staff for NST
- necessary to enhance regional cooperation in the field of HNS preparedness and response

Session 3 -Prevention and preparedness of HNS spill incidents

- Recommendations

  URGES NOWPAP Member states to access to OPRC-HNS Protocol 2000

  URGES NOWPAP member states to include HNS spill response matters in their NCP

  URGES NOWPAP Member states to enhance education and training their personal/staff for HNS spill response

  URGES NOWPAP Member states to provide special HNS response equipment

Session 3 -Prevention and preparedness of HNS spill incidents

Identification of the MERRAC activities to be taken in the future

- necessary to include in the Agenda of MERRAC FPM a specific item concerning HNS spill preparedness and response
  - national standards of HNS equipments;
  - information about the restoration of the affected areas–environment impact assessment
- to recommend the expansion of the MERRAC information system to HNS spill response matters: HNS Focal Points, HNS equipments, list of HNS institute and experts

Session 3 -Prevention and preparedness of HNS spill incidents

- to consider the possibility of launch the new MERRAC Specific Project on HNS risk assessment and assessment of regional level of preparedness
- HNS training and exercise
  - training:
    - > IMO Model Course on HNS preparedness and response
    - > GI Initiatives
    - > Japan training centre (level 1)
  - exercise
    - > NOWPAP BRAVO with scenario which to be based on HNS incident
    - > NOWPAP ALPHA during the FPM
    - > NOWPAP Delta with elements of HNS spill response

Session 3 -Prevention and preparedness of HNS spill incidents

Public awareness

- MERRAC Secretariat
  - to consider the possibility to present the regional activities in the field of HNS spill response
  - IOCS 2014 – report on the relevant session
  - working document to PPP Sub-Committee IMO

Session 3 -Prevention and preparedness of HNS spill incidents

Public awareness

- MERRAC Secretariat

  - collect information about HNS spill and HNS spill response operation in the other part of world

Session 3 -Prevention and preparedness of HNS spill incidents

Thank all participants and MERRAC Secretariat for active consideration and supporting

2013 NOWPAP MERRAC
Expert Meeting

Organized by
NOWPAP MERRAC

Northwest Pacific Action Plan
Marine Environmental Emergency Preparedness and Response
Regional Activity Centre

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