NOWPAP MERRAC Expert Meeting

2017 해양재난 대응 국제 컨퍼런스

2017 International Maritime Disaster Response Conference

10th Anniversary of Hebei Spirit Oil Spill Incident

6-7 December 2017, The Westin Chosun Hotel, Busan, Republic of Korea

POLICE 해양경찰

해양경찰청
KOREA COAST GUARD

KRISO 선박해양플랜트연구소 KOREA RESEARCH INSTITUTE OF SHIPS & OCEAN ENGINEERING

KOEM Korea Marine Environment Management Corporation

KEI 한국환경정책·평가연구원 Korea Environment Institute

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

Table of Contents

1. Outline of the Conference 4

2. Program of the Conference 5

3. Opening speech & Commemorative address 9

4. R&D Exhibition & Marine Disaster Response Exercise 15

5. Session 1: Case studies of major oil and HNS spill accidents 19

5.1. Hebei Spirit oil spill incident 21

5.2. Deep-water Horizon oil spill accident 55

5.3. Case studies of major oil spill accidents occurred in Europe 69

5.4. Lessons and challenges from large oil spill of Korea 73

6. Session 2: The policies and the latest technologies on Maritime disaster 89

6.1. Overview of Korea Vessel Traffic Service (VTS) and its Big Data Application 91

6.2. China' s Policy on the Capability Building for Ship-source Pollution Preparedness and Response 105

6.3. National Policies on maritime disaster preparedness and response by JCG 117

6.4. Activities of the Russian Marine Rescue Service in the field of oil spill preparedness and response and international cooperation 130

6.5. Recent trend of IOPC Funds 146

7. Session 3: Future workplan for increasing capacity building for effectiveness of marine disaster preparedness and response 163

7.1. International response to pollution incidents - Current picture and future outlook 165

7.2. The 4th Industrial Revolution and future of maritime disaster response 179

7.3. The Development of Surveillance, Modelling and Visualization (SMV) tools to support a response effect 191

7.4. Regional cooperation on marine pollution preparedness and response in the NOWPAP Region 205

목 차

1. 행사 개요 4

2. 프로그램 일정 5

3. 개회사 및 기념사 9

4. R&D 전시 및 사고 대응 시연 15

5. 1세션: 국내 · 외 재난성 해양사고 대응 사례 발표 19

5.1. 허베이스피리트호 해양오염 대응 21

5.2. 미국 딥워터 호라이즌호 사고 대응 55

5.3. 유럽지역 해양오염사고 대응 69

5.4. 대형 해양오염사고로부터 얻은 교훈과 도전 73

6. 2세션: 주요 선진 해양국가의 해양사고 대응정책 공유 89

6.1. 국내 VTS 현황 및 빅데이터 활용방안 91

6.2. 선박으로부터의 해양오염 대비 · 대응 역량 확보 105

6.3 해양사고 대비 · 대응에 대한 국가 정책 117

6.4. 해양오염 대비 · 대응 및 국제협력 활동 130

6.5. 해양오염피해 국제보상 체제와 대규모 해양오염 관리 방안 146

7. 3세션: 국제정세 변화 및 기술발전에 따른 미래 전망 163

7.1. 해양재난 대응 국제동향 및 미래전망 165

7.2. 4차 산업혁명에 따른 해양재난대응 변화 179

7.3. 해양오염방제를 위한 감시, 모델링 및 시각화(SMV) 기술 개발 191

7.4. 동북아 국가간 방제분야 협력활동 성과 및 발전방향 205

Outline of the Conference

Subject	Past, present and future of the maritime disaster response
Date	6- 7th December 2017
Venue	Westin Chosun Hotel, Busan, Republic of Korea
Host	Korea Coast Guard
Co-host	Korea Research Institute of Ships & Ocean engineering (KRISO), Korea Marine Environment Management Corporation (KOEM), Korea Environment Institute (KEI), Northwest Pacific Action Plan Marine Environmental Emergency Preparedness and Response Regional Activity Center (NOWPAP MERRAC)
Participation	International and domestic experts, national delegations
Events	R&D Exhibition & Maritime Disaster Response Exercise

행사 개요

주제	해양재난대응의 변화와 미래
일자	2017년 12월 6 ~ 7일
장소	부산 웨스틴 조선 호텔
주최	해양경찰청
공동주관	선박해양플랜트연구소 해양환경관리공단 한국환경정책평가연구원 NOWPAP 방제지역활동센터
참가대상	국내 · 외 해양재난대응 분야 전문가 및 국가 대표
부대행사	해양 R&D 기술 전시 및 사고 대응 시연

Program

Day 1 (Wednesday, 6 December)

09:30-10:30	Registration
Opening of the Conference	
10:30-10:50	Opening ceremony
10:50-10:55	Opening speech by Commissioner General of Korea Coast Guard
10:55-11:00	Address by Secretary General of IMO
11:0011:10	Group Photo
[Session 1] Case studies of major oil and HNS spill accidents	
11:10-12:00	Hebei Spirit oil spill incident (Hyeong Man Kim, KCG)
12:00-13:00	Luncheon
13:00-13:30	Deep-water Horizon oil spill accident (Arex Avanni, USCG)
13:30-14:00	Case studies of major oil spill accidents occurred in Europe (Richard Johnson, ITOPF)
14:00-14:30	Lessons and challenges from large oil spill of Korea (Sun Cheol Na ,KOEM)
14:30-14:50	Coffee/Tea Break
[Session 2] The policies and the latest technologies on maritime disaster	
14:50-15:20	Overview of Korean Vessel Traffic Service (VTS) and its Big Data Application (Kwang Il Kim, Chungbuk National University)
15:20-15:50	China' s Policy on the Capability Building for Ship-source Pollution Preparedness and Response (Guo Peng, China MSA)
15:50-16:20	National Policies on maritime disaster preparedness and response by JCG (Katsuaki Nagasaki, Japan JCG)
16:20-16:50	Activities of the Russian Marine Rescue Service in the field of oil spill preparedness and response and international cooperation (Natalia Kutaeva, Russia MRS)
16:50-17:20	Recent trend of IOPC Funds (Chiara Della Mea, IOPC Funds)
17:20-17:40	Discussion
18:00-20:00	Welcoming Reception

Day 2 (Thursday, 7 December)

[Session 3] Future workplan for increasing capacity building for effectiveness of marine disaster preparedness and response	
09:00-09:40	International response to pollution incidents - Current picture and future outlook (Patricia Charlebois, IMO)
09:40-10:20	The 4th Industrial Revolution and the future of maritime disaster response (Young-Joo Lee, NIA)
10:20-10:40	Coffee/Tea Break
10:40-11:10	The Development of Surveillance, Modelling and Visualization (SMV) tools to support a response effect (Chris Moore, OSRL)
11:10-11:40	Regional cooperation on marine pollution preparedness and response in the NOWPAP Region (Seong-Gil Kang, MERRAC KRISO)
11:40-12:00	Discussion
12:00-13:00	Luncheon
13:30-14:30	Venue Transfer (Hotel → Technical Tour)
14:30-16:00	Demonstration on Marine Disaster Response Exercise

프로그램 일정

1일차 (12.06.수)

09:30-10:30	참석자 등록
컨퍼런스 개회식	
10:30-10:50	식전 공연
10:50-10:55	개회사: 해양경찰청장
10:55-11:00	기념사: IMO 사무총장
11:00-11:10	기념촬영
[1 세션] 국내 · 외 재난성 해양사고 대응 사례 발표	
11:10-12:00	허베이스피리트호 해양오염 대응 (김형만, 해양경찰청)
12:00-13:00	오 찬
13:00-13:30	미국 딥워터 호라이즌호 사고 대응 (Arex Avanni, USCG)
13:30-14:00	유럽지역 해양오염사고 대응 (Richard Johnson, ITOPF)
14:00-14:30	대형 해양오염사고로부터 얻은 교훈과 도전 (나선철, 해양환경관리공단)
14:30-14:50	Coffee/Tea Break
[2 세션] 주요 선진 해양국가의 해양사고 대응정책 공유	
14:50-15:20	국내 VTS 현황 및 빅데이터 활용방안 (김광일, 충북대학교)
15:20-15:50	선박으로부터의 해양오염 대비 · 대응 역량 확보 (Guo Peng, 중국 해사안전국)
15:50-16:20	해양사고 대비 · 대응에 대한 국가 정책 (Katsuaki Nagasaki, 일본 해상보안청)
16:20-16:50	해양오염 대비 · 대응 및 국제협력 활동 (Natalia Kutaeva, 러시아 해양구난방제대)
16:50-17:20	해양오염피해 국제보상 체제와 대규모 해양오염 관리 방안 (Chiara Della Mea, IOPC Funds)
17:20-17:40	질의 및 토론
18:00-20:00	환영만찬

2일차 (12.07.목)

[3 세션] 국제정세 변화 및 기술발전에 따른 미래 전망	
09:00-09:40	해양재난 대응 국제동향 및 미래전망 (Patricia Charlebois, IMO)
09:40-10:20	4차 산업혁명에 따른 해양재난대응 변화 (이영주, 한국정보화진흥원)
10:20-10:40	Coffee/Tea Break
10:40-11:10	해양오염방제를 위한 감시, 모델링 및 시각화(SMV) 기술 개발 (Chris Moore, OSRL)
11:10-11:40	동북아 국가간 방제분야 협력활동 성과 및 발전방향 (강성길, MERRAC 선박해양플랜트연구소)
11:40-12:00	질의 및 토론
12:00-13:00	오 찬
13:30-14:30	버스 이동(호텔→시연장)
14:30-16:00	해양사고대응 시연 참관

Opening Speech

Ladies and Gentlemen, good morning.

I am Kyoung-Min Park, the Commissioner General of Korea Coast Guard.

I would like to give a warm welcome to all of you for participating in 2017 International Maritime Disaster Response Conference commemorating 10th year of the Hebei Spirit oil spill incident. Specially to the delegates of People's Republic of China, Japan, Russian Federation, United States and Canada, maritime disaster response experts from International Organizations of IMO, IOPC Funds, ITOPF, IPIECA, OSRL. Also, to the domestic experts from Korea Marine Environment Management Corporation, Korea Research Institute of Ships and Ocean Engineering, NOWPAP MERRAC and Korea Environment Institute for their participation.

As you are well aware, this year is the 10th year of Hebei Spirit oil spill incident occurred in 2007 in Korea and the 20th year of Nahodka oil spill incident occurred in 1997, Japan. Moreover, it is the 50th year of Torry Canyon oil spill incident occurred in 1967 at England shoreline.

I am greatly honored to have an opportunity to coordinate this meaningful International Conference which to hold in accordance with Northwest Pacific Action Plan (NOWPAP) Expert Meeting where we can look back the past and the present and prepare for the future ahead of us.

We had various marine pollution incidents last few years in Korea. The Hebei Spirit oil spill incident occurred in 2007, Wu Yi San oil spill incident occurred in 2013 and Captain Vangelis L oil spill incident occurred in 2014. Through this major maritime incidents, we have witnessed how massive damages could be caused to our environment.

Hereupon, Korea Coast Guard has made great efforts in order to response maritime disaster incidents during the last 10 years and we have achieved important changes and improvement.

Korea Coast Guard has secured the authority to command on maritime pollution incident response. KCG has made the best efforts to strengthen maritime pollution response capabilities by providing continuous support to local governments.

In addition, KCG had constructed oil spill response equipment warehouses in Gwangyang, Daesan and Ulsan where the potential of maritime pollution incidents occurrence is relatively high. Therefore, oil spill response equipment and resources are readily accessible and can be quickly mobilized to support the response whenever maritime pollution incidents occur. The large enough of oil spill response equipment and resources are stockpiled in the warehouses to be provided for the initial stage of maritime disasters up to 7 days.

Moreover, in order to reinforce maritime pollution incident response at an initial stage and in emergency, KCG set up the Special Rescue Unit at Eastern, Western and Southern part of Korea. The chemical incident response vessels will be dispatched at Ulsan, Yeosu and Daesan, the areas where the HNS contained vessel traffics are high.

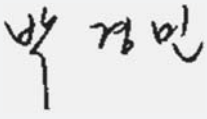
In addition, we push forward to develop modernized maritime disaster response equipment by applying science technology. The vessel hull blockade device, oil fence and nanotechnology resources, etc. are the results of our research and development.

The world is changing and moves forward to the fourth Industrial Revolution. The maritime disaster response methods need to follow the circumstances. Since the international regulation on Sulphur usages of vessel fuels will be strengthened by the year of 2020, new LNG fuel vessels will be appeared and replaced. Thus, we need to prepare for the possible maritime pollution incidents, which might occur from new LNG fuel vessels.

The experiences of maritime disaster incidents shall not be repeated. Therefore, we shall be prepared to manage maritime disaster with scientific response methods. In this respect, I wish this conference could be the platform where all the participants in the field of marine disaster response can share their information and have fruitful discussion on the future direction of maritime disaster response.

Thank you.

Commissioner General
Korea Coast Guard



개 회 사

안녕하십니까?

해양경찰청장 박경민입니다.

허베이스피리트 유류오염사고 10주년을 맞아 해양재난 대응 국제 컨퍼런스에 참석하여 주신 미국, 캐나다 국가 대표단과, 중국, 일본, 러시아 대표단, IMO, IOPC Funds, ITOPF, IPIECA, OSRL 국제기구와 해양오염사고 대응전문가 그리고 해양환경관리공단, 선박해양플랜트연구소, NOWPAP MERRAC, 한국환경정책 · 평가연구원 등 국내 · 외 전문가 여러분들께 깊은 감사의 인사를 드립니다.

올해는 2007년 허베이스피리트호 유류오염사고가 발생한지 10년째가 되는 해입니다. 또한 1997년 일본 나호드카호 사고가 발생한지는 20년이 되는 해이고 토리캐니언 유류오염사고가 발생한지 50년이 되는 뜻 깊은 해입니다.

해양경찰은 과거의 대형 해양오염 사고를 돌아보고 현재의 문제점을 진단하여 희망찬 미래를 준비하고자 국제 컨퍼런스를 개최하게 되었습니다.

또한, 금번 국제 컨퍼런스가 북서태평양지역 해양환경보전을 위한 북서 태평양보전실천계획(NOWPAP) 전문가회의 일환으로 진행되는 점에서 매우 뜻 깊은 행사라고 할 수 있습니다.

우리나라에서는 지난 수십 년 동안 많은 해양오염사고가 발생하였습니다. 2007년 역사상 최악의 재앙으로 기억되는 허베이스피리트호 사고, 2013년 우이산호사고, 2014년 캡틴반젤리스L호 사고 등 대형 해양오염사고가 얼마나 치명적이고 막대한 피해를 가져올 수 있는지를 잘 알고 있습니다. 이러한 재난적 해양오염사고에 대응하기 위해 지난 10년간 많은 변화와 발전이 있었습니다.

해양경찰청장이 해양오염사고 긴급방제 총괄지휘권을 갖게 되었고 해안방제 책임기관인 지방자치단체에 방제기술지원 등 방제대응역량을 강화하기 위한 노력을 기울여 왔습니다.

대규모 해양오염사고에 대비하기 위해 해양오염사고 발생우려가 높은 광양, 대산, 울산에 방제 비축기지를 설치하였고, 사고초기 7일간 대응할 수 있는 방제장비와 자재를 비축하였습니다.

* 방제 비축기지 신축 : 광양('09.9), 대산('09.11), 울산('11.4)

해양에서 발생되는 긴급한 사고에 대응하기 위해 동해, 서해, 남해에 특수구조대를 설치하였으며, 화학물질 취급시설이 많이 위치한 울산, 여수, 대산에 화학방제정을 배치할 계획입니다.

아울러 해양오염사고 대응장비의 현대화를 위하여 과학기술을 응용한 선박파공봉쇄장치와 나노기술을 이용한 방제자재, 악천후에서도 사용이 가능한 오일펜스 등 연구개발도 추진하고 있습니다.

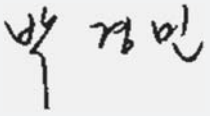
향후 IT기술과 4차 산업혁명시대 도래에 따라 해양오염사고 대응 방법도 획기적인 변화를 모색하고 있습니다. 2020년부터는 국제적인 선박연료유 황함유량 규제 강화로 LNG 연료유 선박 등 새로운 유형의 사고 위험에도 적극적으로 대비할 계획입니다.

우리는 과거에 발생했던 재앙과 같은 사고의 경험을 반복해서는 안 됩니다. 변화하는 국제환경에 발맞추어 보다 과학적인 방법으로 해양 재난상황에 적극적으로 대처해 나가야 합니다. 그런 의미에서 금번 국제 컨퍼런스에 모인 국내·외 전문가와 해양오염방제에 대한 발전방안을 공유하고 심도있게 논의하는 장이 될 수 있기를 바라겠습니다.

감사합니다.

해양경찰청장

치안총감



Commemorative Address

Ladies and Gentlemen, good morning.

I am Kitack Lim, the Secretary General of IMO.

I am very grateful to be given this opportunity to send my greetings to the government representatives, experts working in the field of marine pollution preparedness and response, and also the Korea Coast Guard commissioner general and officials who are hosting this 2017 International Maritime Disaster Conference.

The Hebei Spirit oil spill incident of 2007 was the most major incident occurred in Republic of Korea and the world was astonished by the response operation conducted by the Korea Coast Guard with participation of more than 1.2 million volunteers all working together to overcome the crisis of oil spill incident .

IMO is making our utmost efforts to achieve sustainable development of the ocean and establish a safe ship and port to fulfill Blue Economy.

I hope this conference will provide an important platform to have constructive discussions on how to make our ocean safer and cleaner and on how to prepare marine disaster by keeping a cooperative system between countries.

IMO will continue to make efforts in human life safety and sustainable development of the maritime industry.

I wish this conference can be served as a foundation to ‘look back’ of 10 years after the Hebei Spirit incident to ‘look ahead’ into the next 100 years.

Thank you very much.

International Maritime Organization (IMO)

Secretary General

Ki-tack Lim

기 념 사

안녕하십니까?

IMO 사무총장 임기택입니다.

허베이스피리트호 사고 10주년을 맞아 해양재난 대응 국제컨퍼런스에 참가하신 각 국 정부대표와 전문가 여러분께 멀리서 나마 인사를 드리게 되어 매우 기쁘게 생각합니다.

허베이스피리트호 사고는 한국에서 발생한 가장 큰 규모의 해양오염사고로써 123만명의 자원봉사자들과 해양 경찰, 그리고 관계기관이 혼연일체가 되어 재난을 극복해가는 모습은 세계가 놀랄만한 것이었습니다.

IMO는 블루 이코노미를 실현하기 위해 선박의 안전항해와 해양환경보호를 위한 제반 노력을 기울이고 있습니다.

금번 컨퍼런스를 통해 해양오염방지와 효율적인 대응을 위한 국가간의 협력이 강화되고, 환경변화에 따른 해양재난에 대비하는 건설적인 논의가 될 수 있기를 바랍니다.

IMO도 해양에서의 인명안전과 해양산업의 지속가능한 발전을 위한 노력을 아끼지 않을 것입니다.

금번 컨퍼런스가 지난 10년을 토대로 향후 100년을 내다보는 뜻깊은 자리가 되기를 기대합니다. 감사합니다.

국제해사기구(IMO)

사무총장

임 기 택

R&D Exhibition

● Exhibition stand layout

① Korea Institute of Science and Technology (KIST)	● Response technique on spilt oil and floating HNS using nanostructures - Demonstration of the Oil Scooper	
② Korea Coast Guard (KCG)	● Award-winning works of the 2017 KCG invention contests - Walkie-talkie receive channel display device, etc.	
③ Korea Marine Environment Management Corporation (KOEM)	● R&D achievement of KOEM - Oil Gravel Cleaner	
④ Korea Advanced Institute of Science and Technology (KAIST)	● HNS spill accident Response technique and equipment development - Unmanned aircraft	
⑤ Korea Coast Guard (KCG)	● R&D achievement of KCG - Foothold and knob for hull blockade, Buoyancy bag	
⑥ Korea Institute of Robot and Convergence (KIRO)	● Development of external insert device for hull blockade - Hole blocking robot	

Maritime Disaster Response Exercise

▶ Date/Time: Thursday, 7 December 2017, 14:30 ~ 16:00

▶ Venue: Exclusive port of Busan Coast Guard Korea

KOEM, Marine Environment Research & Training Institute

* Hotel → Technical Tour (by bus) (13:30 ~ 14:30)

▶ Contents of demonstration

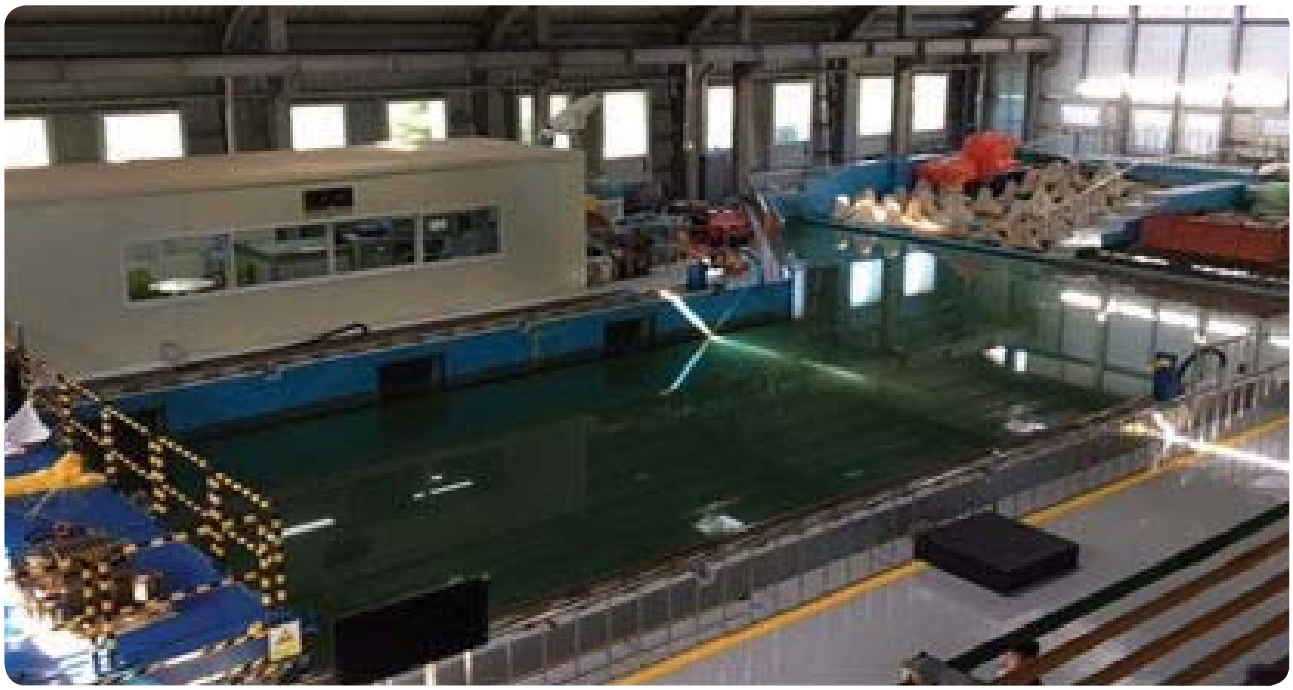
1. Maritime Disaster Response exercise of Korea Coast Guard Special Rescue Unit (50 min)

Rope rescue technique	Rescue equipment exhibition	Surface diving	Emergency response exercise
			

2. Response operation exercise at the Wave tank, KOEM, Marine Environment Research & Training Institute (20 min)

Artificial wave operation → Oil spill (B-C) → Set up an oil fence (boom) → Oil Recovery

※ Demonstration of the Nano Oil Scooper (R&D achievement)



R&D 전시

● 전시부스 배치도

① 한국과학 기술연구원	● 나노구조체 이용 유출유 및 부유성 HNS방제기술 - 기름뜰채 시연	
② 해양경찰청	● 2017년 해경발명대전 수상작품 - 무전기 수신채널 표시장치 등	
③ 해양환경 관리공단	● 해양환경관리공단 연구개발 성과물 - 자갈세척기(모형)	
④ 한국과학 기술원	● HNS 유출사고 현장 대응기술 및 장비개발 - 무인기	
⑤ 해양경찰청	● 해경청 자체연구과제 성과물 - 선박 파공부 봉쇄 작업용 발판 · 손잡이, 부력가방	
⑥ 한국로봇 융합연구원	● 외부 투입형 선박파공 봉쇄장치 개발 - 소형 파공봉쇄 로봇	

해양사고대응 시연

▶ 일시: 12. 7(목), 14:30 ~ 16:00

▶ 장소: 부산해경서 전용부두 및 해양환경관리공단 교육원

* 호텔 → 시연장으로 버스 이동(13:30 ~ 14:30)

▶ 시연 내용

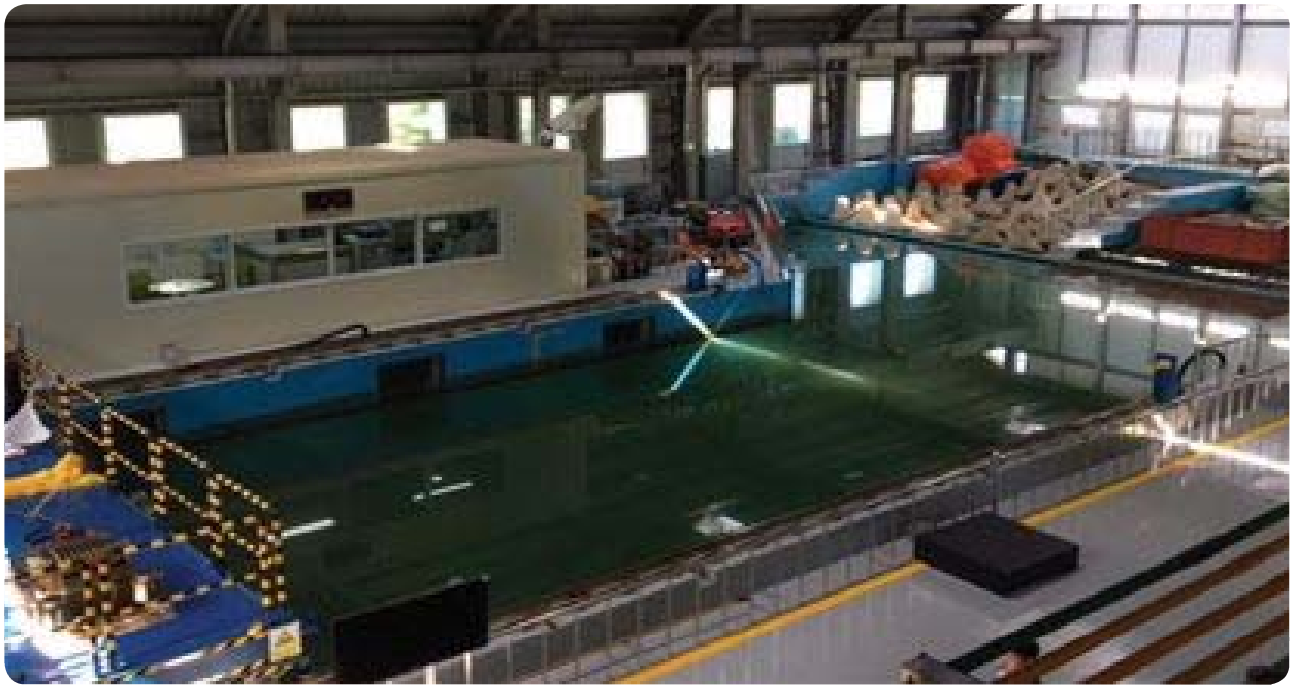
1. 중앙특수구조단 해양재난대응 훈련 시연(50')

로프구조	장비전시	표면잠수	긴급방제
			

2. 해양환경관리공단 해양환경교육원 조파수조 방제 시연(20')

인공파도 작동 → 기름 유출(B-C) → 오일펜스 전장 →기름 회수

※ R&D 성과물 나노뜰채 시연 예정



Session 1

Case studies of major oil and HNS spill accidents

Chair: Chang-Woo Ha

Hebei Spirit oil spill incident

Speaker: Hyeong Man Kim (KCG)

Deep-water Horizon oil spill accident Challenges in Managing a Major Incident

Speaker: Arex Avanni (USCG)

Case studies of major oil spill accidents occurred in Europe

Speaker: Richard Johnson (ITOPF)

Lessons and challenges from large oil spill of Korea

Speaker: Sun Cheol Na (KOEM)

Hebei Sprit oil spill incident

Hyeong-Man Kim
Director General, Marine Pollution Response Bureau
Korea Coast Guard

◆ *Abstract*

On 7th December 2007, a crane barge(GT 11,828) owned by Samsung Heavy Industries being towed by a tug collided with the anchored Hong Kong registered crude carrier Hebei Spirit(GT 146,848), carrying 302,000kl of crude oil. The incident occurred near the port of Daesan on the Yellow Sea coast of Taean County.

By the incident, 12,547kl of crude oil was spilled, it polluted Taean Coast 70km. This caused enormous damage to the marine environment and economy of the West Coast of Korea. The Korean government declared a state of disaster in the region and implemented clean up measure which lead by Korea Coast and 1,230,000 volunteer. As a result, Taean has now recovered to the former clean area. Since the incident, Korean government has sought to improve its ability to respond to marine pollution incidents by improving its policies and developing technologies regard with marine pollution response.

◆ *Profile of the presenter*

Education

• MPA in Sung Kyun Kwan, Republic of Korea

Biography

• 2014-2015, Director Marine Pollution Response Planning Division, Korea Coast Guard

• 2015-, Director General Marine Pollution Response Bureau, Korea Coast Guard

Field of interest

• Public and natural disaster control and management

Hebei Spirit oil spill incidents

National policies on marine disaster preparedness and response

Korea Coast Guard
Marine Pollution Response Bureau
Director General
Hyoung Man KIM

Contents

1. Outline of the H/S oil spill
2. Strengthen the capacity for the response after H/S incidents
3. Enhancement of the national response capacity
4. Future direction of maritime disaster response policy

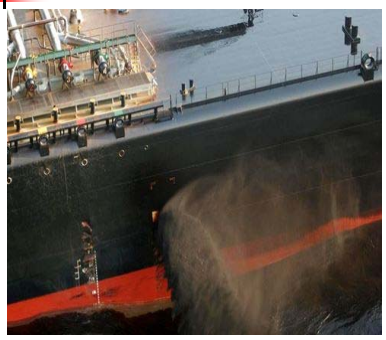
1 Outline of the H/S oil spill

1. The worst domestic accident

- **Date: Friday, 7 Dec 2007, 7 AM**
- **Location: 10km Northwest of Man-li po, Taean**
- **Details**

  Crane-carrying barge(11,800-ton)'s towing line crashed and collided with the M/V Hebei Spirit(146,848-tons)

  #1,3,5 Tank punctures



▶ **Spillage amounts**

12,547 ㎘ spilled

※ 302,000㎘ left in the ship

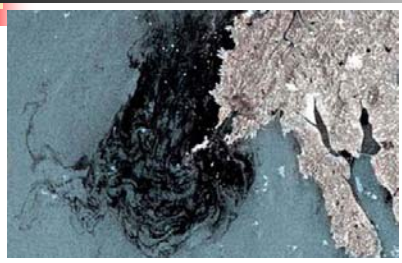
▶ **Oil spill spreading**

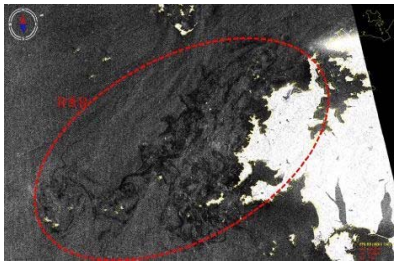
7 Dec, 22:10 PM: Shoreline polluted by spilt oil
(4h 30m earlier than the predicted time
with Oil Spill Spreading Prediction Program)

▶ **Special Disaster Proclamation**

- Damage claim requisition: $ 3.8 billion
- Definite amount: $ 390 million

<Widespread damage by spilt oil>





※ Spread over 70km of shoreline of Taean, Lot of tar made a rush to the shoreline on the 9 cites and provinces (Chung-nam, Chun-nam, Chun-buk, etc.)

‹Farm and coast pollution›

※ Farm damage : 34,700ha

2. Limitation of the response measures

▶ **Strong wind, current & High wave**

- NW wind 14~16m/s, wave height 3~4m
- Issue a High seas watch

▶ **Worse weather →**
difficult to initial response

- Unable to extend oil boom
- Conserve environment-sensitive area
- Focus on not to disperse into abroad

3. Response strategies

▶ Hard to apply standardized methods due to worst weather
- Limitation on extending oil booms to collect spillage and prevent to disperse

▶ Monitor distribution of spillage with planes and establish strategy periodically

▶ Prevent from oil spreading into the sensitive area- aquaculture, fishery, industrial facilities (water intake facility)

▶ Extend oil booms to the onshore to prevent coastline contamination

▶ Spray oil dispersants to prevent possible dispersion toward offshore

3. Offshore response options

A. Spray oil dispersants

B. Oil recovery operation by oil response vessels

C. Mechanical recovery oil by skimmer

D. Collect Tars




4. Onshore response options

▶ Direct collection for thick oils, use buckets and shovel by hands


▶ (Natural attenuation by the waves) Dig in the ground and turn over, transferred oiled sand to tidal area for the natural attenuation and collection with absorbents

▶ High pressure flushing is implemented on contaminated man-made structure

▶ For gravel on the rock attached oil, low pressure spray

▶ Oil recovery in the shallow sea area using the skimmer




▶ For the removal of permeated oil in sandy area, perform the inhaling both oil and sand, and removing the oil




▶Gravel attached oil clean by high temperature using the fork crane



▶ Wipe and collect oil by hands in beach areas (gravel, rock)

*The standardized method for large scale of onshore oil contamination




▶ Police and army were deployed in dangerous areas(cliff)

5. Volunteers response activities

▶ Private volunteers work

▶ Volunteers work in various field





<Miracle of the 1,230 thousand volunteer>


➢ The more difficult situation, Koreans help each other with sense of national solidarity

(The gold-gathering movement in the financial crisis)

5. Completion of the response action

❖ Offshore : 8 Jan 2008(during 1 month)

❖ Onshore : 7 Jul 2008(during 7 month)

* Completion of the response action on the 70km pollution shoreline of taean (160 regions)

❖ Island: 10 Oct 2008(during 10 month)

* Completion of the response action on the 101 of Polluted island

※ After the Joint surveys of pollution level, close the response

* Experts, stockholder, local governments and residents

➢ 11 months to complete the offshore and onshore response

➢ The amount of damage: about 390 million (judgement criteria: september 2017)

6. Paradigm shift to marine pollution accident

A. The worst domestic environment disaster

B. Experience the important of environment,
Miracle of the 1,230 thousands volunteers

C. Paradigm shift to maritime disaster response

1978	1995년	2007년
Start of pollution response	Sea prince Oil Spill	H/S Oil Spill
Prevention of Marine Pollution Act	National Contingency Plan	Marine Environment Management Act
Pluralistic	Dualistic(offshore/onshore) ⇨ KCG General Command	
Lack of equipment, skills	Complement the maritime powers	Improve law institution & strengthen maritime response

2 Strengthen the capacity for the response after H/S incidents

1. Problem on the H/S incidents

▶ (Failed in early stage) Worse weather → delay to block and transfer the spilt oil, large-scale coastal pollution and damage caused by failure to prevent spreading

▶ (Duality of command system) Dualised management agency & Control tower(MLTM-KCG dual press release system)

▶ (Lack of response resources) Delay to response due to lack of initial coastal response resources

→ The worst damage, National blame → National measures set up, hosted by prime minister

2. Political Improvement plan

Unification of the command system by KCG

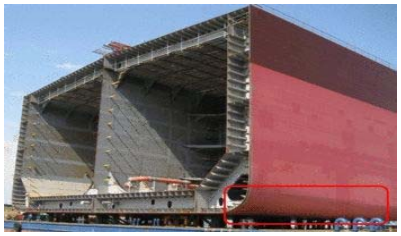
- Under the amendment of Marine Environment Management Law, Commissioner general of the KCG command in emergency oil spill response
- Head of response management(Commissioner general of the KCG): command at the scene
- Director of control tower(Minister of MLTM): cooperation between ministries, restoration, compensation for resident

Strengthen the coastal response responsibility of the local government

- Commissioner general of KCG: support the response equipment, expert, and skills
- Coastal response management agency: chief of competent local government / two or more municipalities are affected: provincial governor
- Mandate for reserving the oil boom and absorbent for local government according to the response material stockpile standard

Shorten ply of single hull tanker (introduction of the Double-hull vessel)

- Early adoption of a Single-hull oil tanker that can be operated by 2015, if it meets certain criteria under international convention, stop ply from 2010



Improvement of the operating system on the Vessel Traffic Service(VTS) Center

- Connection reinforcement between the maritime powers of KCG and VTS of MLTM
- Unification for VTS to KCG after the Sewol ferry accident (2014)

<After the H/S oil spill>

- ❖ Coastal VTS: refer to KCG
- ❖ Port VTS : Joint service of the Korean maritime and port administration and KCG

<After the Sewol ferry accident>

- ❖ Coastal VTS (3 office) + Port VTS (15 office) : refer to KCG

2. Strengthen of national response capacity

Establishing the 3 places of national stockpiles

➢ Response resources stockpile available for 7 day of the large scale marine pollution accidents

Personal protective equipment(set)	Working tool(set)	Adsorbent (ton)	Storage container(㎥)	Collecting bag
24,599	1,254	129	1,140	52,104

<Daesan national stockpiles>

<Yeosu national stockpiles>

<Ulsan national stockpiles>

Expansion of the response equipment on the maritime pollution

- H/S oil spill[2007]: 19 of the Response vessel, 134 of the response equipment, 15㎞ of the Oil fence, etc.
- Recent[2017]: 37 of the Response vessel, 303 of the response equipment, 42㎞ of the oil fence, etc.

	Response vessel	Response equipment	Oil fence
H/S incident[2007]	19	134	15km
Recent[2017]	37	303	42km
variation(%)	18(95%)	169(126%)	27km(180%)

17 of Small-sized response vessel

Response for the coastal, port and shallow sea

Strengthen the capacity of response

wagon	Beach cleaner	High pressure cleaner	Low pressure cleaner	Power sprayer	Transfer pump
29	6	47	47	28	42

3 Enhancement of the national response capacity

1. Occurrence of the National maritime disaster accident

Consistence occurrence of the maritime disaster accident on vessel [Yeo su-Wu Yi San accident, Maritime Maisie accident]

➡ New policy requires to response in a variety of situations

2. Establishment of Mid-term strategy on maritime pollution response

➢ Background of the Mid-term strategy

- Need for capacity of the maritime pollution response in response to increased public demand for safety

- Change of the paradigm on the maritime pollution response in the world-wide

➢ Establishment progress

- Analysis of performance on marine pollution response task and current chromic problems(control tower absence etc.) for 37 years

- Expansion of work scope to response all activities(emergency rescue, safety management, etc.) to spillage accidents

➡ Establish future direction of response task and the project

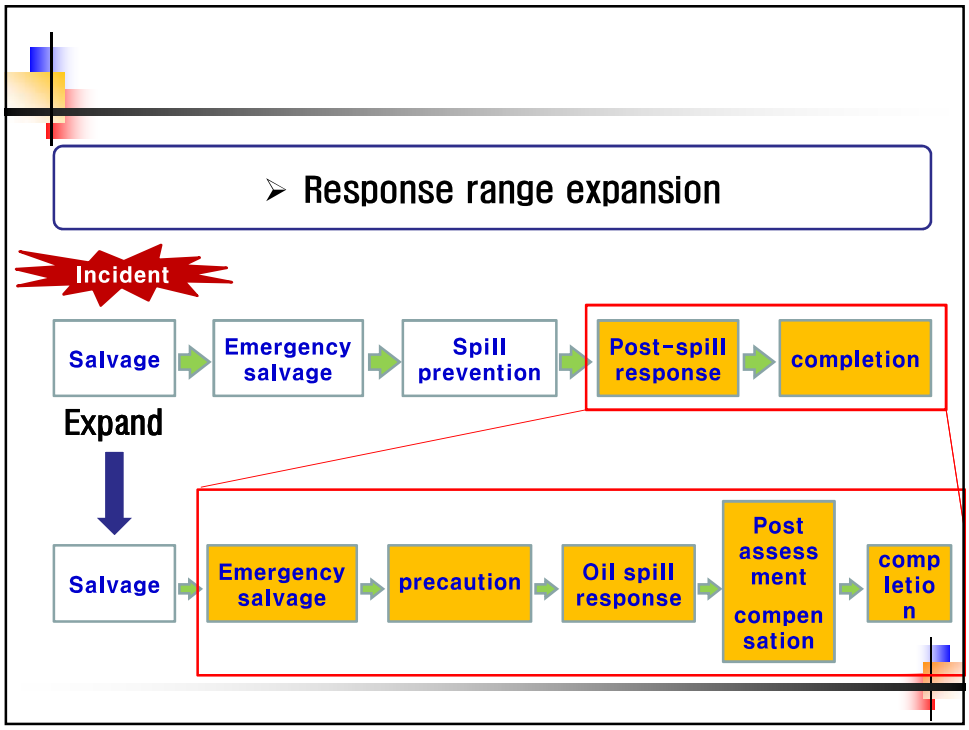
Policy target	From marine Pollution Protect the life and property of the people, and marine environment
Policy direction	Establish roles and responsibilities for each agency, National-lead response in an emergency
Basic rule	● Consistency of the innovation direction on the national disaster protective system ● Conversion to response system and technologies operating on-site ● Establishment of international base principles 「Responsibility of Pollutant 」
Development strategy	1. Establishment of national response system 2. Strengthen on-site response capacity 3. Enhance marine pollution response force 4. Vitalize of private oil spill response sectors 5. Strengthen marine pollution prevention and post management

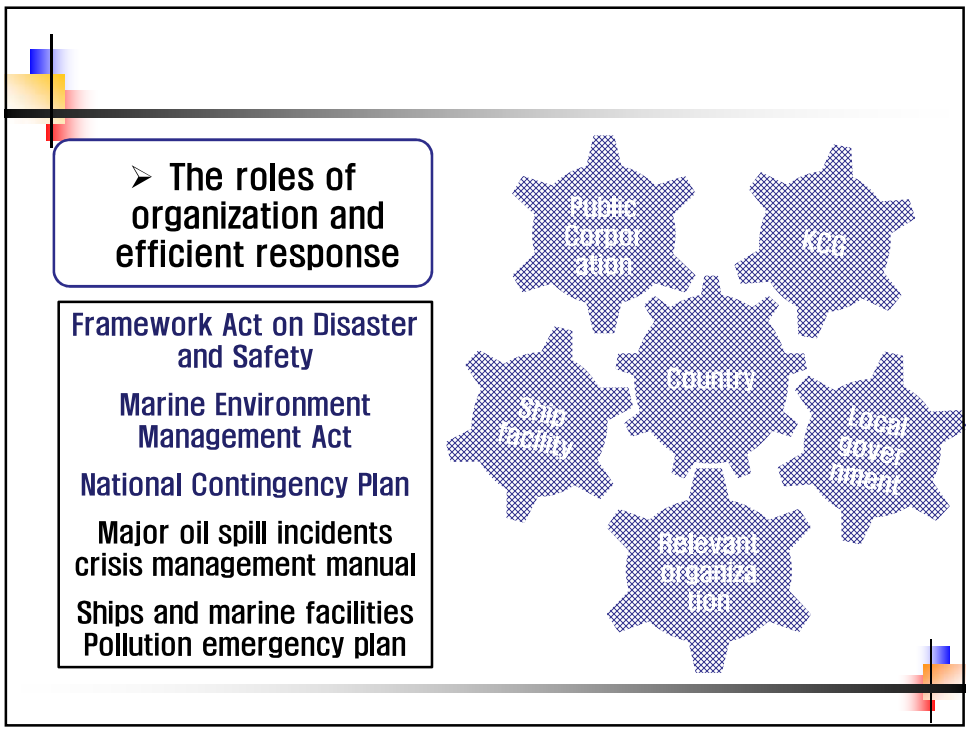
3. Major Achievements

➢ Establishment of National Response system

▶ (Response policy) Provide clear role for response organizations, establish a foothold for rapid and efficient response

▶ (Expansion of the task range) task expansion from oil spill recovery to every activity of damage mitigation


➢ Response range expansion
Incident
Salvage
Emergency salvage
Spill prevention
Post-spill response
completion
Expand
Salvage
Emergency salvage
precaution
Oil spill response
Post assessment
compensation
completion


➢ The roles of organization and efficient response
Framework Act on Disaster and Safety
Marine Environment Management Act
National Contingency Plan
Major oil spill incidents crisis management manual
Ships and marine facilities Pollution emergency plan
Public Corporation
KCG
Country
Ship facility
Local government
Relevant organization

➢ Strengthen on-site response capacity

▶ Convert from post-spill response to pre-spill prevention response

▶ Strengthen specialty of marine pollution emergency salvage

▶ Newly-organized 3 KCG Special Rescue Unit emergency response teams

▶ Improvement of marine pollution emergency salvage capabilities

➢ Enhance marine pollution response force

▶ Rearrange response resources based on the risk assessment

▶ Advancement of response techniques and equipment

*2015: 1Billion, 2016: 4.1Billion, 2017: 6.6Billion, 2018: 10Billion

▶ Establish KCG Special Rescue Unit to strengthen response organization (2015), dispatch response agents (2016), build up a research function of KCG research center (2017)

➢ Adoption of Chemical spill response vessels

– Pressure device and air purification system in vessels

– 2 ships (480 tons) are under construction (will be dispatched at Ulsan, Yeosu from 2018)

– In the process of adopting Mega sized chemical response vessels (1,500 tons)

➢ Enlargement of national R&D projects

– Convert marine pollution response capacity from quantitative expansion to qualitative scale

⇨ – 1billion in 2015 10billion in 2018

Project name	Total budget (2017, billion)	Duration (year)	Objectives
◦ Development of HNS spill incident site response technique and equipment	7.7 (1.7)	15~18	◦HNS spill incident initial response strategic system and development of site detection and analysis
◦ Development of response technology using nanotechnology	10 (2)	16~20	◦Nanotechnology oil scooper, storage, oil filter and oil collecting net
◦ Development of puncture blocking devices	5 (0.6)	16~19	◦Development of device to block the puncture rapidly
◦ Development of emergency response technique on hazardous substance spreading prevention	2.9 (0.4)	16~19	◦Development air transport oil fence and expanding technique
◦ Marine oil spill risk assessment and development of response support system through big data analysis	7.4 (1.3억)	16~20	◦Risk assessment of sensitive resources and establish response strategy, prediction on oil trajectory
◦ Development of oil fingerprint identification technique	3 (0.4)	17~20	◦Development of oil fingerprint identification key technology ◦Development of oil fingerprint identification program

➢ Activation of Private oil spill response sectors

▶ Cost rationalization to private level, reinforce the duty of causer

▶ Induce causers to be in part of response operation to mobilize private companies by themselves

▶ Establish a foothold as ODA project selection that domestic private sectors can be expanded into overseas markets

➢ Strengthen marine pollution prevention and post management

▶ **(Inspection)** Base on statistical analysis, Introduction of marine pollution incidents mitigation goal and systematization of ship and facility safety management

▶ **(Investigation)** Adopt cause investigation, enhance function of assessment

4. Case study : Ocean Tango incident (2016)

▶ On 16 April 2016, due to the bad weather, Ocean Tango (car carrying ship, 3,000 tons) grounded near shoreline. The fuel partially spilled from the puncture on fuel tank located bottom of the ship.

4. Case study : Ocean Tango incident (2016)

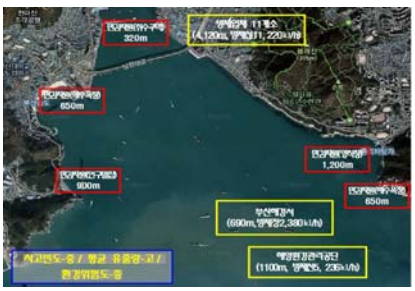
▶ Oil spill response Operations Headquarter

- Cooperative response system operation, overall command at the site under the response system
- Supervise enforcement of the causer

4. Case study : Ocean Tango incident (2016)

▶ Prompt action at early stage under Joint Response of private and public

- Mobilization of private response and salvage companies and assigned to the site within 6 hours
- Local government, Korean Maritime and Port Admin, Public corporation implement the missions under the KCG command and strategy



4. Case study : Ocean Tango incident (2016)

▶ Emergency salvage, Systematic level transition

- Pollutant removal with emergency response team and emergency salvage (oil transfer, blocking)
- After removal, transition to the next level is made (ship disposal, handled from Korean Maritime and Port Administration)



Evaluated as Best Practice of marine pollution incidents response

4 Future direction of Maritime Disaster Response Policy

1. Recent Changes worldwide

➢ The independence of the Korea Coast Guard

At the ceremony on Korea Coast Guard day (12 Sept. 2017)

○『Korea experience major maritime incidents as Hebei Spirit oil spill incidents occurred in 2007 and ...』

○『From marine pollution incidents, the damages are vast in size and take longer time to recover ...』

○『KCG needs to make provision thoroughly thinking in mind that this organization is irreplaceable in the field of marine pollution response ...』

➢ The strategic direction on maritime disaster response needs to improve according to the future direction on KCG renovation

1. Recent Changes worldwide

➢ Future Maritime Pollutant

- Regulation on vessel fuel leads the usage of environment benefit vessels (LNG ships, electric vessels, etc.)
- Causing expansion of environmental sensitive areas

➢ Occurrence of large scale incidents

- Mega container ship appears (2,000TEU)
- Necessity to secure response capacity toward the changes of marine pollutant

➢ Application of advanced technology

- 4th Industrial Revolution arrived and recently advanced technology applies to the various field (IoT, AI, big data, drone, etc.)

3. Future direction on Maritime Response Policy

➢ Capacity building on National response at initial stage to prepare for the complex maritime pollution incidents

➢ Application of cutting-edge equipment and technology for the marine pollution preparedness and response

➢ Improve the legal and management system so that principal agents could actively response to marine pollution incident

Goverment		Private
Emergency salvage capacity on maritime incidents	+	Strengthen the response duty on ships and marine facilities

3. The direction of Main Policies

① (Maritime Pollution Response System)

- Strengthen on-site maritime pollution response commanding with National oil spill Contingency Plan

- Improving institutions (Duty fulfillment on the pollution response of the one who cause the accident)

Incident Command Post

THE NATIONAL OIL SPILL CONTINGENCY PLAN

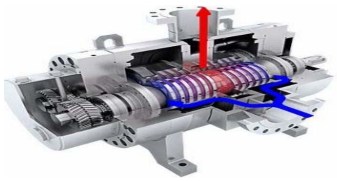
② (Initial response)

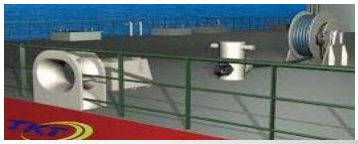
- Strengthen capacity on the response of emergency salvage and chemical incident in order to manage various complex circumstance




③ (Response resources)

- Expand response resources management system into chemical incidents and emergency salvage
- Enhance R&D program in the field of response and the feedback from the site




④ (Oil spill response from private sectors)

- Motivate to secure self-control power of ships and offshore facilities

- Hold regular International Conference, Official Development Assistance (ODA) program, etc.

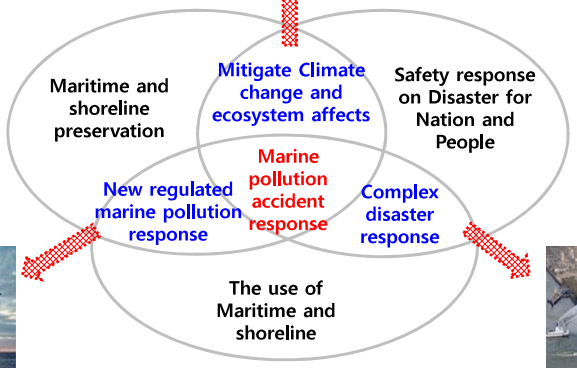
⑤ (Preparedness management)

- Monitoring system using Drone / Application of cutting-edge analysis equipment

- Strengthen equipment inspection for air pollutant management

- Operate pre-assessment on capacity of private response sector

Future tasks on Marine Pollution Response



출처 : KEI「선제적 해양오염 대응 방안 연구」

Thank you

U.S. Response to Deepwater Horizon Challenges in Managing a Major Incident

Arex B. Avanni

Federal On-Scene Coordinator for Deepwater Horizon Response

United States Coast Guard

◆ *Abstract*

Captain Arex Avanni, U.S. Coast Guard, will present the United States' federal response to the Deepwater Horizon Drilling Rig Oil Spill that continually flowed into the Gulf of Mexico from 20 April 2010 to 19 September 2010. This unprecedented incident was the one of the largest and most complex oil spills in history (approx. 4.4 to 5.4 million barrels).

Captain Avanni will review the cause of the spill, actions US government took to respond to the spill, review the command and control system used to manage the response, and what policy and regulation changes the United States has made due to the spill.

◆ *Profile of the presenter*

Education

- Bachelor of Science in Management of the United States Coast Guard Academy, 1994
- Master's degree in National Security and Strategic Studies with a concentration in Asymmetric Warfare from the United States Naval War College
- Public Leadership through the executive education program at the Brookings Institute

Biography

- – Current: Senior Advisor to the Deputy Secretary for the U.S. Department of Homeland Security
- 2016-2017: US Coast Guard's Federal Executive Fellow at The Brookings Institution, one of the world's top ranked think tanks located in Washington, DC
- The Deputy Sector Commander of Coast Guard Sector Honolulu, Hawaii
- 2010-2013: the Commanding officer of the Coast Guard Gulf Strike Team
- July 2010-December 2011: Operations Section Chief for the State of Louisiana and then as the Gulf Coast Deputy Incident Commander and Federal On-Scene Coordinator for the consolidated Deepwater Horizon Oil Spill response
- 2004-2008: Chief of the Sector Command Center and then Chief of Incident Management at Sector San Francisco, California
- November 2007: The Federal On-Scene Coordinator and Incident Commander for the extended response to the Motor Vessel COSCO BUSAN oil spill that occurred in San Francisco Bay
- September 11th, 2001: D1's Incident Management Team which coordinated all Coast Guard port security efforts in response to the Terrorist Attacks in New York City
- 2001-2004: Regional Response Team Coordinator for New England and then Port Security and Waterways Management Program Manager for the First Coast Guard District in Boston, Massachusetts
- 1998-2001: Marine Inspector and Federal On-Scene Coordinator Representative at Marine Safety Office in Morgan City, Louisiana
- 1996-1998: Company Officer at the Naval Academy Preparatory Scholl in Newport, Rhode Island
- 1994-1996: Deck Watch Officer aboard the Coast Guard Cutter MORGENTHAU homeported in Alameda, California

U.S. Coast Guard Deepwater Horizon Challenges in Managing a Major Incident

United States Coast Guard
U.S. Department of Homeland Security

1

What Happened and Why?

- Methane Gas erupted from well causing massive explosion & uncontrollable fire
- 11 Crewmembers killed

Main issues:

- Cement did not sufficiently seal borehole against high pressure
- Valve failures within the Blow-out Preventer
- Uncontrolled release (est 50,000-62,000 bbls/day) on sea-floor

On 22 April (approx. 36 hrs later) – Deepwater Horizon Rig collapsed and sank.

United States Coast Guard
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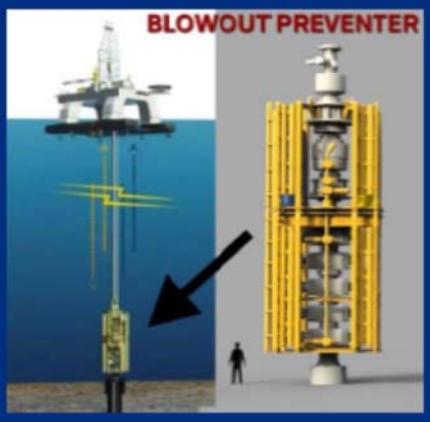
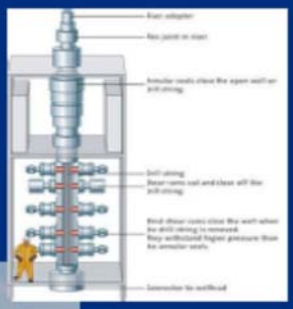
2

Blow-Out Preventer

Shear Rams failed to close completely to prevent the surge of pressure from gas within the well.





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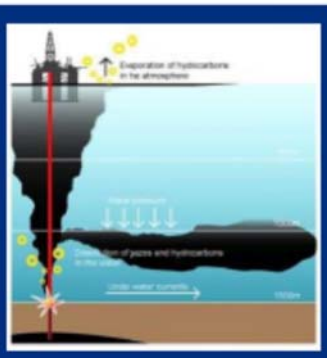
Unique Challenges



- Offshore - 66 km off the southeast coast of Louisiana
- Uncontrolled release at the bottom of the ocean floor – 1,500 meters deep
- No means of stopping the well-head release
- Unpredictable underwater currents

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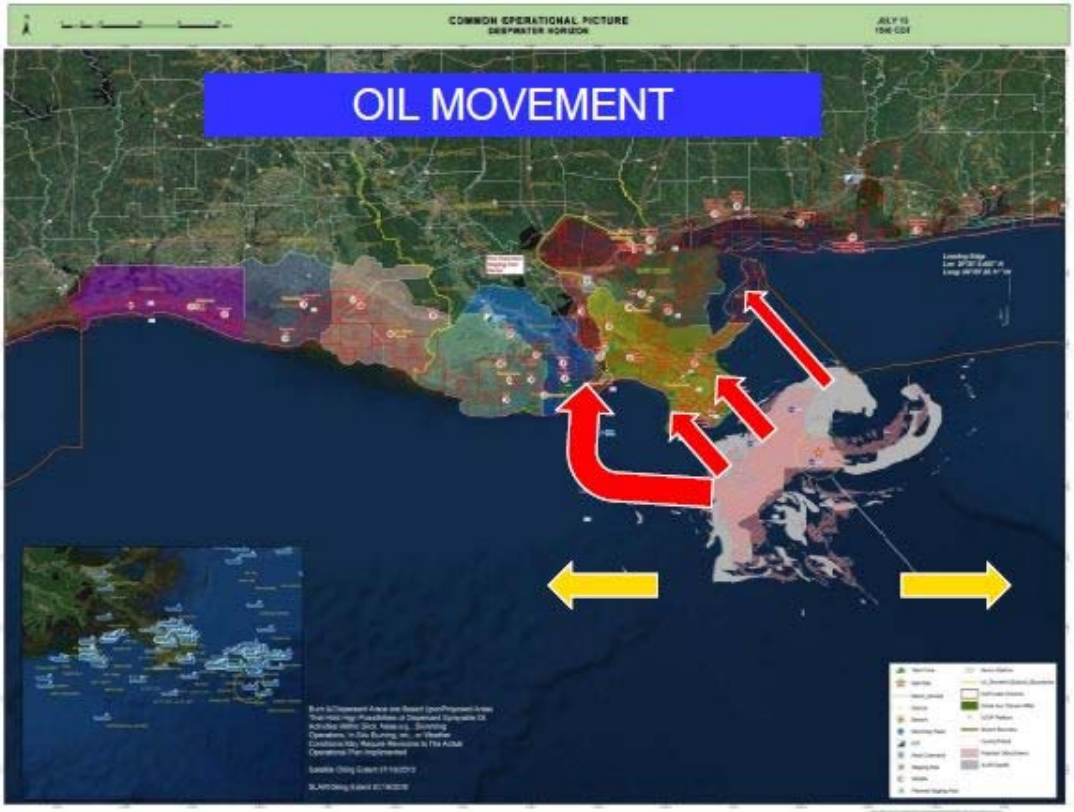
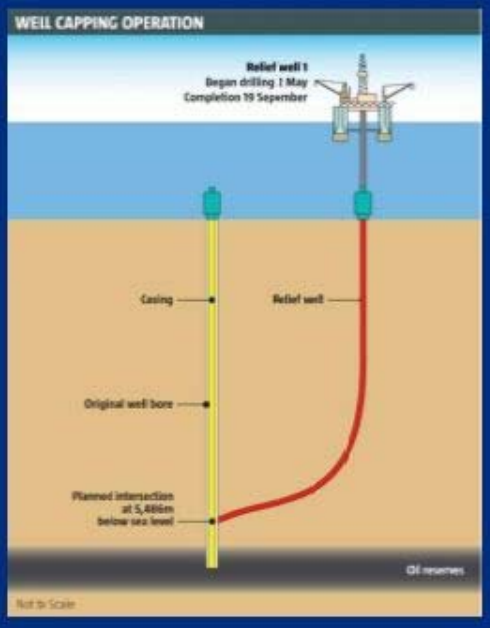


The final solution…

Relief well completed & capped – 19 Sept 2010

After 87 days of uncontrolled release



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6

Deepwater Horizon Oil Spill Response by the numbers…

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U.S. Department of Homeland Security

7

4.4 – 5.4 million barrels oil discharged (estimated)

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8

More than 47,000 people

- 3,300 Coast Guard
- 1,625 National Guard
- 41,470 Contractors
- 723 BP
- 4,000 Volunteers

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9

- 4.5 million meters of boom
- 835 skimmers
- 6,131 vessels

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10

123 aircraft

- 78 rotary wing
- 45 fixed wing

United States Coast Guard
U.S. Department of Homeland Security

11

- Incident Command Posts in four states
- 17 subordinate branches
- 18 staging areas for equipment

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U.S. Department of Homeland Security

12

Fate of Oil

- 800,000+ barrels oily water recovered

United States Coast Guard
U.S. Department of Homeland Security

13

Fate of Oil

- 770,000+ gallons subsea dispersants applied
- 1.07 million gallons of dispersants applied

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U.S. Department of Homeland Security

14

Fate of Oil

- More than 400 in-situ burns conducted
- 265,000+ barrels oil removed by in-situ burns

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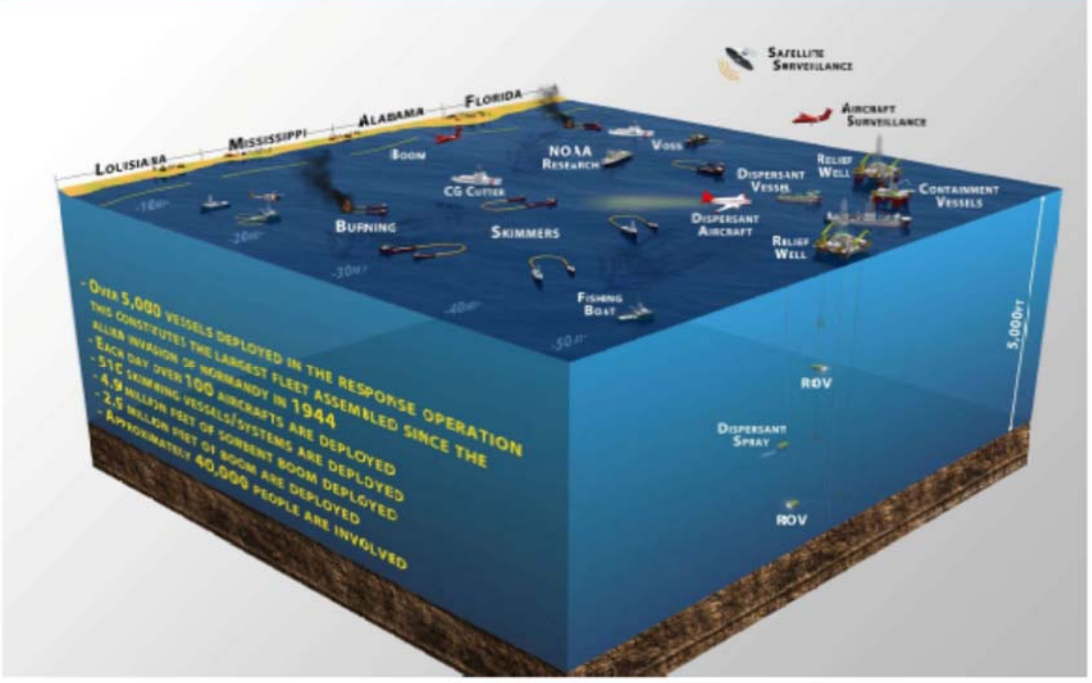
15

Concept of Operations



Governments providing assistance include:

- Canada
- Mexico
- Norway
- Japan
- Germany
- France
- Russia
- Tunisia
- Belgium
- Qatar
- Kenya
- China
- Russia
- Netherlands
- Sweden
- UK
- European Maritime Safety Agency
- International Maritime Organization
- European Union

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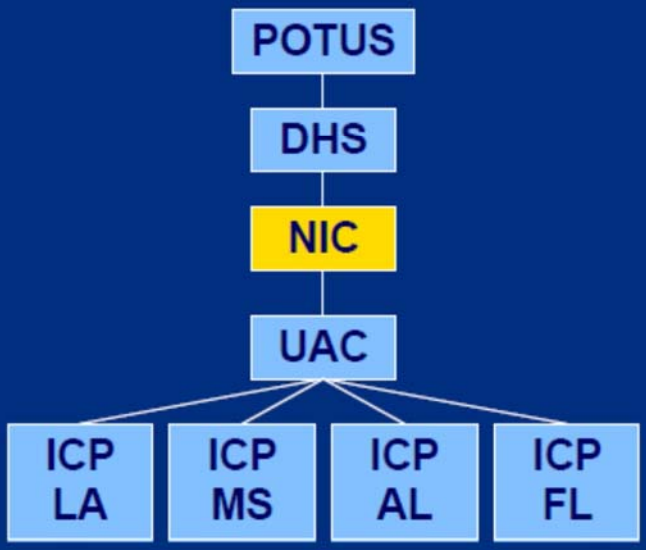
18

ICS Response Organization



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19

ICS: FLEXIBILITY

- Good: IAP, Resources, Flexibility
- Delta: Limited organization levels (5)
  - -Forms support incident not supplant
- IAPs can be too large
- Lack of position specific qualified personnel
  - - Lack of understanding ICS process and how they relate to one another
  - - Agencies were forming their own IAPs or ICS structures

Solution: Aggressive ICS Coaches who report to IC

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U.S. Department of Homeland Security

20

* EVERY OTHER DAY

BATTLE RHYTHM			
0600	Shift Briefing	UC, Command & General Staff, Unit leaders	ROOM 214
0630	BRANCH OPERATIONS BRIEFING	UC, Command Staff, Branch Directors	ROOM 214
0630	Planning Section Brief	Planning Sect Chief, all Houma Planning	AUDITORIUM
0700	UAC CONFERENCE CALL	UC Area,	USCG IC ROOM
0700	Operations Section Brief	Ops Section Chief, All Houma Operations	AUDITORIUM
0730	IC / DIC meeting	IC, Deputy ICs	IC Office
0745	UC OBJECTIVES MEETING	Unified Command	USCG IC ROOM
0800	GOVERNOR'S CONFERENCE CALL	CG IC	IC Office
0800	COMMAND & GENERAL STAFF MEETING	UC, SECTION CHIEFS, SUL, DUL	ROOM 214
1000	All Hands Briefing	ALL	AUDITORIUM
1100	Pre-Tactics	OPS, PLANNING & LOGISTIC SECTION CHIEFS, RUL, SUL, EUL	BUILDING NEXT DOOR CONFERENCE ROOM
*1400	TACTICS MEETING	OPS, PLANNING & LOGISTIC SECTION CHIEFS, RUL, SUL, EUL	ROOM 214
*1600	Planning Section Alignment Meeting	PLANNING SECTION CHIEF & UNIT LEADERS: , AC,	ROOM 214
1630	GOHSEP EOC / Parish conference call	UC	
1630	Planning Section / Branch Planning Meeting	Planning Section Chief, Unit Leaders & Planning Unit Leaders: HOUMA & FIELD BRANCHES	ROOM 214
1630	PLANNING MEETING	UC, Command & General Staff, DUL, RUL, SUL, EUL	ROOM 214
1730	UAC CONFERENCE CALL	UC Area,	USCG IC ROOM
1800	Shift Briefing	UC, Command & General Staff, Unit leaders	ROOM 214
2000	Data Integration Meeting	UC, Operations Section Chief, Planning Section Chief, SUL,	ROOM 214
2130	PLANNING SECTION ALIGNMENT MEETING	Planning Section Chiefs & Planning Unit Leaders , AC	ROOM 214
2300	SITUATION STATUS/PLANNING MEETING	DEPUTY INCIDENT COMMAND, SECTION CHIEFS & SULS	ROOM 214
2400	IC BRIEFING	IC Houston	
0030	COMMAND AND GENERAL STAFF MEETING	ICP STAFF	AUDITORIUM

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23

Changes to Policy & Regulations

- Minerals Management Agency transformed to two separate agencies:
  - Bureau of Ocean Energy Management (BOEM) – permitting & policy
  - Bureau of Safety and Environmental Enforcement - oversight and enforcement of regulations
- US Coast Guard Changes:
  - Enhanced MER training requirements/certification for CG response personnel
  - Established permanent Co-Chairs to Regional Response Teams
  - Created National Incident Management Response Assistance Team
  - Reinvigorated Interagency Coordinating Committee on Oil Pollution Research
  - Revised SONS/NIC Policy to strengthen interagency partnerships
  - Updated Regional and Area Contingency Plans
  - Reinvigorated international & joint pollution contingency plans (Canada, Mexico, & Russia)

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24

QUESTIONS?

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U.S. Department of Homeland Security

25

Case studies of major oil spill accidents occurred in Europe

Richard Johnson

Head of Response Planning Team

Korea Marine Environment Management Corporation

◆ *Profile of the presenter*

Richard Johnson has been with ITOPF for over 20 years, and in that time, he has been involved in over 500 incidents, 200 of which since he became Technical Director in 2009.

Richard has travelled extensively, having presented at international conferences and at IMO and IOPC Fund training courses and has visited over 80 countries.

Richard has provided claims analysis and damage assessment advice on numerous cases to a range of different entities including government, P&I Clubs and the IOPC Funds. He also participated in intergovernmental meetings such as at IMO and has been involved in numerous advisory projects and contingency plan reviews. He has delivered keynote opening, and closing plenary presentations at a number major international conferences as well as providing papers, chairing or giving input to workshops, seminars and training courses at regional, national and local level courses, both for government and industry.

As Technical Director, Richard provides strategic oversight of the full range of technical services offered by ITOPF and is the focal point for the delivery of these services. As well as overseeing the Americas, Africa, Europe, & Middle East and the Asia Pacific Technical Teams, Richard actively contributes to the risk management and knowledge management internal working groups. He is also the Chairman of the ITOPF R&D Award Committee.

Case studies of major oil spill accidents occurred in Europe

Lessons and Challenges from Large-Scale Oil Spill Incidences of Korea

Sun-Cheol Na

Head of Response Planning Team

Korea Marine Environment Management Corporation

◆ *Abstract*

Ever since the 1995 M/V Sea Prince oil spill incident, there has been more than 7,000 small and large marine pollution incidents which has allocated approximately 47,000 kℓ of spilled oil within the last 20 years. Fishing vessels and negligence were the majority in terms of number of incidents, whereas oil tanker incidents became the prime contributor in terms of the amount oil spilled.

Considering the geographical coastal characteristics of the Republic of Korea is extremely complicated with vast amounts of tidal flat concentration, one single large scale oil spill incident may result in severe damages to political, economical, biological as well as social cultural aspects. Furthermore the restoration process can be quite different from those of other countries.

The 1995 M/V Sea Prince oil spill incident became a turning point to formulate a national legal system in regards to marine pollution incidents as well as becoming the catalyst in launching the Korea Marine Environment Management Corporation(KOEM) which is the responsible agency in dealing with major marine pollution incidents. The 2007 M/V Herbei Spirit incident instigated further legislative movements such as enforcing double hull systems for oil tankers as well as the manufactor of the Large-scale multiple response vessel which is able to conduct emergency oil spill response and transfer of oil during extreme weather conditions. KOEM has also developed various automative response equipments such as the auto gravel cleaner which allows the overall response time for civilian personnels working in toxic environments to be reduced drastically within polluted inshore coastal areas ensuring a safe and sustainable working condition.

Currently the 4th Industrial Revolution has forecasted the use of AI and IoT to develop autonomous technology as well as an increased use in alternative energy to reduce carbon footprint. Therefore, it is forecasted that the occurrence of large marine pollution incidents shall

decrease whereas the production and distribution of HNS material needed for the development of new technology to increase.

Therefore, in order to maintain the safety and wellness for marine pollution response workers, the development of robotic response technology as well as a wide range unmanned observation system must be developed and implemented in order to enhance early response capabilities. Additionally, various international cooperation and technical assistance in regards to marine pollution response capacity building for undeveloped countries is essential considering these nations do not have the infrastructure to develop AI and IoT technology and rely heavily on conventional methods of energy sources used today.

◆ *Profile of the presenter*

Education

- Ph. D. in oceanography, Cheonnam University, Republic of Korea.

Biography

- 2015-2017: Head of Response Planning Team, HQ of KOEM
- 2014-2015: Head of Yeosu branch of KOEM
- 2009-2014: Professor & Head of Education Planning Team, Marine Environment Research & Training Institute of KOEM
- 1997-2009: In charge of response of Yeosu branch of KOEM

Field of interest

- Improvement of response infrastructure (Equipment, system, etc.)
- Enhancement of coastal response system including SCAT
- Ecosystem Based Response and Restoration

Lessons and Challenges from Large-Scale Oil Spill in Korea

Dr. Sun-Cheol Na
Head of Response Planning Team

KOEM Korea Marine Environment Management Corporation

CONTENTS

Ⅰ. Korea's Oil Spill during the 20 years

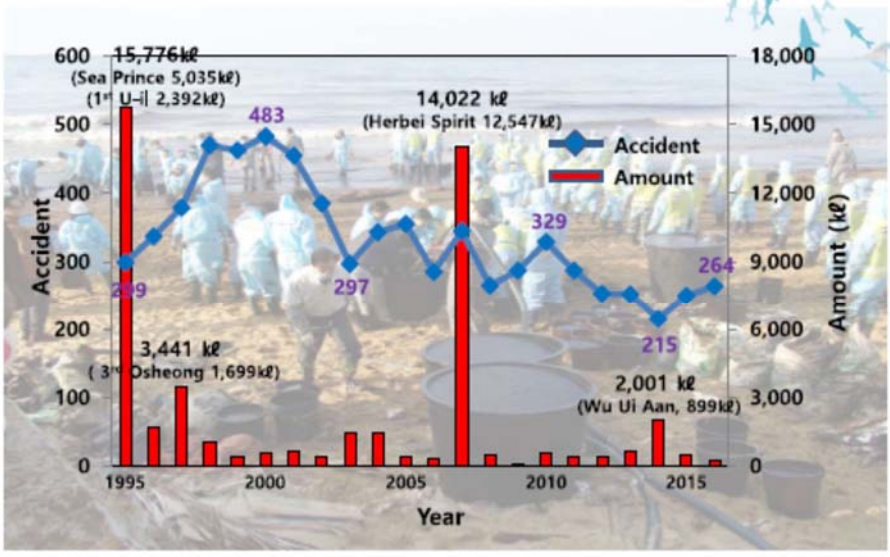
Ⅱ. Lessons from Major Large-scale Oil Spill

Ⅲ. Challenges

Ⅰ. Korea's Oil Spill during the last 20 years

Ⅰ. Korea's Oil Spill during the last 20 years

- Totally 7,298 accidents, 47,066 ㎘ spilled from 1995 to 2016

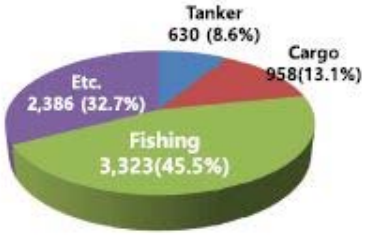


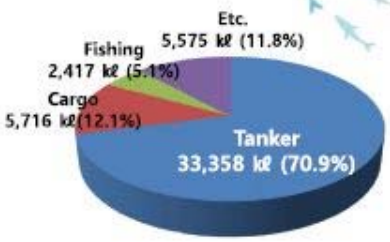
Ⅰ. Korea's Oil Spill during the last 20 years

Detailed type of Oil Spill

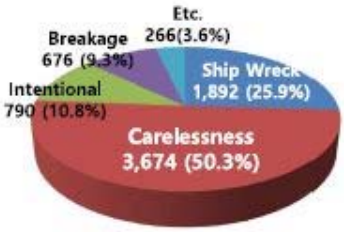
Total of 7,298 accidents | **Total amount 48,481㎘**

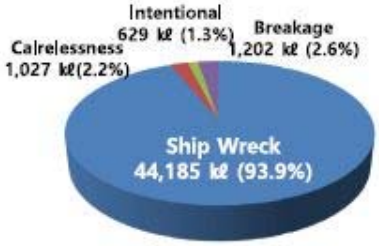
Source





Reason





Ⅰ. Korea's Oil Spill during the last 20 years

Damage Spectra in Korea

Political Aspect

- Disaster Area Proclamation
- Mass Demonstration
- Punishment by international convention, Domestic Laws

Economic Aspect

- Industrial facility outage
- Aquaculture, Barefoot Fishery
- Decrease in Tourism

Ⅰ. Korea's Oil Spill during the last 20 years

Damage spectra in Korea

Ecological Aspect

- Degradation of Photosynthesis
- Mass mortality of benthos, shore birds and Mammals
- Habitat changes caused by cleaning

Socio/Cultural Aspect

- Collapse of local Societies
  - Collectivism
  - Cruelty of Local Emotion
- Limitation of Recreation
  - Swimming, Fishing

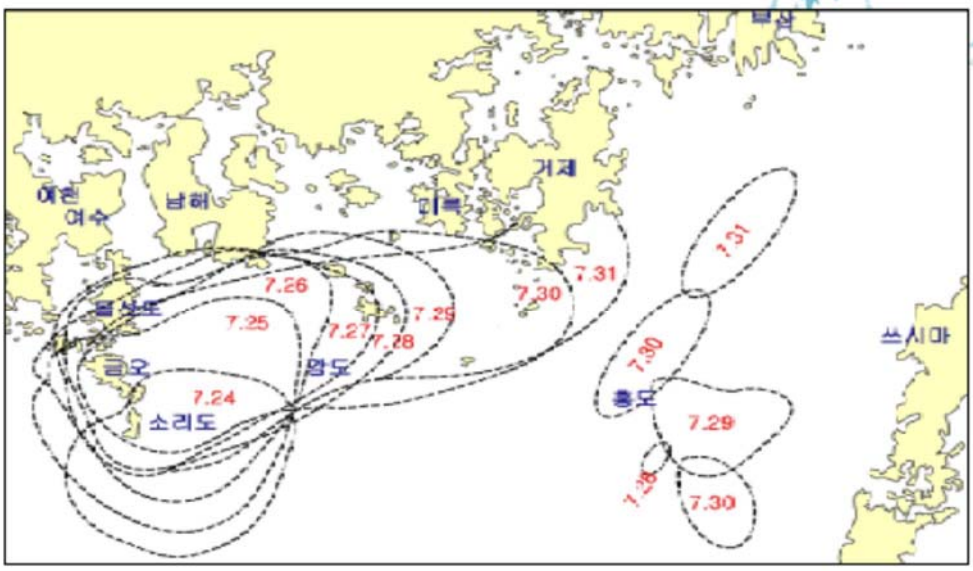
Ⅱ. Lessons from Major Large-scale Oil Spill

I I. Lessons from Major Large-scale Oil Spill

Case 1: Sea Prince Accident (1995) – Accident Details

I I. Lessons from Major Large-scale Oil Spill

Case 1: Sea Prince Accident (1995) – Damaged Area



I I. Lessons from Major Large-scale Oil Spill

- **Case 1: Sea Prince Accident (1995)**

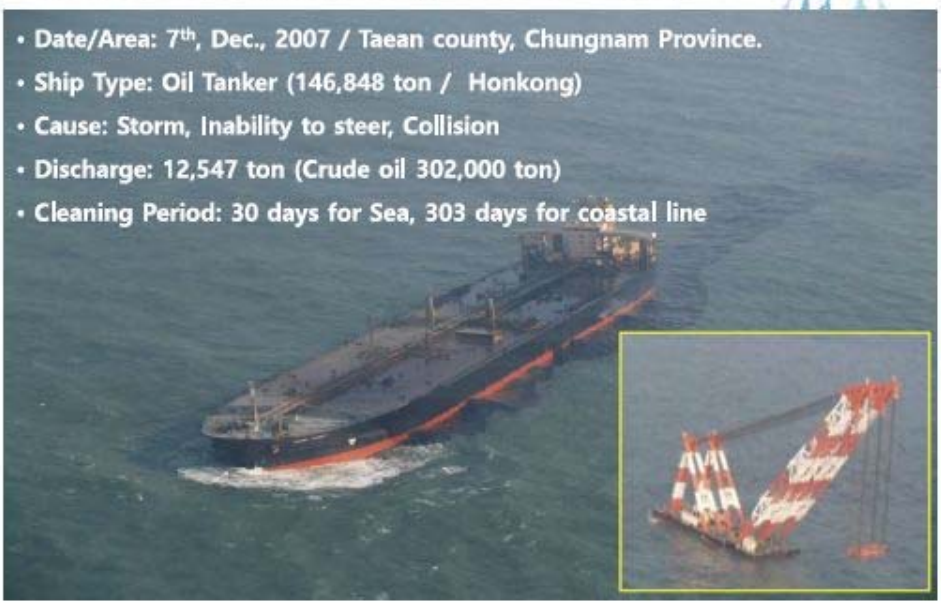
I I. Lessons from Major Large-scale Oil Spill

- **Sea Prince accident triggered following policy changes;**
  - The mandatory survey of marine pollution impact for accidents exceeding 100 tons of discharge
  - Unification of response control system (Marine - KCG; Coast -Local government)
  - Establishment and enforcement of national and local Response Implementation Plan
  - Setting tanker route
  - Introduction and operation of VTS
  - Establishment of Public Response Agency (KMPRC; KOEM)
  - Obligation to register pollution response business
  - Securing 20,000 tons of National Response Capacity and Expansion of response Infrastructure (Equipment, Vessel, Manpower)

I I. Lessons from Major Large-scale Oil Spill

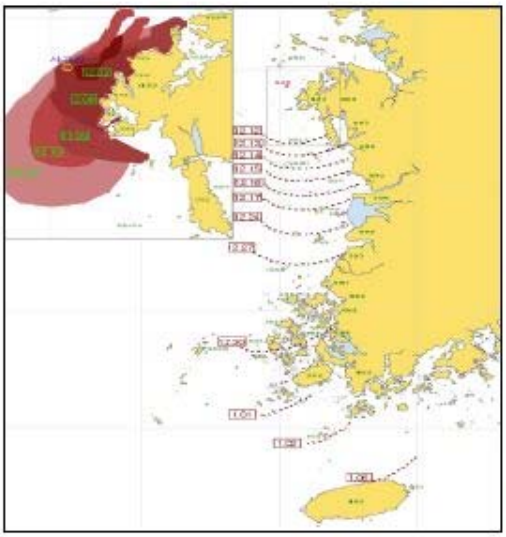
Case 2: Herbei Spirit (2007) – Accident Details

- Date/Area: 7th, Dec., 2007 / Taean county, Chungnam Province.
- Ship Type: Oil Tanker (146,848 ton / Honkong)
- Cause: Storm, Inability to steer, Collision
- Discharge: 12,547 ton (Crude oil 302,000 ton)
- Cleaning Period: 30 days for Sea, 303 days for coastal line



I I. Lessons from Major Large-scale Oil Spill

Case 2: Herbei Spirit (2007) – Damaged Areas



I I. Lessons from Major Large-scale Oil Spill

- **Case 2: Herbei Spirit (2007)**

I I. Lessons from Major Large-scale Oil Spill

- **Herbei Spirit accident triggered followings policy changes**

  - Strengthening Ship Management
    - Early adoption of double hull structure (2015 → 2011)
    - Joint operation of VTS (MOF, KCG)
  - Need for Large-scale response vessel
    - Can be operated in Severe weather
    - Secure spill storage space
  - Joining IOPC Supplymentary Protocol

I I. Lessons from Major Large-scale Oil Spill

- **Herbei Spirit accident triggered changes in infrastructure**
  - Limitation of response in sever weather
    - Necessity of Large-scale response vessel has emerged.

Occured

07:06 Accident occurred(Report 07:30)

Initial response (2H)

09:05 KCG Patrol 278(250 G/T) arrived at the scene

09:35 Access tanker using HC/try to measure transfer

10:00 Tried to transfer with 4 oil barge but failed

* Could not doke due to sever and return

Response (4.5H)

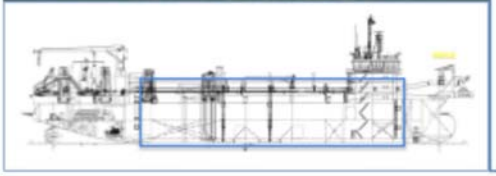
11:30 Oil fense installed by KCG (300m)

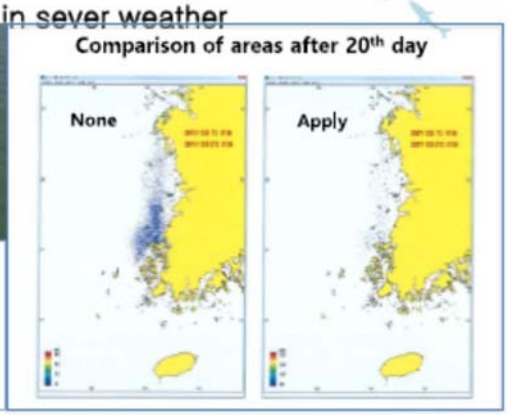
* Fense damaged by High waves, Stong wind and tidal current

The oil recovery at sea was almost impossible due to sever weather for 72 hour

I I. Lessons from Major Large-scale Oil Spill

- **Herbei Spirit accident triggered changes in infrastructure**
- Large-scale (5,000 G/T) multiple response vessel (Will beOperated from 2021)
  - Greatly reduce damages even in sever weather





Capacity
-oil storage, 5,000m^3 /wave height 3m/ Swell 8m/Wind speed 17m/s

II. Lessons from Major Large-scale Oil Spill

- **Herbei Spirit accident triggered changes in infrastructure**
  - Develop and operation of Auto Gravel Cleaner
    - Drastically save time and cost
    - Ensure health and safety of public response workers

Capacity
-5.5 tons/hour
-1:300 person
-No agent
-Sea water

Ⅲ. Challenges

III. Challenges

- **Large-scale marine accidents will be significantly reduced by;**
  - Due to the development, so called, 4th Industrial Revolution
    - Unmanned autonomous navigation (2020)
    - Marine communication technology (Korea's SMART-Navigation Project)

(source: Rolls-Royce website)

(source: SMART-Navigation Project Office website)

III. Challenges

- **Large-scale marine accidents will be significantly reduced by;**
  - **Alternative energy will reduce oil circulation and accident**
    - Zero emission Vessel
    - Alternative energy: Solar, Tide, current, wave

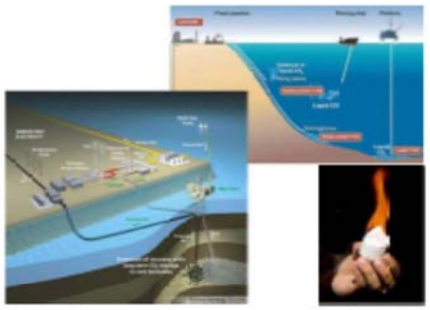
(Zero-emission Vessel/source: Kongsberg website)

(Alternative energy)

III. Challenges

- **Frequency will be decrease but the risk may increase. Because;**
  - **Growth of HNS industry for produce alternative energy and industrial product**
  - **Development of resources in Deep & Open sea** (Transboundary issues)

(HNS industry complex, Ulsan: Yonhap news)



(Deep & open sea resources: Gas hydrate)

III. Challenges

- **Necessity to prepare in near future**
  - **Develop and mainstreaming of Large-scale and unmanned response infrastructure**
  - **International cooperation and support for underdeveloped countries that can not adapt and implement alternatives.**

Thanks for attention !

Session 2

The policies and the latest technologies on Maritime disaster

Chair: Jong-Hwui Yun

Overview of Korean Vessel Traffic Service (VTS) and its Big Data Application

Speaker: Kwang Il Kim (Chungbuk National University)

China' s Policy on the Capability Building for Ship-source Pollution Preparedness and Response

Speaker: Guo Peng (MSA)

National Policies on maritime disaster preparedness and response by JCG

Speaker: Katsuaki Nagasaki (JCG)

Activities of the Russian Marine Rescue Service in the field of oil spill preparedness and response and international cooperation

Speaker: Natalia Kutaeva (MRS)

Recent trend of IOPC Funds

Speaker: Chiara Della Mea (IOPC Funds)

Overview of Korean Vessel Traffic Service (VTS) and Its Big Data Application

Kwang Il Kim

Professor

Chungbuk National University

◆ *Abstract*

Vessel Traffic Service (VTS) system have operated since 1993 and is currently being implemented in 15 port and 3 coastal VTS centers. Using many electronical sensor devices such as Automatic Identification System, Radar, VHF, a massive amount of maritime data is collected. In this presentation, we introduce overview of VTS and its big data application for preventing maritime disaster. First, the type of VTS big data introduce. Then, it apply to the Hadoop MapReduce which one of the famous big data structure. Second, VTS big data applied to ship traffic analysis, route collision probability and near-collision analysis. Finally, we apply VTS big data to deep learning application using convolution neural network and recurrent neural network.

◆ *Profile of the presenter*

Education

- BA: Maritime transportation, Mokpo National University, Republic of Korea in 2005
- MS: Maritime transportation, Mokpo National University, Republic of Korea in 2012
- PhD: Maritime transportation, Mokpo National University, Republic of Korea in 2015

Biography

- 2010-2016: VTS operator, Korea Coast Guard.
- 2016-2017: Research professor, Chungbuk National University.

Field of interest

- Vessel Traffic Service
- Ship Collision Risk
- Big Data
- Deep Learning

Overview of Korean Vessel Traffic Service and Its Big Data Application

Chungbuk National University,
Korea

Kwang Il Kim

Table of Contents

1. Overview of the VTS in Korea

2. VTS Big Data

3. VTS Big Data Application

Overview of the VTS in Korea

1. Overview of the VTS in Korea

▪ Introduction

- The task of managing vessel traffic in ports, harbours and coastal areas places significant demands on those responsible for safety, security and protection of the environment.

▪ Status of Operation

- After the first introduction of the VTS system in Pohang Port in 1993, 15 port VTS centers and 3 coastal VTS centers are currently operating.
- Currently, 400 VTSOs are working in 18 VTS centers in Korea.

1. Overview of the VTS in Korea

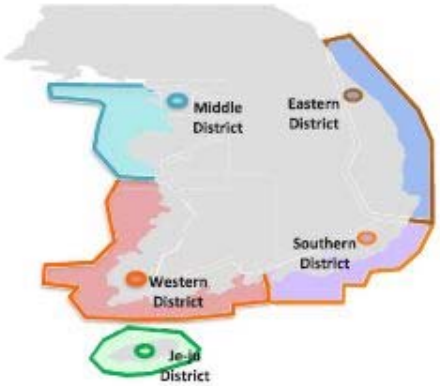
▪ Management Agency

- After the Sewol Ferry accident in April 2014, the management of port and coastal VTS has been designated to one united organization controlled by the Korean Coast Guard.
- This united organization can enhance maritime accident prediction and response.

1. Overview of the VTS in Korea

▪ Management Agency

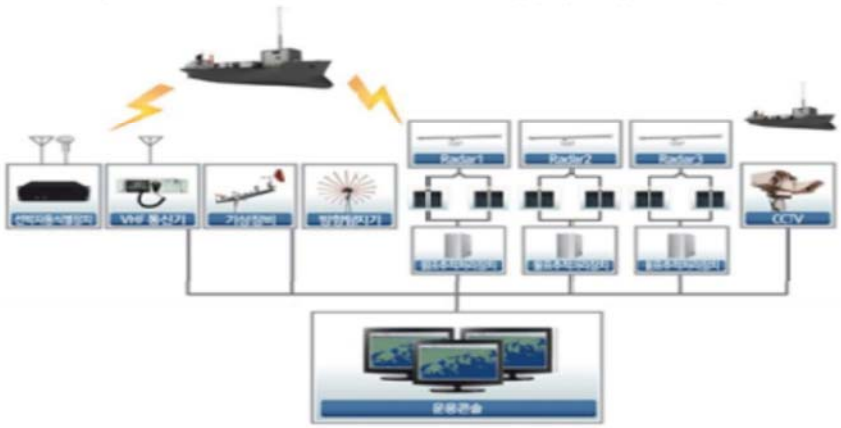
- Eight more coastal VTS centers will be established by 2022.
- Port and coastal VTS centers will be grouped into 5 for the provision of extended regional VTS services.



VTS BIG DATA

2. VTS BIG DATA

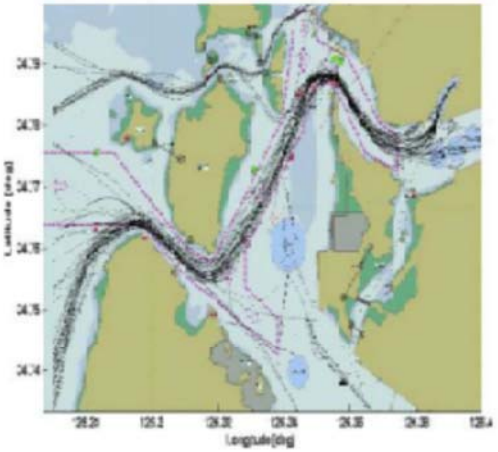
- **Role of VTS for collecting maritime data.**
  - VTS center is the only organization that can collect and manage maritime data using sensor device such as Radar, AIS, CCTV etc.
  - To manage massive data, it need to apply big data processing.



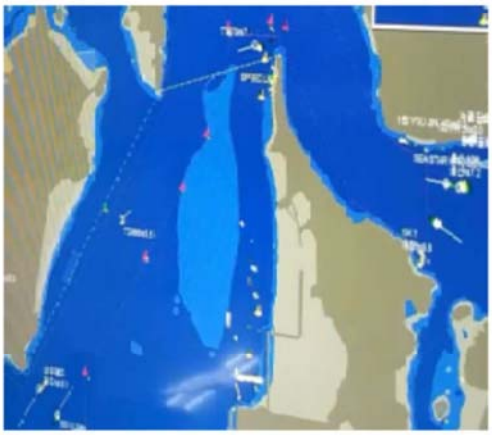
2. VTS BIG DATA

- **Category of Ship Traffic Data in VTS**

▪ AIS Trajectory



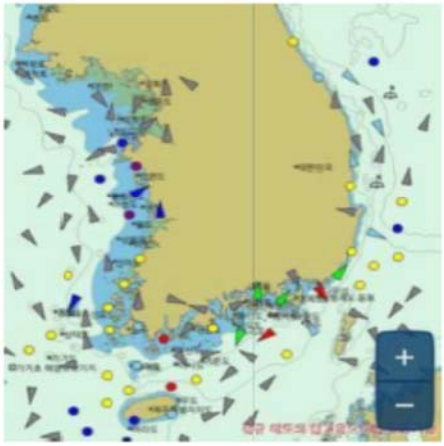
▪ RADAR Trajectory



2. VTS BIG DATA

- **Category of Ship Traffic Data in VTS**

▪ V-PASS



▪ Port Management Port-MIS

ShipName	Callsign	Vos.No	Movement	Event Position	Time

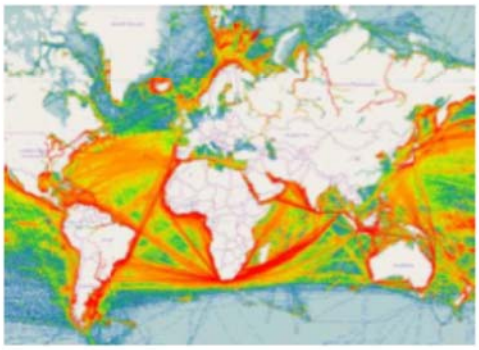
2. VTS BIG DATA

- Comparison of ship traffic data feature
  - AIS data is suitable for big data analysis.

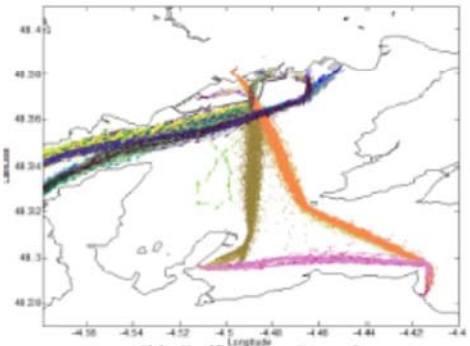
	AIS	Radar	V-Pass	PORT-MIS
Target	All Ship Category	All Ship Category	Fishing Ship Category	Cargo Ship Category
Contents	Dynamic and Static Information	Dynamic Information	Dynamic and Static Information	Berth and cargo operation
Transmission period	Discontinuous	Continuous	Discontinuous	Berth / Unberth
Storage	Long term (GICOMS)	Short term (2~3 month)	Long term	Long term
Access	△	X	X	O

2. VTS BIG DATA

- Characteristic of AIS
  - AIS device transmits and receives ship's information containing dynamic and static information in accordance with the update rate.
  - AIS data used various area, such as ship traffic analysis, route detection, ship collision risk analysis.



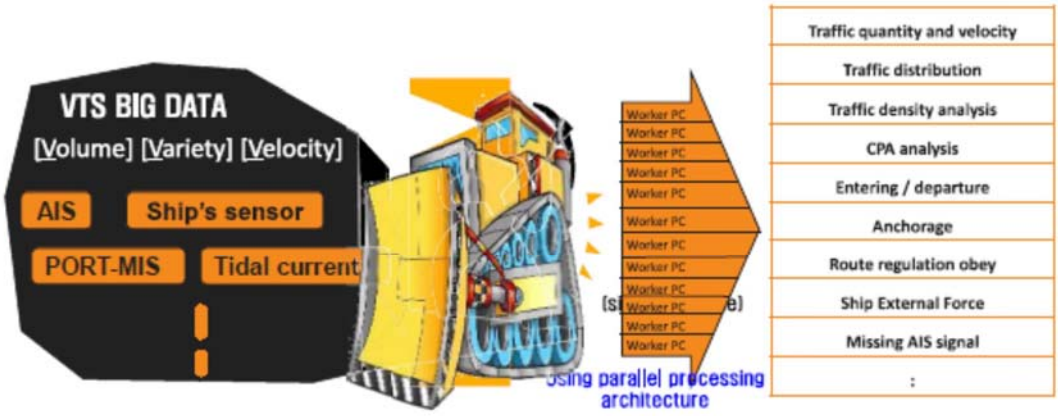
< AIS Density Map of global vessel traffic >



< Ship Traffic Route Detection >

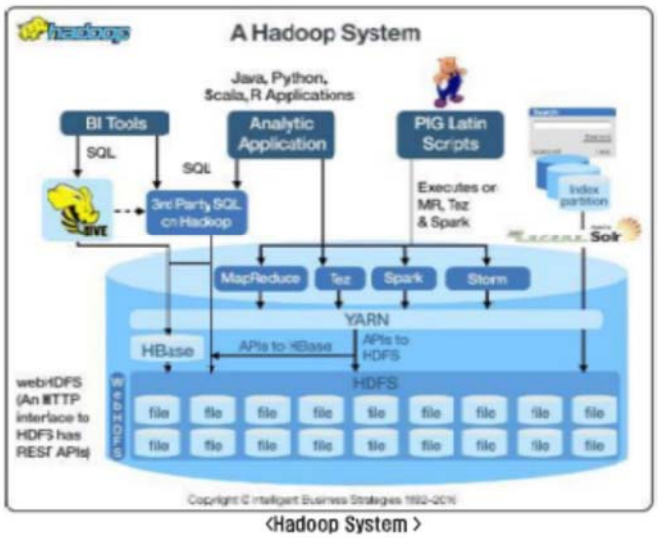
2. VTS BIG DATA

- **Method of VTS big data analysis**
  - A large amount of VTS data stored more than 100 GB per day. It is hard to process by RDBMS such as MySQL, Oracle.
  - Therefore, parallel processing architecture such as MapReduce with NoSQL database is essential to process big data.



2. VTS BIG DATA

- **Method of VTS big data analysis**
  - Hadoop system

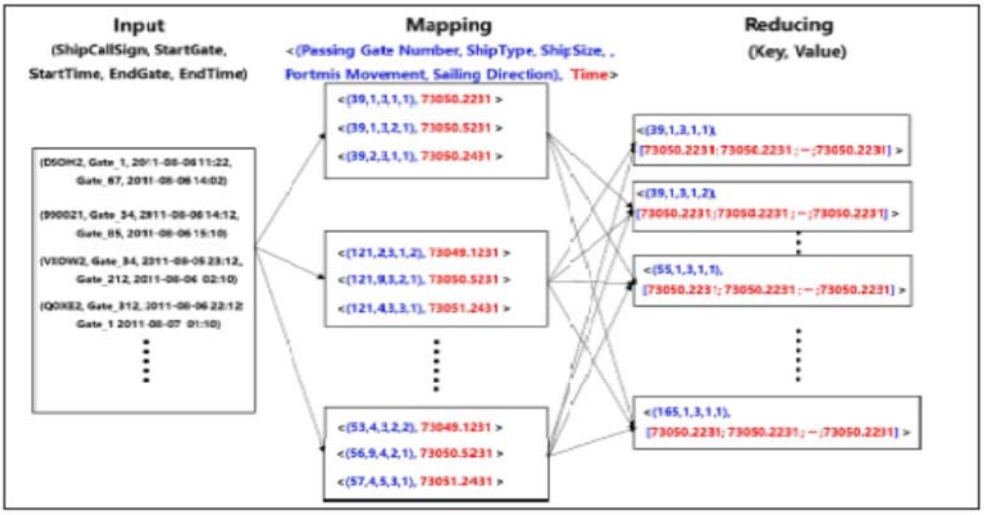


<Hadoop System>

2. VTS BIG DATA

▪ Method of VTS big data analysis

▪ MapReduce Analysis of Ship Trajectory

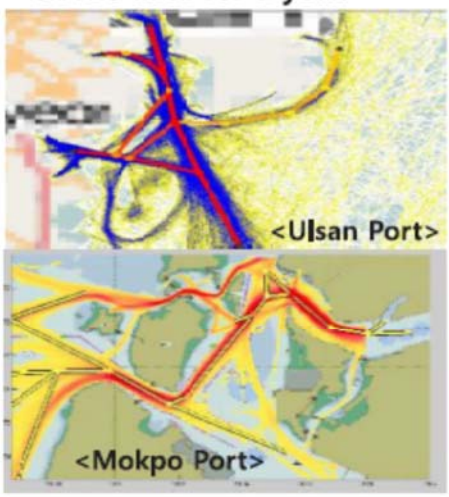


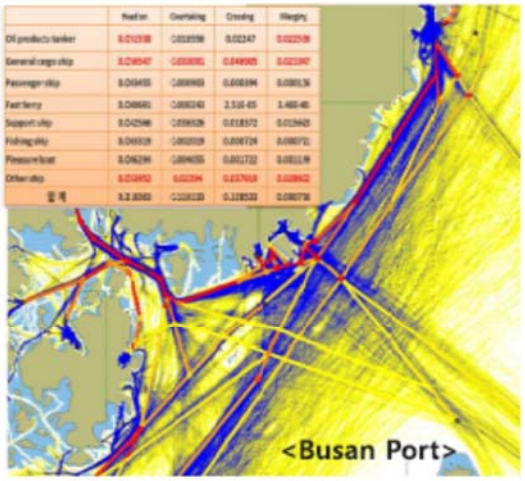
VTS Big Data Application

3. VTS Big Data Application

▪ Route collision risk analysis

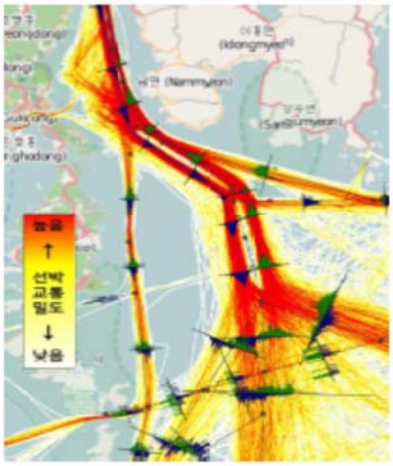
- Calculation of collision probability in each route by statistical ship traffic data for a year.



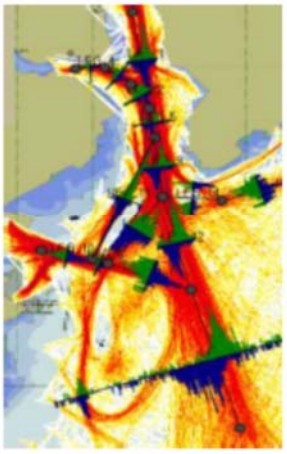


3. VTS Big Data Application

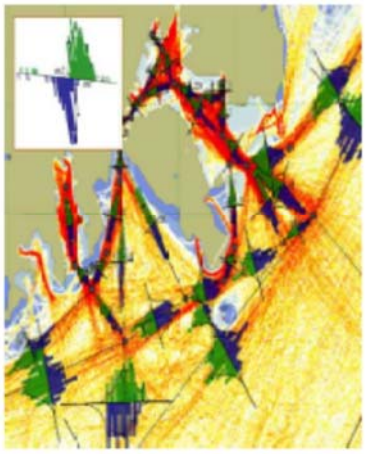
▪ Ship Traffic Distribution Analysis



Yeosu



Ulsan



Busan

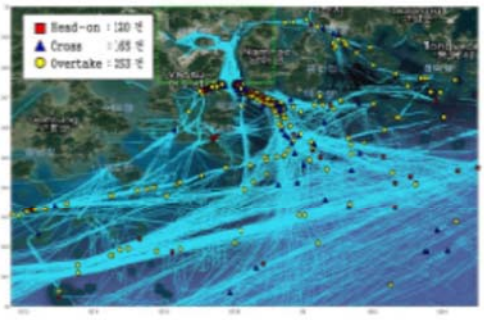
3. VTS Big Data Application

▪ Maritime Accident Analysis

- Accident : actual collision accident
- Near-collision : almost resulted in a collision but collision not occurred

	Number per year
Collision accident	3
Collision near-miss	1,278
Close quarter situation	15,114

Ship Collision (1 year)

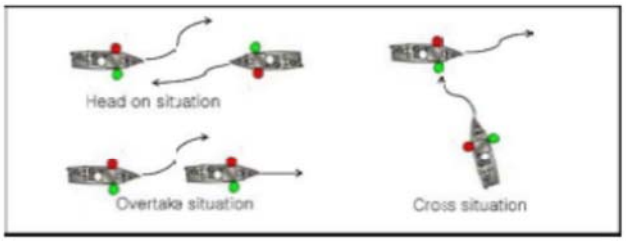


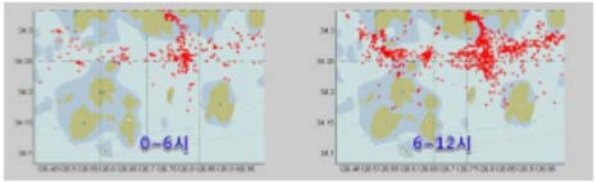
Near-collision (1 month)

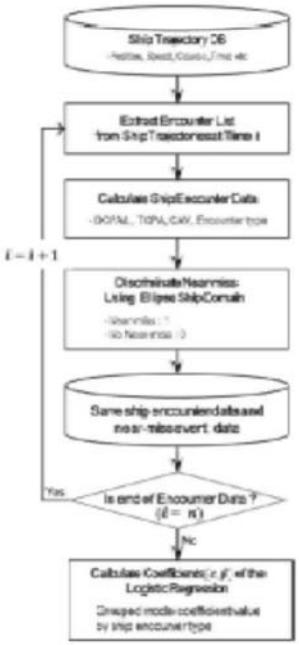
3. VTS Big Data Application

▪ Ship Encounter Situation Analysis

- Datamining of ship encounter situation
- Variables : DCPA, RANGE, TCPA, CAV, encounter type, Near-miss event result.







<Extraction flow of ship encounter data>

3. VTS Big Data Application

- Logistic Regression using ship encounter data
  - To calculate real-time collision risk based on ship encounter big data, logistic regression is used.
    - Independent variables : DCPA, RANGE, TCPA, CAV, encounter type
    - Dependent variables : ship near-collision event

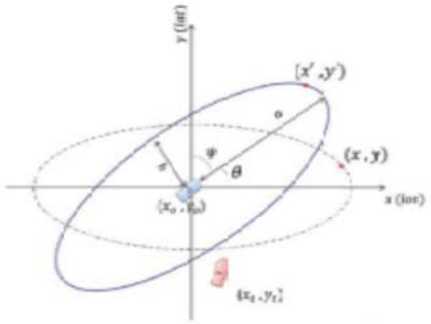


Fig. 4. Discrimination of the ship elliptical domain

$$NP^{headon} = \frac{e^{(3.7-2.01X_1-0.49X_2-1.14X_3)}}{1+e^{(3.7-2.01X_1-0.49X_2-1.14X_3)}} \quad (4)$$

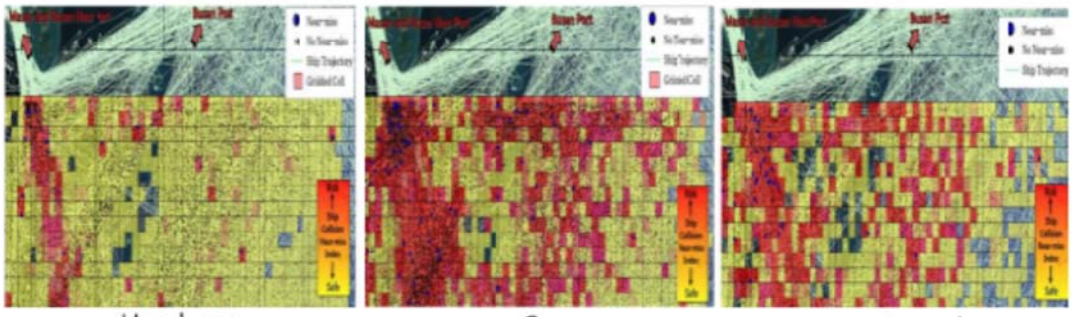
$$NP^{cross} = \frac{e^{(2.13-1.41X_1-0.08X_2-1.05X_3)}}{1+e^{(2.13-1.41X_1-0.08X_2-1.06X_3)}} \quad (5)$$

$$NP^{overtake} = \frac{e^{(3.24-0.91X_1-0.26X_2-1.78X_3)}}{1+e^{(3.24-0.91X_1-0.26X_2-1.78X_3)}} \quad (6)$$

where X_1: DCPAL, X_2: TCPA, X_3: CAV(1) = 0, CAV(2) = 1

3. VTS Big Data Application

- Logistic Regression using ship encounter data
  - Using encounter model, water area ship encounter risk is calculated as below figures.



<Head-on> <Cross> <Overtake>


Thank you

China's Policy on the Capability Building for Ship-source Pollution Preparedness and Response

Guo Peng

Section Chief

Department of Dangerous Cargo Control and Pollution Prevention, Shandong Maritime Safety Administration

People's Republic of China

◆ *Abstract*

In recent years, China has made significant progress in the capacity building for ship-source pollution preparedness and response. In this presentation, a general introduction was made on China's policy in this aspect, including the national mechanism on pollution response management, practices in the capacity building for ship-source pollution response, the domestic ship-source oil pollution damage compensation mechanism, and future trends in China's capacity building. China will continue to cooperate with NOWPAP members under the framework of MERRAC to enhance the regional capability in marine pollution preparedness and response.

China's Policy on the Capability Building for Ship-source Pollution Preparedness and Response

the 2017 NOWPAP MERRAC Expert Meeting

December 2017

China MSA

Summary

1.Pollution response management mechanism;

2.China's capacity building on ship-source pollution response;

3.China's ship-source oil pollution damage compensation mechanism.

4.Future trends in capacity building.

1.Pollution response management mechanism-The Legal System

• International Conventions:
-UNCLOS;
-OPRC 1990 and its HNS protocol;

• National law:
-Marine Environmental Protection Law;
-Emergency Response Law;

• Regulations:
-Regulations on the Prevention and Control of the Vessel-induced Marine Environment Pollution;
-Regulations on the Control over Safety of Dangerous Chemicals.
-etc.

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Marine Environmental Protection Law: The Competent National Authorities

•Environment Protection Administration: Prevention of pollution from land-source.

•Oceanic Administration: Prevention of pollution from marine construction projects, e.g. offshore oil exploration and exploitation.

•Maritime Safety Administration: Prevention of pollution from ships other than fishing ships and military ships.

•Fisheries Administration: Prevention of pollution from fishing ships.

•Armed Forces: Prevention of pollution from military ships.

Marine Environmental Protection Law: Revision in 2016

•Intensifying punishment for the marine environmental illegal activities:
-a cumulative daily penalty will be enforced if the violator refuses to make corrections.
- Whereas the case constitutes a crime, criminal responsibilities shall be affixed.

•Law enforcement in marine environment protection will be even stricter. Related regulations and rules are under enactment or revision.

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Emergency Response Law: General Components of a Emergency Response System

-Contingency Plans;

-Legislations: Emergency response management in various aspects and at different tiers;

-Response resources: From government and industries;

-Risk management: emphasized on prevention, response, and reconstruction.

Regulations: Regulations on the Prevention and Control of the Vessel-induced Marine Environment Pollution

- Detailed requirements on pollution response management;
- Responsibilities of government, industries and relevant parties involved in capacity building;
- Requirement of capability for ports, terminals, and relevant units;
- Agreement for ship pollution response.

China MSA

Regulations: Regulations on the Control over Safety of Dangerous Chemicals

- Units of dangerous chemicals shall formulate their contingency plans for dangerous chemical accident, assign emergency response personnel, equip necessary equipment, and organize drills regularly.
- In case of a dangerous chemical accident, the local government concerned shall organize emergency response in accordance with the local contingency plan for dangerous chemical accident.
- Appropriate measures should be implemented to monitor and evaluate the environmental pollution and damage caused by the accident, and to control the pollution and restore environment.

Contingency Plan System for Ship Pollution Response

- 1 National CP
- 4 Regional CPs
- 9 Provincial CPs
- Over 50 Municipal CPs
- Shipboard marine pollution emergency plans

•In 2010, the State Council designated the Ministry of Transport as leading agency in the response to major oil spill incidents at sea.

•A new national contingency plan for marine oil spill incidents enacted by the Ministry of Transport will come forth in the near future.

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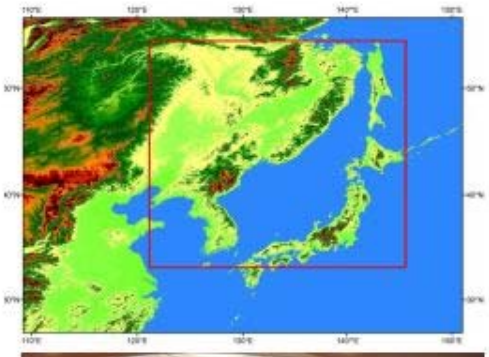
International Cooperation

•Multi-lateral:
-NOWPAP and the NOWPAP RCP;
-Hebei Spirit incidents in 2007.

•Bilateral:
-Maritime cooperation with the US, Japan, Korea and ASEAN countries;

•Other
-GI China Program.



China's Capacity Building on Ship-source Pollution Response

•Responsibility shouldered by government and industry;

•The central and related local government should develop capacity-building plans;

•Related government departments and industries shall establish response facilities and teams, equip response equipments according to these capacity-building plans.

•Ports and terminals are also required to equip response equipments.

China MSA

China's Capacity Building on Ship-source Pollution Response

•Different emphasis in capacity building:

-Central government: To respond to major pollution incidents at sea areas with high risk;

-Local government: To respond to common pollution incidents within respective jurisdiction areas;

-Ports and terminals: To respond to small incidents within port water areas;

-Ships: To obtain appropriate capability through response contracts.

Achievements in the Past Five Years (2010-2015)

•Inter-ministry coordination and commanding system established for major pollution incidents at sea;

•Pollution monitoring and surveillance capability has covered major sea areas;

•Oil spill control and clean-up capability increased significantly:
-Over 30 equipment storages established by the central and related local government, and by the oil industry;
-Over 100 equipment storages established by pollution response organizations;
-Over 200 oil spill response ships;
-Abundant trained response personnel;
-All the major sea ports are covered.

China MSA

Achievements in the Past Five Years (2010-2015)

Achievements in the Past Five Years (2010-2015)

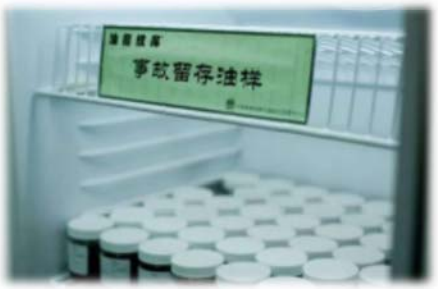




China MSA

Achievements in the Past Five Years (2010-2015)



China's Ship-source Oil Pollution Damage Compensation Mechanism

- To better protect the marine environment and the pollution victims;
- "Polluter Pays" principle: Ship-owners and oil cargo owners share the risk;
- A two-tier Pollution Damage Compensation system is established.

China MSA

First Tier: Pollution Damage Liability Insurance of Ships

- Ships should provide pollution damage liability insurance while they are protected by the limitation of liability;
- China is member state of the CLC 92 and the Bunker Convention, and the Fund 92(only applicable to Hong Kong speci);
- All ships carrying persistent oil as cargo, international or domestic, shall maintain oil pollution liability insurance;
- Ships carrying non-persistent oil as cargo shall also maintain compulsory insurance;
- Ships of 1,000 GT and above, international or domestic, shall maintain bunker pollution compensation insurance.

Second Tier: Domestic Oil Pollution Damage Compensation Fund

•Decree issued by the Ministry of Transport and the Ministry of Finance;

•Contributions will be collected from the cargo owners and their agents who receive persistent oils transported at sea;

•Compensation will be provided for the oil pollution damage if:
-the compensation exceeds the limitation of liability for ship owners;
-the liability of ship owners is exempted according to law;
-ship owners and insurers are unable to fulfill their liability;
-the polluter is unable to be identified.

•The Fund Management Committee is responsible for handling the compensation claims.

Future Trends in Capacity-building

•To integrate the capability of related government agencies and industry to improve efficiency and coordination:
-Communication and information sharing system;
-Monitoring and surveillance through remote sensing, radar and sensors;
-Control and clean-up capability both at sea and on land;
-etc.

•To promote related research and development in:
-Response technology of HNS incidents;
-Technical standards in pollution preparedness, response and compensation.

Thanks

National Policies on maritime disaster preparedness and response by JCG

Katuaki Nagasaki

Director for International Marine Pollution Prevention

Marine Environment Protection and Disaster Prevention Division

Japan Coast Guard Headquarters

◆ *Abstract*

The outline of national policies on maritime disaster preparedness and response by JCG, which consist of domestic policies and international cooperation, will be introduced in the presentation. The preparedness measures and response measures are the essence of the domestic policies. JCG also recognizes the importance of international cooperation in this area such as NOWPAP, Coast Guard Summit, NPCGF. The participants are encouraged to maintain and enhance the international cooperation for the effective response to maritime disasters.

◆ *Profile of the presenter*

Education

- Graduated from Japan Coast Guard Academy/Officer Candidate Course in 1992

Biography

- MAR 2011: Commander
- JUL 2011: Consultant, Malaysia Maritime Enforcement Agency
- JUL 2014: Senior Operation Command Officer, Operation Command Center, Japan Coast Guard Headquarters
- DEC 2014: Senior Anti-Piracy Specialist, International Criminal Investigation Division, Japan Coast Guard Headquarters
- MAR 2015: Commanding Officer, Piracy Crime Investigation Team deployed to the Gulf of Aden
- APR 2016: Deputy Director, International Criminal Investigation Division, Japan Coast Guard Headquarters
- APR2017: Director for International Marine Pollution Prevention, Marine Environment Protection and Disaster Prevention Division, Japan Coast Guard Headquarters

National policies on maritime disaster preparedness and response by JCG

December 6th, 2017

JCG 海上保安庁
JAPAN COAST GUARD

Contents

JCG JAPAN COAST GUARD

1. Domestic Policies

2. International Cooperation

3. Another topic

2

Contents

JCG JAPAN COAST GUARD

1. Domestic Policies

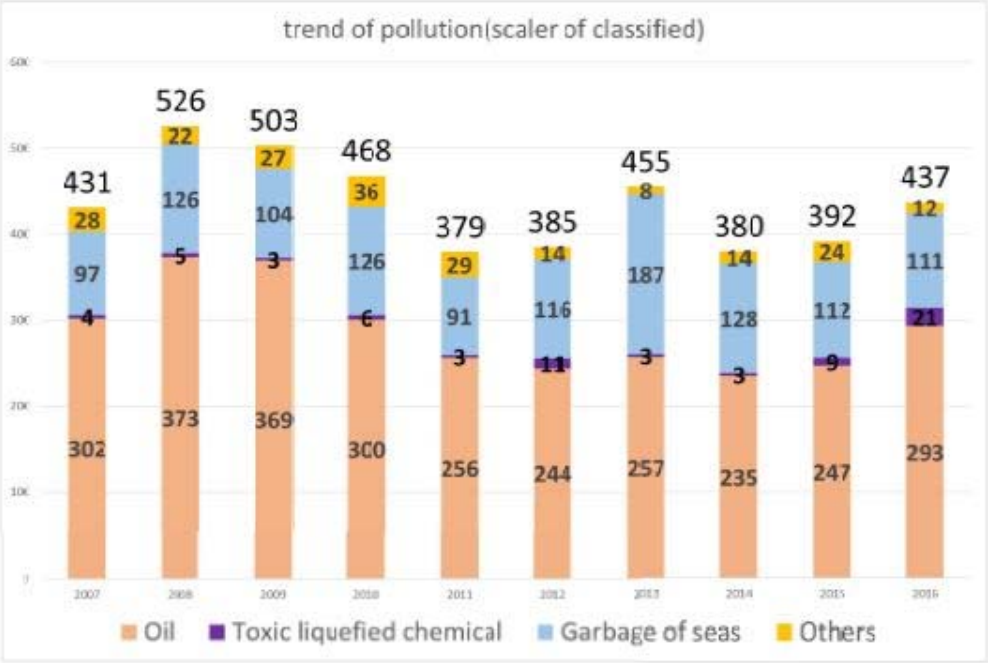
2. International Cooperation

3. Another topic

3

Report of Marine Pollution around Japan

JCG JAPAN COAST GUARD



4

Preparedness Measures

Local Disaster Management Plan

1. "Disaster Countermeasures Basic Act"
   ⇒ National framework, Local Disaster Management Plan, etc.
2. "Act on the Prevention of Marine Pollution and Maritime Disaster"
   ⇒ Obligation of ship-owner/master, Regional Contingency Plan, Equipping oil combating materials, etc.
3. Administrative Guidance
   ⇒ Safety measure for VLCC, Oil/HNS Terminal, etc
4. Role of JCG
   ⇒ Leading agency of maritime disaster countermeasures
5. Surveillance Network
   ⇒ Not only JCG, also Defense Force, Local Authorities, NPO, ordinary citizens
6. Joint Exercise
   ⇒ Conducting joint exercises with related parties


Pre-check on cargo work on a oil carrier


Oil Spill Response Exercise

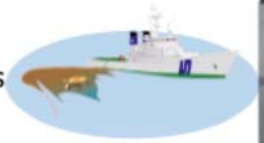
Oil/HNS Spill
JCG JAPAN COAST GUARD

Response Measures

1. "Disaster Countermeasures Basic Act"
   ⇒ Disaster measures HQs, Relief activities, etc.
2. "Act on the Prevention of Marine Pollution and Maritime Disaster"
   ⇒ Obligate Combating activities by shipowner/master
3. Role of JCG
   ⇒ Supervise/order to shipowner/master, Surveillance
   ⇒ Coordination of combating activities with concerned parties
4. Role of shipowner
   ⇒ Conducting combating activities
5. Role of concerned paties
   ⇒ Local authorities, police, Fire Dep., MDPC, etc.


Fire fighting on a oil tanker


Meeting of concerned parties regarding oil spillage

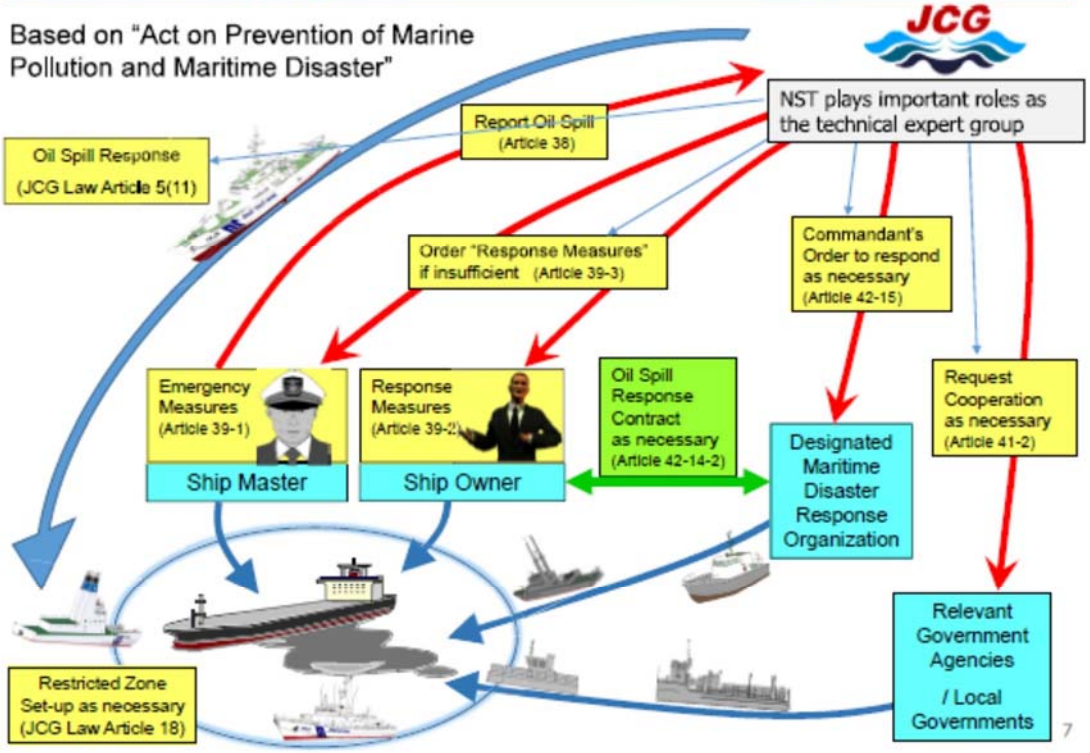



Deploying Oil boom around a sunken Cargo Vessel

Response to Oil Spill Incident

JAPAN COAST GUARD

Based on "Act on Prevention of Marine Pollution and Maritime Disaster"



7

Specialized Unit

JAPAN COAST GUARD

National Strike Team (NST)

Special Unit with High Level Knowledge and Technique regarding Oil/HNS.

Ready to;

- Offer technical guidance
- Coordinate on oil spill control measures
- Advise on formulation of response plans


Detecting noxious gas on a chemical carrier


Study Meeting


Leading at Table-top exercise

8

Contents

JCG JAPAN COAST GUARD

1. Domestic Policies

2. International Cooperation

3. Another topic

9

International Cooperation

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1. Multilateral / Bilateral Cooperation

   CGS, NOWPAP, NPCGF, MARPOLEX

2. Capacity Building Assistance

3. Contribution via IMO

   MEPC, PPR, etc.

10

Coast Guard Global Summit

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- The Coast Guard Global Summit (CGGS) to be held in Tokyo, Japan for the first time ever and co-hosted by the Japan Coast Guard and the Nippon Foundation, serves as a new platform of dialogue and cooperation among coast guards and agencies with coast guard functions across the world.
- In order to deal with environmental and societal global changes and related challenges in the future, multilateral cooperation in the global scale, in addition to the bilateral and regional frameworks would be of utmost importance.
- Three themes; Maritime Safety and Marine Environment Protection, Maritime Security and Capacity Building was discussed during the CGGS.
- In the Maritime Safety and Marine Environment Protection theme, the presentation was done as below,
  - ✓ International Cooperation in Case of a Large Scale Oil Spill Incident(Canada)
  - ✓ The Global arrangement of SAR(IMO)
  - ✓ Marine Environment: pollution detection, preparedness and response(EMSA)

<Schedule>
September 12-14, 2017

Participating Countries and Organizations

Photo session of heads of delegations

Other Multilateral Cooperation

JCG JAPAN COAST GUARD

- **Crimes becoming global & borderless, accidents & disasters becoming extensive**
- **Dealing with such situations through the international cooperation**

North Pacific Coast Guard Forum (NPCGF) Since 2000

Head Level Meeting

Members of Emergency Response WG

Multilateral Multi-purpose Exercise (MMEX)

[Participants] 6 countries
Japan(JCG), **South Korea**(KCG), **China**(CCG), **Russia** (**Border Guard Service**), **U.S.** (USCG), **Canada** (CCG)

Heads of Asian Coast Guard Agencies Meeting (HACGAM) Since 2004

Head Level Meeting

A joint exercise for combatting piracy

[Participants] 19 countries, 1 region
Japan, China, South Korea, Hong Kong, ASEAN10, India, Bangladesh, Maldives, Pakistan, Sri Lanka, Australia

MARPOLEX

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Marine Pollution Exercise (MARPOLEX)

MARPOLEX is the implementation of;

- Sulawesi Sea Oil Spill Response Network Response Plan (Established in 1981)
- ASEAN Oil Spill Response Action Plan (MoU signed in 1993 in Japan)

MARPOLEX has been conducted every other years since 1988 by;

- Philippine Coast Guard (PCG)
- Directorate General of Sea Transportation (DGST, Indonesia)

MARPOLEX Objectives are;

- To test and evaluate the oil spill response capability of Indonesia and the Philippines.
- To train and enhance cooperation and capability in firefighting, rescue and oil spill recovery operation.
- To exercise participants in planning, command and control

13

JICA Training Course

JCG JAPAN COAST GUARD

Objective

To **acquire skill and knowledge** in the field of SAR, Disaster Prevention and Environment Protection, based on IMO model courses and JCG's expertise and experiences, and to assist participants' capacity development to find a solution for their own Administrations

Outline

Annual training – ever evolving and developing training programme delivered annually as varied as possible, with 510 officials from 66 countries since 1982

Period: 8 weeks (every autumn) **Target**: Mainly Asian developing countries
Contents: Lecture, Exercise, Observation
Location: JCG (Regional HQs, Air Station, Yokohama National Strike Team Station)
JICA Yokohama International Center, Maritime Disaster Prevention Center, etc.

Result of Last Year (25/9/2017–17/11/2017)

Countries of Participants:
Bangladesh, Djibouti, Indonesia, Philippines, Sri Lanka, Thailand, Timor-Este and Vietnam (17 people from 7 countries)
Joint implementation with IMO: Lecture with latest IAMSAR manual by an IMO consultant

JICA

14

JICA Training Course

JCG JAPAN COAST GUARD

Opening Ceremony

Analysis of oil and water at Coast Guard Research Center

Observation of equipment

Exercise of oil boom extension

15

Contents

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1. Domestic Policies

2. International Cooperation

3. Another topic

16

Regional Contingency Plans

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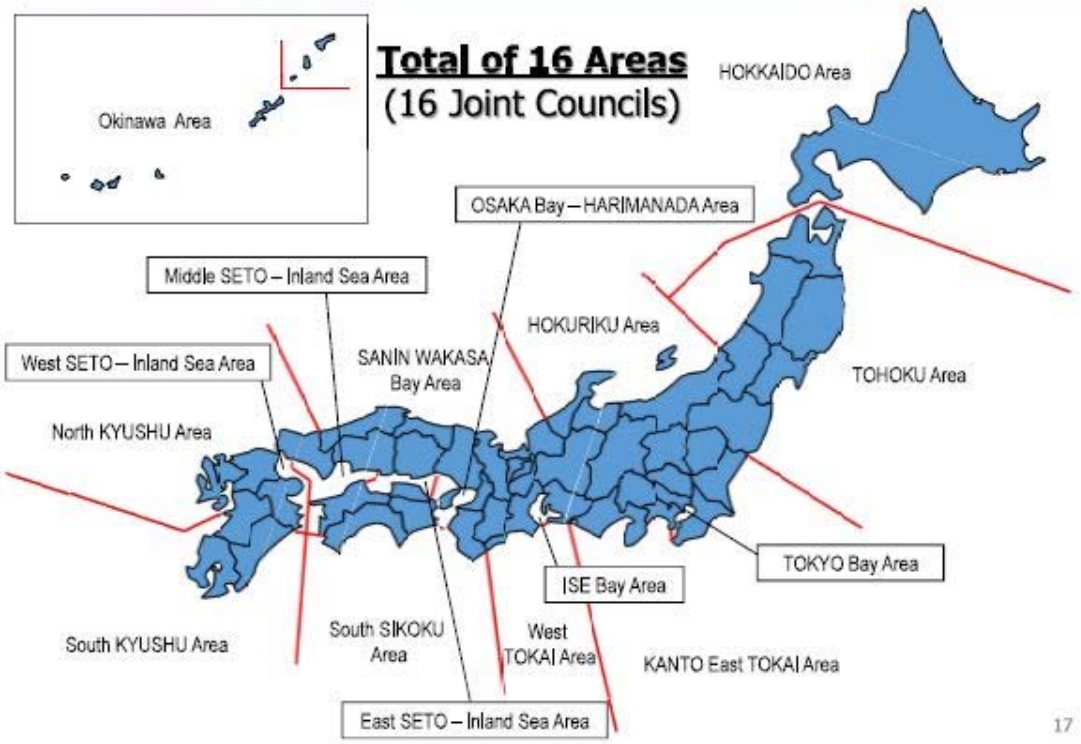

17

Regional Contingency Plans

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Outline

Regional Contingency Plan

Main 4 issues

1. Purpose
2. Target Sea Areas
3. Basic Plan Outline
4. Characteristics of Target Sea Areas
5. Possible Scenarios of Oil Spill Incidents
6. Target Stockpiles of Equipment
7. Communication, Information Sharing
8. Countermeasures
9. Countermeasures at the Deep Sea Areas
10. References (Stockpiles, Facilities)
11. Best Practices, etc.

Assumed scale of pollution

Target Stockpiles of Equipment

Communication

Counter measures

18

Revision of Regional Contingency Plans

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Background

To reflect the latest situation including decrease of assumed discharge amount and the succeeding changes in the Regional Contingency Plans

Assumed discharge amount

Because of transition from single hull tanker to double hull tanker, assumed discharge amount declines.

	【Before the revision】	【After the revision】
In case of collision	9% of deadweight	2.15% of deadweight
In case of grounding	20% of 2 center tanks' volume	0.63% of deadweight

Oil dispersant

Sprayed oil dispersants react fully. Based on academic knowledge, it was estimated that **70%** of dispersants react to spilled oil.

【Before the revision】 100% → 【After the revision】 70%

19

Revision of Regional Contingency Plans

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Oil recovery machine

Actual capacity of a oil recovery machine depends on weather and sea condition and situation of oil dissemination, Based on academic knowledge, it was estimated that average of actual capacity was 32.3% of capacity published by its manufacture.

【Before the revision】 100% → 【After the revision】 32.2%

Recovery efficiency × Contact probability = Total efficiency

62% × 52% = 32.2%

Session for response to oil spill

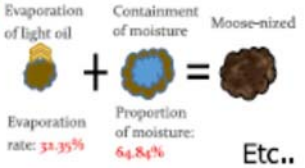
Based on an average session of 132 incidents for response by an external expertise organization, it was extended to **7 days**.

【Before the revision】 2 or 3 days → 【After the revision】 7 days

Variation with time

After spilling to the sea, oil is "moose-nized" with time transit. Based on results of experiments, the increase of volume is estimated to be **2-fold**.

【Before the revision】 no consideration → 【After the revision】 2-fold increase of volume



20

Questions?

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Activities of the Russian Marine Rescue Service in the field of oil spill preparedness and response and international cooperation

Kutaeva Natalia

Councellor to the Director

FBI “Marine Rescue Service of Rosmorrechflot” (MRS)
Federal

◆ *Abstract*

There are developed national oil spill preparedness and response system, which is based on the provisions of OPRC Convention and relevant international recommendations, namely three levels approaches planning and responses. National legislation concerning oil spill preparedness and response are developed and effective implemented.

The Ministry of Transport of the Russian Federation is federal executive body, which is responsible for functioning of subsystem of organization of work on the prevention and liquidation of oil spills in the sea from ships and objects, regardless of their departmental and national affiliation. Accordingly, to the national legislation the Ministry of Transport of the Russian Federation is authorized to act on behalf of the State to request assistance or to decide to render the assistance requested in case of major oil spill incident.

The Federal Agency for Maritime and River Transport (Rosmorrechflot) is a federal executive body, which is entrusted to provide state services and to manage state property in the field of maritime and inland waterway transport, as well as in the field of transport security.

FBI “Marine Rescue Service of Rosmorrechflot” (MRS), which is one of subordinated organizations to the Federal Agency for Maritime and River Transport, together with their branches and Federal State Budgetary Institution “Rescue Coordination Center of Rosmorrechflot” form a national functional subsystem of means and resources respond to the emergencies deals with search and rescue people in distress and oil spill response at the sea.

MRS is an organization responsible for practical fulfillment of the Russian Federation obligations in the field of oil spill response operation and international bilateral agreements. Nowadays, MRS is assigned to solve the tasks for rending assistance to distressed people at the sea, emergency vessels, oil spill recovery at the sea, oil spill response for oil production platforms and oil-gas exploring, towing, underwater technical and diving operations of different

purpose. There are nine branches and 39 units at the all marine basins of the Russian Federation, where is located oil spill response equipment.

Taking into account the tasks for salvage and rescue readiness in the search and rescue area of the Russian Federation, the modern multipurpose salvage and rescue vessels have been built for last years. The vessels in questions are providing permanent oils spill preparedness at the marine basins of the Russian Federation.

MRS organizes and participates in the oil spill response exercises on other levels including international, national and objective.

Thus, MRS is a developing state structure, which is formed to respond to emergencies at the sea, and reliable partner for maritime business community.

MRS is involving in the international cooperation in the field of marine environmental protection, including oil spill preparedness and response. MRS's representatives participate, as member of the Russian delegation, in the activities of working bodies of IMO, HELCOM, Black Sea Commission, Arctic Council, Tehran Convention, NOWPAP.

◆ *Profile of the presenter*

Education

- BSc: Diploma with honours, Moscow Engineer–Building Institute (Department of Water Supply and Sewage Treatment), Moscow, Russian Federation
- PhD: Post-graduate Department of the USSR Research Institute of Water Supply Hydrotechnical Construction and Sewage, Moscow, Russian Federation

Biography

- 1997 – until now: Leading Specialist on Environmental Protection, Head of the Maritime Environment Pollution Protection Division, Councellor to the Director, Federal Budgetary Institution “Marine Rescue Service of Rosmorrechflot” (MRS)

Field of interest

- Implementation of the national legislation in the field of marine environmental protection from shipping
- Implementation and Enforcement of the international regulations in the field of marine pollution prevention from ships, namely MARPOL, BWC, OPRC, HNS-OPRC Protocol, etc., at the national level
- International co-operation related marine environment protection from shipping and oil spill response planning (participation in the sessions of MEPC IMO as well as leads of Russian delegation at the meeting of working bodies in marine field of regional international organizations such as Baltic Marine Environment Protection Commission (HELCOM), Commission on the Protection of the Black Sea Against Pollution (Black Sea Protection Commission), Arctic Council, NOWPAP. Acted as consultant of IMO for some projects, including Project related the elaboration of the draft Caspian Sea Plan concerning Regional Co-operation in Combating Oil Pollution in Cases of Emergency and draft Protocol concerning Regional Co-operation in Combating Oil Pollution in Cases of Emergency to the Framework Convention for the Protection of the Marine Environment of the Caspian Sea.)

unified state system of prevention and liquidation of emergency situations (Decree of the Governmental of the Russian Federation No 794 dated 30.12.2003)

unified state system of prevention and liquidation of emergency situations (Decree of the Governmental of the Russian Federation No 794 dated 30.12.2003)

Regulations on the functional subsystem of organization of work on the prevention and liquidation of oil spills in the sea from ships and objects, regardless of their departmental and national affiliation (Order of the RF Ministry of Transport No 53 dated 06.04.2009)

Federal bodies involved in the subsystem of organization of work on the prevention and liquidation of oil spills in the sea from ships

Ministry of Transport of the Russian Federation

a federal executive body responsible for drafting and implementing government policy and legal regulation in the field of civil aviation, controlling airspace and providing air navigation services to airlines operating in the airspace of the Russian Federation; aeronautical search and rescue; maritime (including sea ports), domestic water, rail and motor transport (including transport control at the points of the Russian state border crossing), urban electrical and industrial transport (including underground rail); road infrastructure; operation and safety of navigation and hydraulic facilities and transport security; government certification of aircraft ownership rights and related transactions; and management procedures to control road traffic

Federal bodies involved in the subsystem of organization of work on the prevention and liquidation of oil spills in the sea from ships

Ministry of Transport of the Russian Federation

- Federal Agency for Maritime and River Transport
- Federal Service for Supervision of Transport
- Federal Agency for Air Transport
- Federal Road Agency
- Federal Agency for Rail Transport

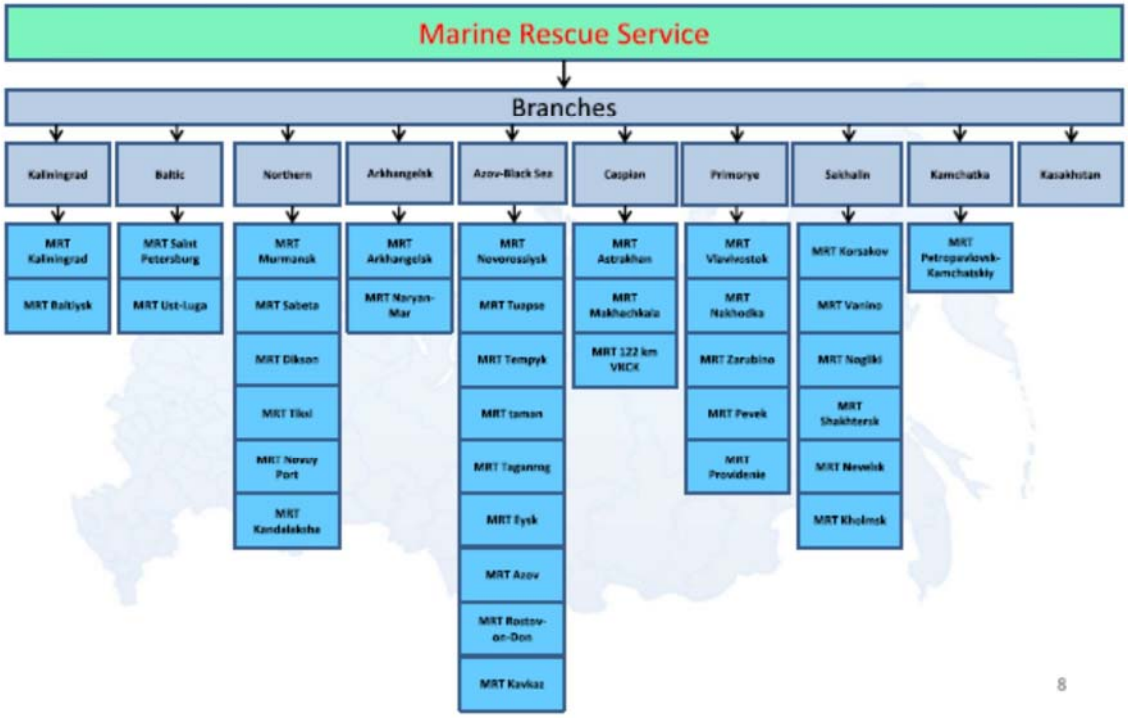
Federal Agency for Maritime and River Transport (Rosmorrechflot)

a federal executive body responsible for providing government services and managing government property in this sphere, such as sea ports (except for terminals intended to service fishing ships and boats). It also is in charge of providing services to ensure river transport safety. The agency is authorised to fulfil Russia's international obligations with respect to the implementation of government policy, the provision of government services, and the management of government property in the sphere of sea and inland water transport.

Federal Agency for Maritime and River Transport

- Maritime Rescue Service of Rosmorrechflot
- Rescue Coordination Center of Rosmorrechflot
- Sea Port Administrations
- Administrations of Inland Waterways
- Education Institutions
- Administration of the Northern Sea Route
- Rosmorport
- Morsviazsputnik
- others

Location of branches and divisions MRS



8

Carrying out of permanent OSR preparedness

Carrying out of permanent OSR preparedness

Multipurpose salvage vessels «BALTIKA» with capacity of 7 MW

Main dimensions

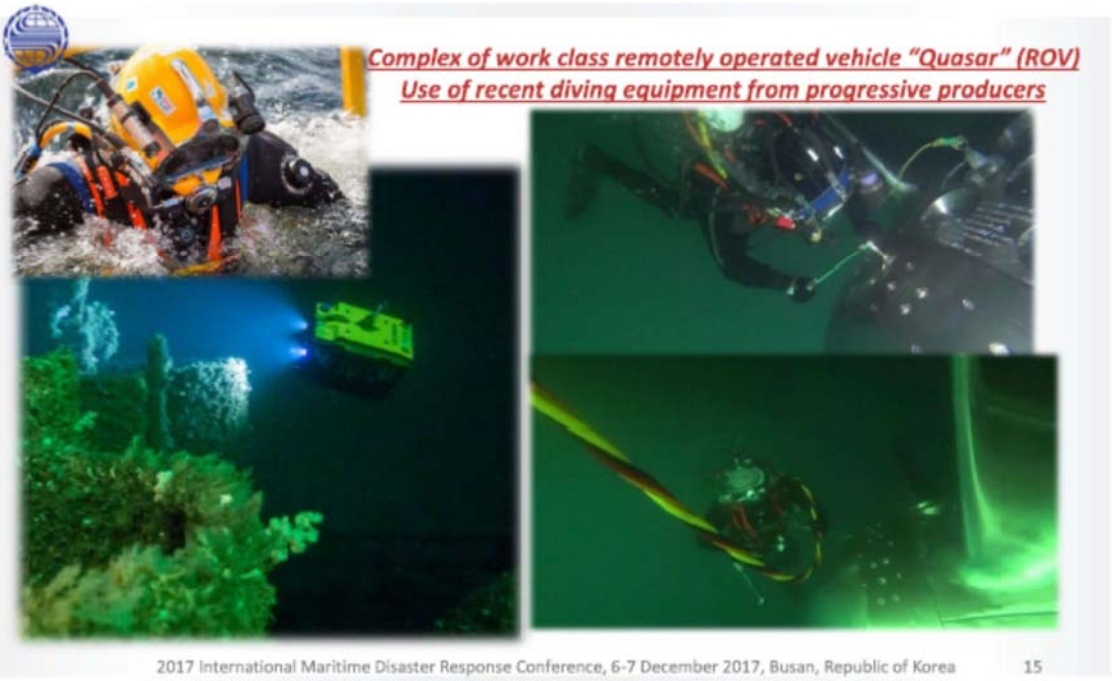
Overall length (without fenders) approx. 76.4 m
Length on waterline approx. 72.1 m
Overall width approx. 20.5 m
Width on waterline approx. 19.2 m
Draught, minimum performance of approx. 6.0m
Draught at the estimated waterline approx. 6.3m
Draught, max approx. 7.0 m
Depth to main deck approx. 9.0 m
Deadweight at maximum draft of 7.0 m should be about 1900 tons with open hatches onboard in oil collecting operational mode

Multipurpose salvage vessels with capacity of 7 MW

Overall length – 87,75 m
Width – 19,10 m
Max drought – 6,52 m
Speed - 15 knots
Crew – 22 pers, including 2 medics
Autonomuos – 30 days

Oil spill response operation

Conduction of salvage operation


Complex of work class remotely operated vehicle "Quasar" (ROV)
Use of recent diving equipment from progressive producers
2017 International Maritime Disaster Response Conference, 6-7 December 2017, Busan, Republic of Korea
15


Use of uninhabited aircrafts for monitoring of water area and assessment of emergency situation dynamics
2017 International Maritime Disaster Response Conference, 6-7 December 2017, Busan, Republic of Korea
16

Exercise

Exercise on Arctic terminal on Ob bay water area, March 2016

Exercise in the south-eastern part of Barents sea (Pechora sea), March 2017.

2017 International Maritime Disaster Response Conference, 6-7 December 2017, Busan, Republic of Korea 19

Exercise in the water area of the Kara Sea, August 2017

2017 International Maritime Disaster Response Conference, 6-7 December 2017, Busan, Republic of Korea 20

Educational and Training Center

ETC could provide a professional advancement in the following areas:

- 1. divers;
- 2. remotely operated underwater vehicle (ROV) operators;
- 3. Engineer of compressor for air supply to divers;
- 4. diver – welder-cutter;
- 5. rescuers;
- 6. drivers of small vessels;
- 7. specialists for oil spill response 1,2,3 Tiers.

Educational and Training Center

International cooperation

- Maritime International Organization (IMO)
  - Marine Environment Protection Committee (MEPC)
  - Sub-Committee on Pollution Prevention and Response (PPR)
- Baltic Marine Environment Protection Commission (HELCOM)
  - Maritime Group
  - Response Group
- Commission on the Protection of the Black Sea Against Pollution (Black Sea Protection Commission) – AG on the Environmental Safety Aspects of Shipping (ESAS AG)

International cooperation

- Arctic Council
  - Protection of the Arctic Marine Environment Working Group (PAME)
  - Emergency Prevention, Preparedness and Response Working Group (EPPR)
- NOWPAP
  - MERRAC
- Bilateral agreement on oil spill combatting at the sea (Finland, Lithuania, Poland, Norway, Estonia, US CG, etc)


ROSMORRECHFLOT
MARINE RESCUE SERVICE
MARINE RESCUE SERVICE OF ROSMORRECHFLOT (MRS)
MINISTRY OF TRANSPORT
OF THE RUSSIAN FEDERATION
FEDERAL AGENCY FOR MARITIME AND RIVER TRANSPORT
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2017 International Maritime Disaster Response Conference, 6-7 December 2017, Busan, Republic of Korea
25

Recent trend of IOPC Funds

<The international compensation regime for oil pollution damage and how it deals with large oil spills>

Chiara Della Mea

Claims Manager

International Oil Pollution Compensation Funds

◆ *Abstract*

The paper will show how the international system for liability works and how it dealt with the response to incidents such as the *Hebei Spirit* and with the follow up activities, including the presentation and submission of claims, with a focus on the concept of admissibility criteria for compensation of clean up claims under the international regime, in particular the definition of technical reasonableness and its application in the assessment of claims after major oil spill incidents.

◆ *Profile of the presenter*

Education

- Master of Marine Management, University of Dalhousie, Canada
- Laurea Degree in International Political Sciences, Italy

Biography

- 2004-2017: Claims Manager, International Oil Pollution Compensation Funds (IOPC Funds)
- 2002-2004 Consultant, Marine Protection Unit, Italian Ministry of Environment and Marine Protection, Italy
- 1999-2004 Consultant, Italian Institute for Marine Applied Research (ICRAM), Italy

Field of interest

- Environmental monitoring and assessment
- Claims and Compensation

International Maritime Disaster Response Conference
Busan, Republic of Korea

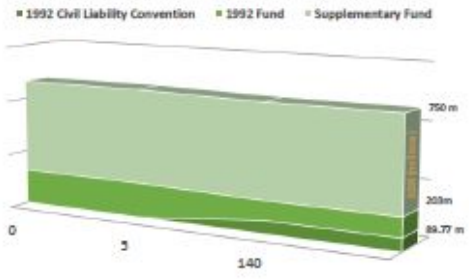
The international Oil Pollution Compensation Regime for oil spills from tankers

Chiara Della Mea
Claims Manager

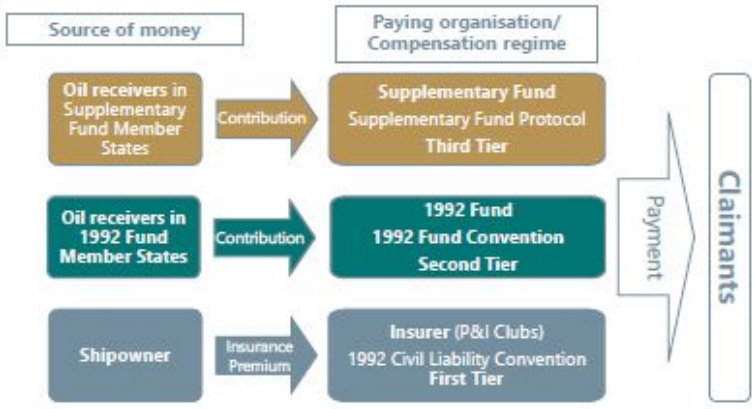
6-7 December 2017

The international compensation regime
Legal framework

Convention	Membership
1992 Civil Liability Convention	133 Member States
1992 Fund Convention	114 Member States
2003 Supplementary Fund Protocol	31 Member States



How the regime works
Three Tier system



The International Compensation Regime
Rationale

Compensation to victims of pollution damage caused by spills of persistent oil from tankers

- ✓ Compensation through amicable settlement
- ✓ Uniform and consistent application of compensation regime
- ✓ Equal treatment of all claimants

The International Compensation Regime
Scope of application

- Pollution damage
- Spills of persistent oil from tankers
- Territory, territorial waters and Exclusive Economic Zone or equivalent
- Cost for preventive measures
- Bunker spills from unladen tankers
- 'Mystery spills' from tankers

The International Compensation Regime
Time bar

Rights to compensation under both the 1992 CLC, the 1992 Fund Convention and the Supplementary Fund Protocol shall be extinguished unless action is brought within 3 years from the date of damage

However, in no case shall an action be brought after 6 years from the date of the incident

3

Management of an incident

Common issues in major incidents

- Who is in charge of coordination and surveillance?
- Role & position of the authorities
- Social concerns, Public opinion; "Media pollution"
- Volunteers
- How clean is clean?
- Record keeping

Management of an incident

Role of the IOPC Funds

- Early presence of the IOPC Funds on site
- Regular visits to affected areas
- Establishment of contacts with all parties involved and in particular
  - Coordination meetings with Authorities, Coastguards and Fund/Club's experts
  - Meeting with the claimants / the public
  - Meeting with media

4

Management of an incident

Role of experts

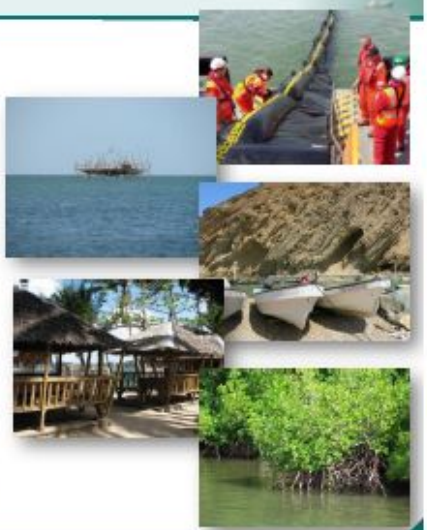
- ✓ Local surveyors and international experts jointly appointed to:
  - Visit and advise all parties on most effective clean up to minimise resource damage
  - Investigate damage & monitor clean-up
  - Offer guidance on admissibility of claims
  - Submit recommendations to the Fund & Club
- ✓ Role only **advisory**

Only the Fund & P&I Club approve claims

Admissibility of claims

Types of claim

1. Costs of clean-up operations and preventive measures
2. Property damage
3. Economic losses by fishermen or those engaged in mariculture
4. Economic losses in the tourism sector
5. Costs for reinstatement of the environment



Admissibility of claims
Basic principles

Existing criteria: Claims Manual

- Objective criteria
- Reasonableness
- Relationship between costs and benefits

Political/social considerations are outside the scope of the Conventions

Admissibility of claims
General criteria

- Link of causation
- Action must be reasonable
- Costs must be reasonable
- Expenses must actually be incurred
- Does the claim reflect actions? Losses?
- Do the sums add up?

- Importance of record keeping

Admissibility of claims

Clean up and preventive measures claims

"All reasonable measures taken by any person after an incident has occurred to prevent or minimise pollution damage"

- Combat oil at sea
- Responding to threat of spill
- Protect resources vulnerable to oil
- Clean shorelines/coastal installations
- Dispose of oil/oily waste

- ✓ Based on a technical appraisal
- ✓ Seeking to enhance natural processes
- ✓ Proportionate in cost
- ✓ Reasonable chance of being effective based on information available at the time of the decision

Admissibility of claims

Property damage claims

- Cleaning and repairs costs (manpower and materials)
- Replacement of property contaminated by oil (less wear and tear)

- ✓ Damage must have been caused by contamination
- ✓ Claim = measures taken and costs
- ✓ Reasonable costs based on invoices
- ✓ Estimates normally are not admissible
- ✓ Wear and tear taken into consideration
- ✓ No compensation for betterment

7

vvv

Admissibility of claims

Economic losses claims

Consequential loss
Loss of earnings by owners of property contaminated by oil

Pure economic loss
Loss of earnings by businesses who have suffered a loss as a consequence of a spill, without direct contamination

- ✓ Geographic proximity between the claimant's activity and the contamination
- ✓ Claimant's economic dependence on the affected resource
- ✓ Alternative sources of supply or business opportunities
- ✓ Extent to which the business forms an integral part of the economic activity within the area affected

Admissibility of claims

Reasonable costs – Environmental damage/Reinstatement

Admissible claims

- Economic loss which can be quantified in monetary terms
- Costs of reasonable measures to reinstate contaminated environment

Existing criteria:

- Claims Manual
- Environmental damage claims guidelines

- ✓ Compared to natural recovery, does the proposed response minimise oil impacts or enhance environmental recovery?
- ✓ Basis of all environmental trade-offs analysis
- ✓ Primary axiom of response - if you can't help, be sure to do no further harm

Claims based on abstract calculation of environmental damage / punitive damages are **not admissible** for compensation

8

Admissibility of claims

Post-spill studies

IOPC Funds may contribute to the cost of post-spill studies provided they:

- Relate to pollution damage
- Aim to establish nature and extent of environmental damage and whether reinstatement is necessary and feasible

- ✓ Studies are not required after all oil spills
- ✓ Studies should be carried out with scientific rigour and objectivity
- ✓ Studies should not repeat work already done

Presenting a claim

General guidelines – Clean up claims

- ➢ 1992 Fund Claims Manual
- ➢ 2015 Clean-up claims Guidelines

- ✓ **Early notification** to enable experts to attend on-site
- ✓ Key to successful recovery is **good record-keeping** linking action to expenditure

9

Presenting a claim

Documenting a claim – clean up and preventive measures

- ✓ Invoices insufficient by themselves
- ✓ Narrative describing response activities and linking these with expense
- ✓ Maps & spreadsheets very helpful
- ✓ Comparative figures
- ✓ Cost items should be supported by invoices, receipts, worksheets, wages records etc.

Evidence provided must be sufficient for the insurer / IOPC Fund to form its own opinion of the losses suffered

Settling claims

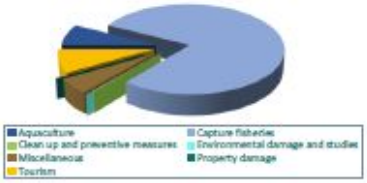
Claim assessment and settlement

- Claims assessed based on information provided
- Fund will provide claimants with a detailed assessment in writing
  - If agreement is reached the claim is settled
  - If agreement is not reached:
    - Assessment may be revised, based on additional information provided by the claimant
    - Claimants have right to take court actions

10

Hebei Spirit incident
Claims for compensation

128,483 claims submitted



- Amount available insufficient to pay all established claims in full
- The Korean Government decided to stand last in the queue for part of its claims
- Level of payments at 60% of the established claims

Hebei Spirit incident
Spill impacts

- Political vs technical sensitivities
- Government intervention (Special Law)
- Public protests, social concerns, safety considerations
- Fishing restrictions imposed and lifted gradually from April 2008
- Temporary impact on tourism businesses in the most affected areas
- Shortage of experts
- Large numbers of small, undocumented claims submitted

Hebei Spirit incident
Issues related to claims for compensation

Capture fisheries claims

- ✓ More than 88,900 handgatherers
- ✓ Little to no supporting information
  - Claimants triaged (in cooperation with Korean Government)
  - 50,000 "genuine" hand-gatherers interviewed individually
  - Assessment based on village revenues, interviews, brokers info, statistics

Other economic losses claims

- ✓ More than 1,000 by small scale accommodation businesses (no official records)
- ✓ High proportion of claims assessed at Nil
  - Lack of link of causation
  - Lack of proof
  - No loss

Negative assessments take the same time as positive ones

Hebei Spirit incident
Impact on IOPC Funds policies

- Dramatic rise in the number of claims

Erika (1999):	7 000
Solar 1 (2006):	32 000
Hebei Spirit (2007):	128 000

Each claim must be individually assessed

Solution:

- 'Fast track' assessment of "small" claims
  - 'Use of recognised/reliable economic models justified where documentation is not available
  - Target time frame for assessing claims
- Guidance documents and tools available for Member States in the event of an oil spill

Hebei Spirit incident
Cooperation with Government

Cooperation agreement between the Skuld Club & the Korean Government

- The Club to pay 100% of established claims
- The Korean government to pay 100% of all established claims above 1992 Fund's limit

Cooperation between the 1992 Fund and the Korean Government

- Korean Government to make advance payments to claimants in full and subrogate the claimants' rights against 1992 Fund
- 1992 Fund to reimburse the Korean government up to the level of payment established by the 1992 Fund Executive Committee

The international compensation regime
Conclusions

The international compensation regime has dealt with 150 incidents over almost 40 years

Key to successful recovery is **good record-keeping** linking actions to expenditure

Assessment carried out on the basis of **technical criteria**

Supplementary Fund	• No incident • No compensation paid
The 1992 Fund	• 45 incidents • £311 million paid
The 1971 Fund	• 107 incidents • £331 million paid
Total	• 150 incidents • £642 million paid

Data as of 30 September 2017

System constantly under review to adapt to the new challenges and needs of society in the 21st century

www.iopcfunds.org

Chiara Della Mea
Claims Manager

Session 3

Future workplan for increasing capacity building for effectiveness of marine disaster preparedness and response

Chair: Jonghwa Eun

International response to pollution incidents - Current picture and future outlook

Speaker: Patricia Chalebois (IMO)

The 4th Industrial Revolution and the future of maritime disaster response

Speaker: Young Joo Lee (NIA)

The Development of Surveillance, Modelling and Visualization (SMV) tools to support a response effect

Speaker: Chris Moore (OSRL)

Regional cooperation on marine pollution preparedness and response in the NOWPAP Region

Speaker: Seong-Gil Kang (KRISO NOWPAP MERRAC)

International response to pollution incidents – Current picture and future outlook

Patricia Charlebois

Deputy Director, Marine Environment Division

International Maritime Organization

◆ *Abstract*

Technical knowledge, policies and infrastructure related to marine oil spill prevention, preparedness and response have continued to evolve and are now considered to have reached a state of relative maturity. However, new risks and challenges continuously emerge that require new considerations and perspectives.

The International Maritime Organization (IMO), as the specialized agency of the United Nations with a global mandate for the protection of the marine environment from pollution caused by shipping, discharges its commitment to protecting the marine environment from pollution from oil and HNS at the global level along four different but interdependent paths: prevention, preparedness and response, and technical co-operation, supported by a number of international instruments that embrace and promote these principles.

Against the backdrop of this longstanding legal and operational framework, incidents involving ships are on the decline. However, other incidents such as the Montara and Macondo spills from offshore drilling platforms have demonstrated new and serious threats from oil pollution in a different sector. Other new and emerging risks are coming to the fore every day, including exploration in increasingly deeper waters and in new and more challenging environments, notably in Arctic waters. We are looking into the future and seeing the emergence of autonomous ships and new types of fuels, for example, that will present different response risks, considerations and challenges.

The presentation will examine these elements in greater detail and will consider the future outlook of shipping within the context of maritime disaster response consideration.

◆ *Profile of the presenter*

Education

- BSc: Chemistry from the University of Ottawa, Canada
- MSc: Environmental Management and Business from Royal Roads University in Victoria, Canada

Biography

- More than 30 years' experience in pollution response and emergency management
- Response to numerous environmental emergencies and natural disasters around the world during her 15 years with IMO and prior to that five years with the United Nations Environment Programme
- Emergency management positions within the Canadian Government with both the Ministry of Transport and Ministry of Environment

Field of interest

- All matters related to marine oil and chemical pollution preparedness and response as covered by the OPRC Convention and the OPRC-HNS Protocol and is responsible for the management of the IMO's programme of environmental Technical Co-operation activities and related projects

International Response to Pollution Incidents – Current picture and Future Outlook

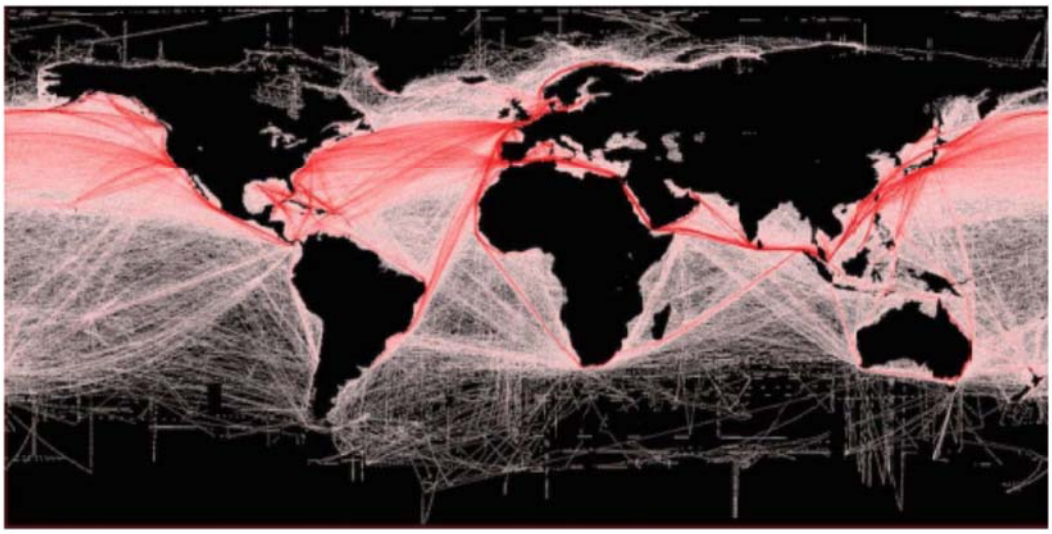
Patricia Charlebois
Marine Environment Division, IMO

IMO INTERNATIONAL MARITIME ORGANIZATION

International Maritime Organization

- Specialized UN agency with a global mandate for addressing maritime issues
- Mandate....

Need for international regulation



IMO INTERNATIONAL MARITIME ORGANIZATION

IMO Convention

The need for IMO:

- Shipping – international
- Underpins world trade
- Assets move between jurisdictions
- Universally applicable standards

IMO Convention:

- Adopted Geneva 1948
- Entered into force 1958
- First IMO meeting 1959

IMO INTERNATIONAL MARITIME ORGANIZATION

Global coverage

172 Member States representing:

- All major ship owning nations
- All major coastal states
- IGOs and NGOs

IMO INTERNATIONAL MARITIME ORGANIZATION

Legal Framework – Oil/HNS Pollution

PREVENTION	▪ MARPOL Convention
Preparedness & Response	▪ OPRC 1990 ▪ OPRC-HNS Protocol 2000
Compensation & Liability	▪ CLC 92 & Funds Conventions ▪ HNS Convention & HNS Protocol ▪ Bunkers Convention & LLMC

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MARPOL – the Prevention Instrument

International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978

APPLICATION

The Convention applies to:

- Ships entitled to fly the flag of a Party to MARPOL
- Ships not entitled to fly the flag of a Party but operate under the authority of a Party. (to foreign ships in a port or territorial waters of a Party)
- Ships operating inside a EEZ of a Party to MARPOL (UNCLOS Part XII)

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MARPOL – the Prevention Instrument

The teeth of the Protocol are in the Regulations contained in six annexes .....and related codes

- Annex I: Oil (1983)
- Annex II: Noxious Liquid Substances in Bulk (1987)
- Annex III: Harmful Substances Carried at Sea in Packaged Form (1992)
- Annex IV: Sewage from Ships (2003)
- Annex V: Garbage from Ships (1998)
- Annex VI: Air Pollution from Ships (1995)

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The Preparedness & Response Instruments

OPRC 1990 and OPRC-HNS 2000

Objectives

- a framework developing national and regional capacity to prepare for and respond to oil/HNS pollution incidents, and…
- A platform to facilitate international co-operation and mutual assistance in preparing for and responding to major oil and HNS pollution incidents

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Obligations - National

- A national system for responding to oil pollution incidents
- Oil pollution emergency plans
- Reporting of any oil pollution incident to nearest coastal State or State with jurisdiction
- Response capacity – individually or via bilateral/multilateral agreement

IMO INTERNATIONAL MARITIME ORGANIZATION

Obligations - International

- Informing neighbouring States of oil spills which could affect them
- Providing assistance if requested by another Party
- Requesting Parties agree to facilitate the receipt of such assistance in-country

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OPRC Convention

International convention on oil pollution preparedness, response and co-operation, 1990

112 States
75% of world tonnage

Protocol on preparedness, response and co-operation to pollution incidents by hazardous and noxious substances, 2000

39 States
51% of world tonnage

IMO INTERNATIONAL MARITIME ORGANIZATION

International Compensation Conventions

CIVIL LIABILITY CONVENTION (1992 CLC)

The International Convention on Civil Liability for Oil Pollution Damage, 1992

FUND CONVENTIONS (Fund 92 & Supplementary Fund 03)

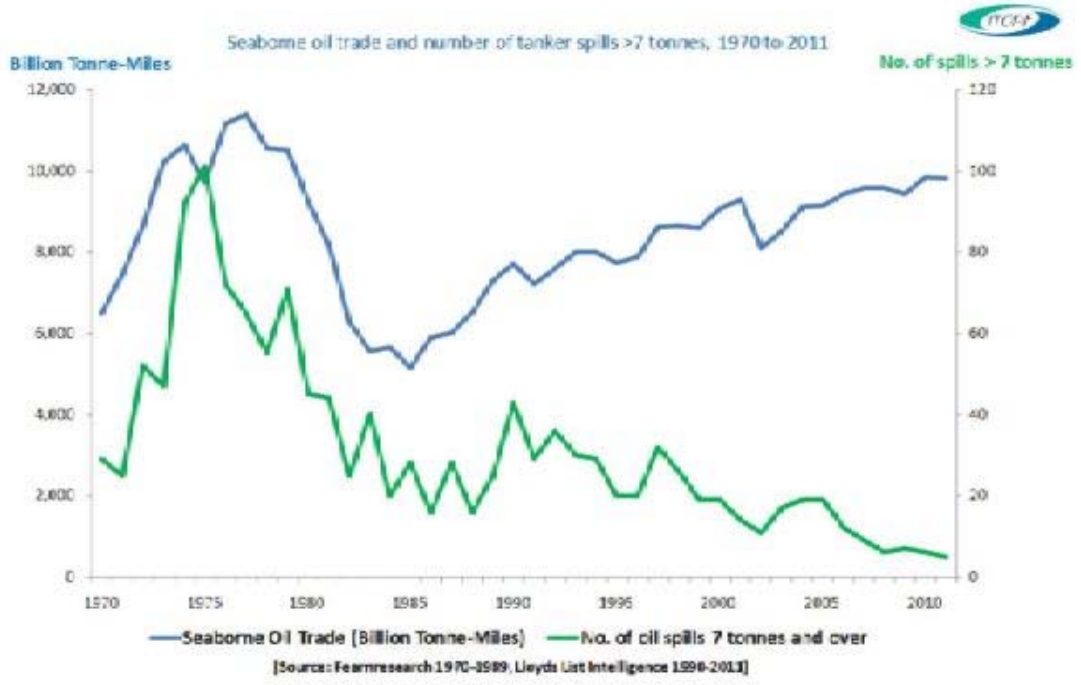
The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992 & Supplementary Fund 2003

IMO INTERNATIONAL MARITIME ORGANIZATION

Situation today

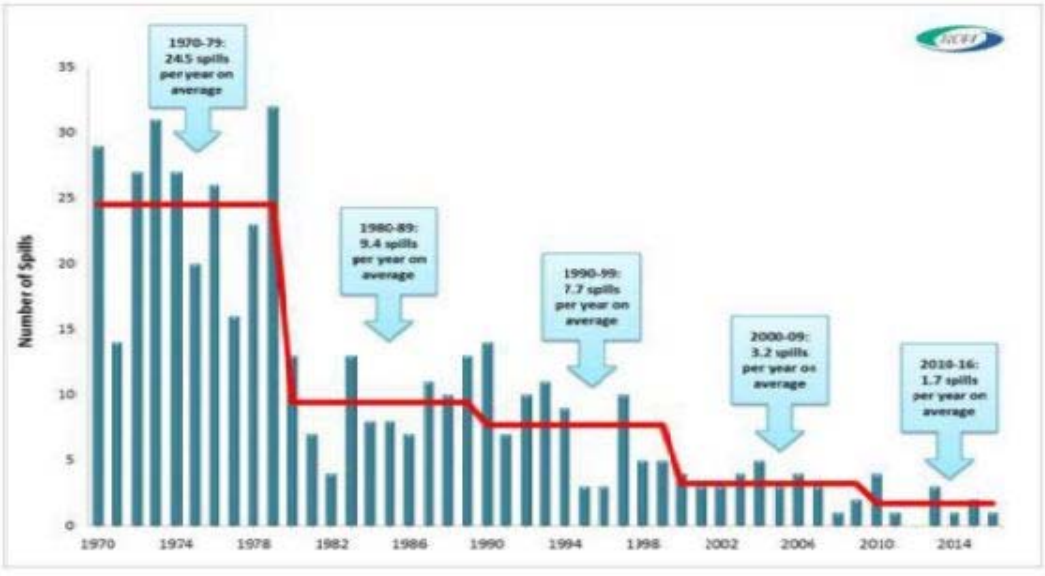
Thirty years on…..

…….has OPRC been successful?



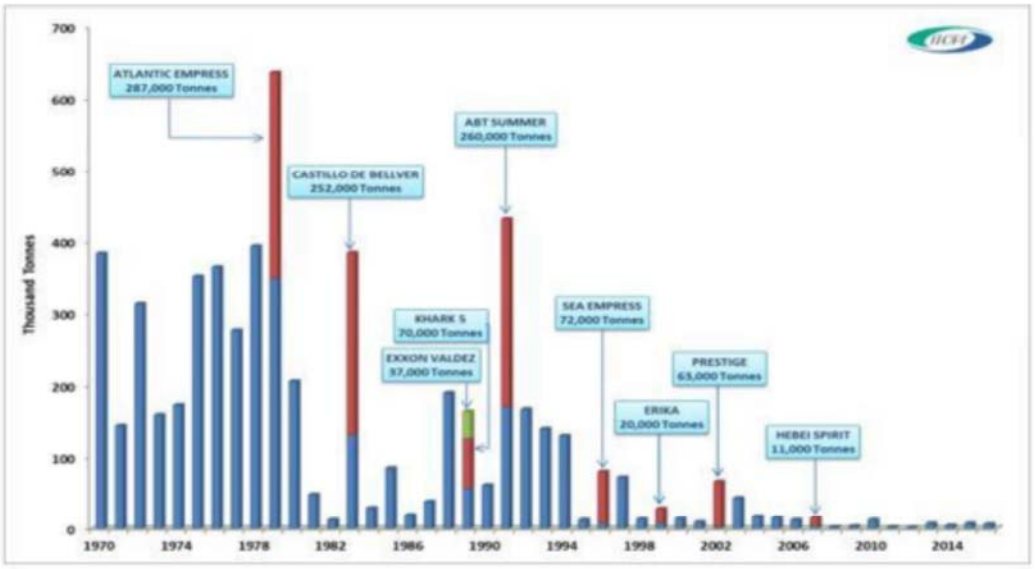
INTERNATIONAL MARITIME ORGANIZATION

Number of large oil spills (>700 tonnes) (ITOPF)



INTERNATIONAL MARITIME ORGANIZATION

Quantities of oil spilt 7 tonnes and over (ITOPF)



INTERNATIONAL MARITIME ORGANIZATION

Future outlook

What are the present day concerns and future outlook?

INTERNATIONAL MARITIME ORGANIZATION

Recent threats and risks – Offshore exploration

Two major incidents:

- Montara, August 2009

- Macondo, April 2010

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Offshore exploration

Increased exploration in:

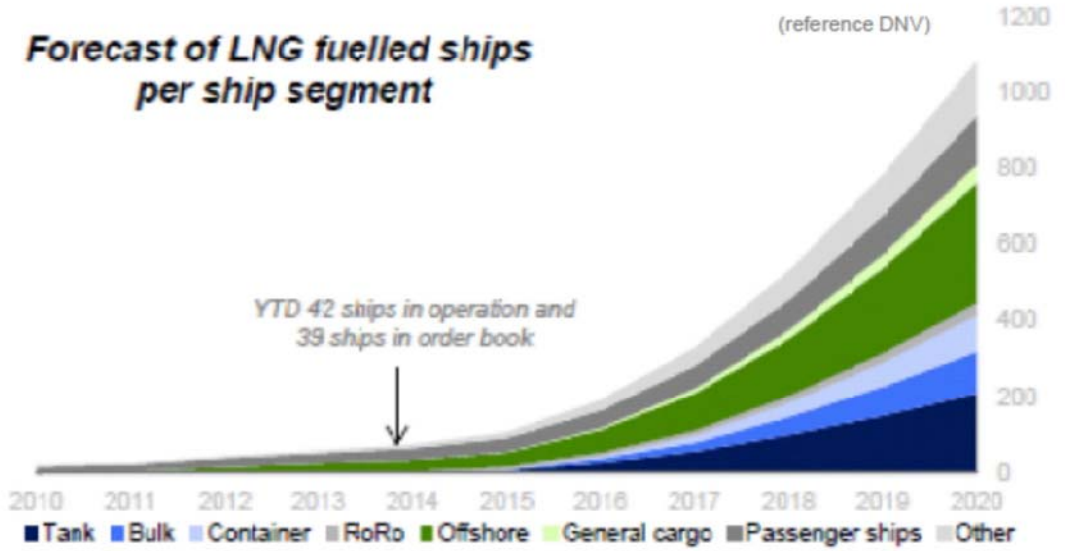
- deeper waters (some at a mile in depth (1.6 km))
- Remote areas with unique challenges (Arctic)
- Areas at potential risk of terrorism

- **Some of these are far offshore:**
  - Making response challenging
  - Presenting unique logistical challenges (people/equipment)

IMO INTERNATIONAL MARITIME ORGANIZATION

LNG-fuelled ships

- Currently relatively few in number but that is set to change



LNG-fuelled ships

- New Global sulphur limits (2020) will drive alternative fuel technologies
- Potential risks from LNG-fuelled ships:
  - Transported under high pressure
  - Cryogenic liquid
  - Highly flammable – explosion hazard
  - Training requirements for crew
- Safety requirements high reducing risk, however consequences very high

The future – Autonomous/Unmanned Ships

- Hailed to be the next major direction in shipping
- Still in developmental phase
- Considerations: safety, security, legalities, economics and ***risk***
- Some potential and known risks: Collisions, cyber threats, emergency situations, and other unknown risks

IMO INTERNATIONAL MARITIME ORGANIZATION

Thanks for your attention - Questions

www.imo.org

IMO INTERNATIONAL MARITIME ORGANIZATION

The 4th Industrial Revolution and the Future of Maritime Disaster Response

Young-Joo Lee

Principal Researcher / Ph.D.

National Information Society Agency

◆ *Abstract*

Coming of the age of big data and Internet of Things stimulates both the public and private sector to realize the 4th industrial revolution. However, conceptual agreement and future planning of these new phenomena is in the early stage particularly in the disaster management sector. The current presentation deals with the widening approach toward the 4th industrial revolution and its key drivers: intelligent technologies. We discuss the conceptual distinction between traditional information technologies and intelligent technologies focusing on IoT, big data, cloud computing, mobile devices, and artificial intelligence. Next, we introduce how we may discover the possibilities of intelligent technologies in the maritime disaster management field. Finally, the review of several challenges we face and their implications and future directions conclude the presentation.

◆ *Profile of the presenter*

Education

- BA. in sociology, Yonsei Universty, Republic of Korea
- MBA, KAIST Business School, Republic of Korea
- Ph.D. in information system, Graduate School of Information at Yonsei University

Biography

- 2000-2004: ERP solution Consultant, LG CNS
- 2007-2007: IT Consultant, BearingPoint Korea
- 2007-present: Principal Researcher, National Information Society Agency Korea

Field of interest

- Information technology and societal changes
- Big data analytics and forecasting
- Horizon Scanning and Risk Assessment
- E-government system and public sector informatization

[2017 International Maritime Disaster Response Conference]

The 4th Industrial Revolution and the Future of Maritime Disaster Response

2017.12.7

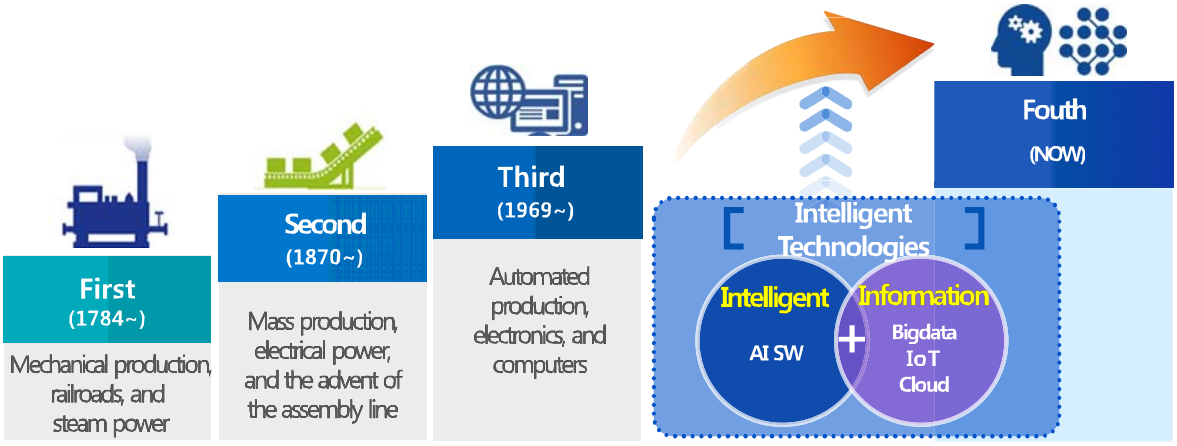
Young-Joo Lee (Ph.D.), Principal Researcher

Future Strategy Center, NIA NATIONAL INFORMATION SOCIETY AGENCY

The rise of 4th Industrial Revolution

" Everything is connected, evolving toward intelligent Society "

- WEF Davos Forum 2016 -



* Source : Ministry of Science and ICT(2016.12)

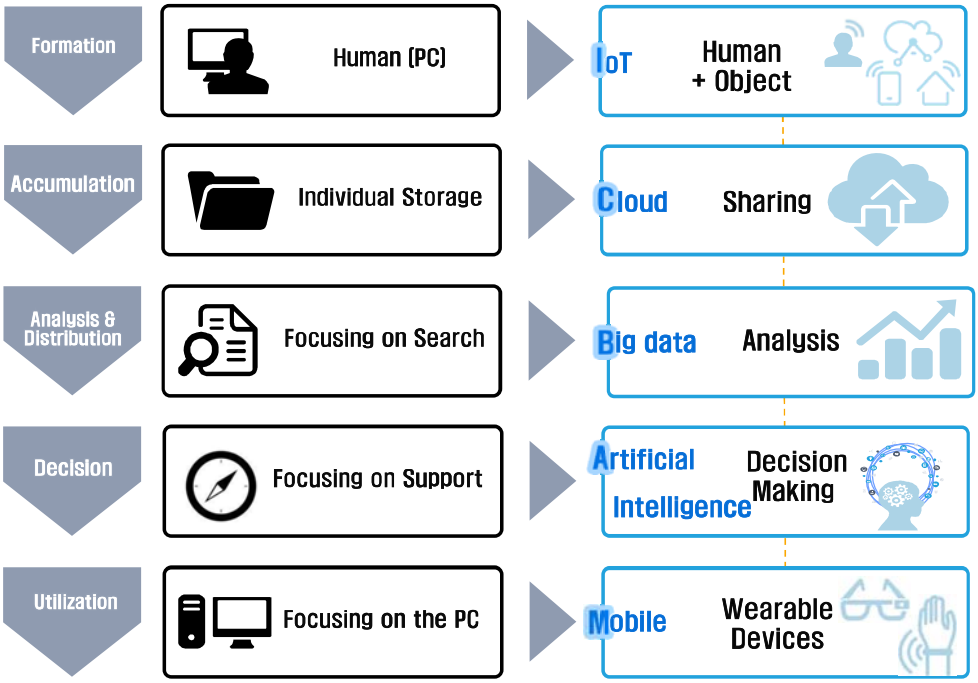
Driver : Data Explosion

- Rise of Data Economy -

People-to-people	Machine-to-machine	Industry-to-industry
SNS users	Things in the internet	ICT convergence market
19.6('15) › 28.2('20)	4.8('15) › 250('20)	1.99('15) › 3.6('20)
(billion, source: eMarketer)	(billion, source: Gartner)	(trillion dollar, source: ETRI)

3

Driver : Intelligent Technologies



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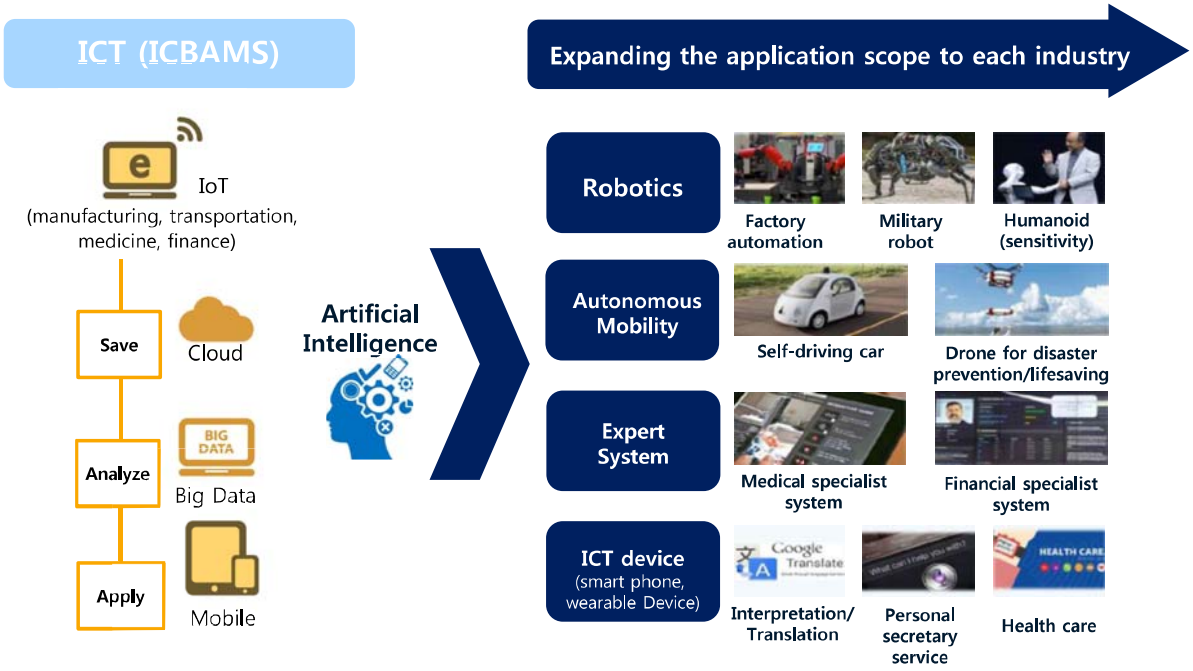
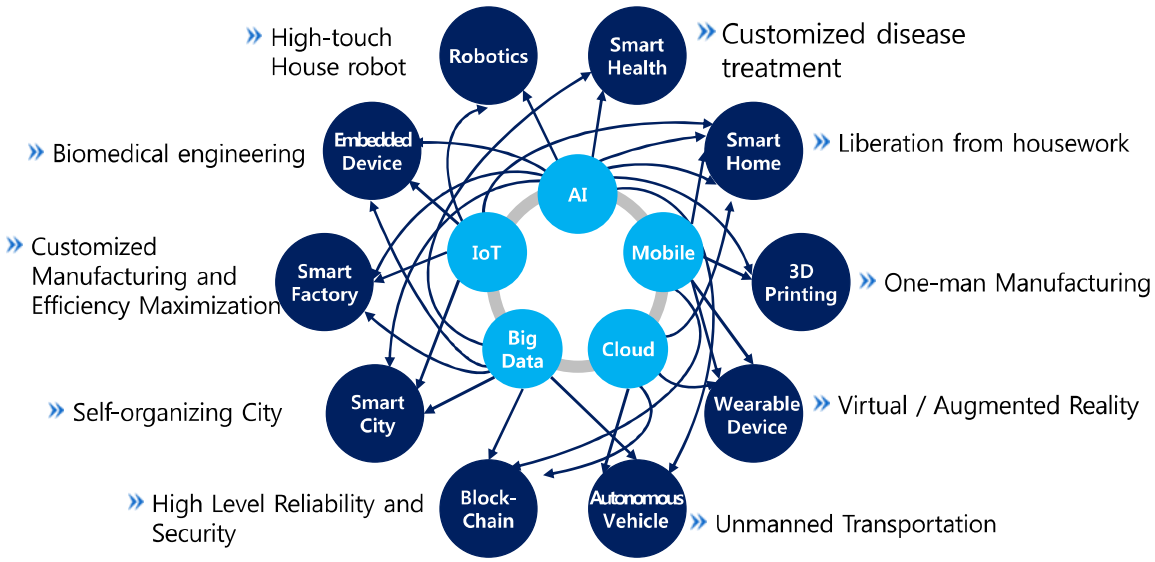
Intelligent Technologies and Industrial Applications



Future Service based on Intelligent Technologies



Intelligent Technologies in Our Daily Life

Virtual Assistant

AI Writers

Forbes < AI Reporters >

Los Angeles Times

Chicago Tribune

< AI Novelist >

Intelligent Technologies in Our Business

Robo Advisors

DBS

Customized investment advisory and asset management service using intelligent ICT

USAA

Specialized consulting service related to social adaptation after discharge from military service using intelligent ICT

AI Doctor

"The accuracy of cancer diagnosis using Watson is higher than the specialist's initial diagnosis rate (80%)."

(colon cancer - 98%, bladder cancer - 91%, pancreatic cancer - 94%, and uterine cervical cancer - 100%)
(American Society of Clinical Oncology)

Vision for 4th industrial revolution in Korea

I – KOREA 4.0

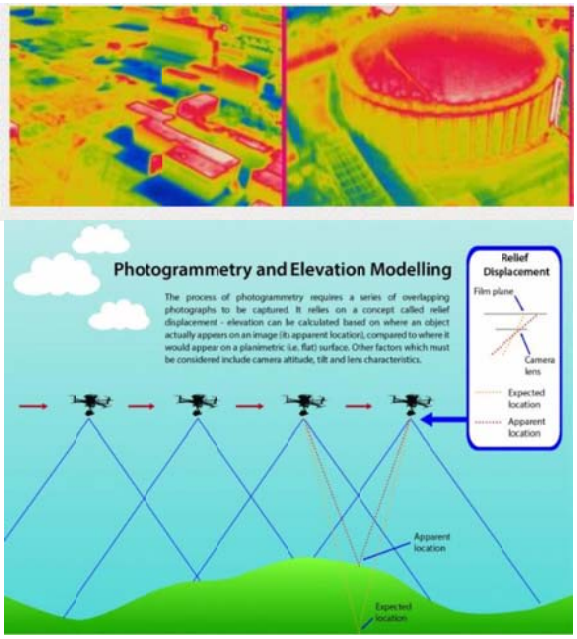
- Intelligence
- Innovation
- Inclusiveness
- Interaction

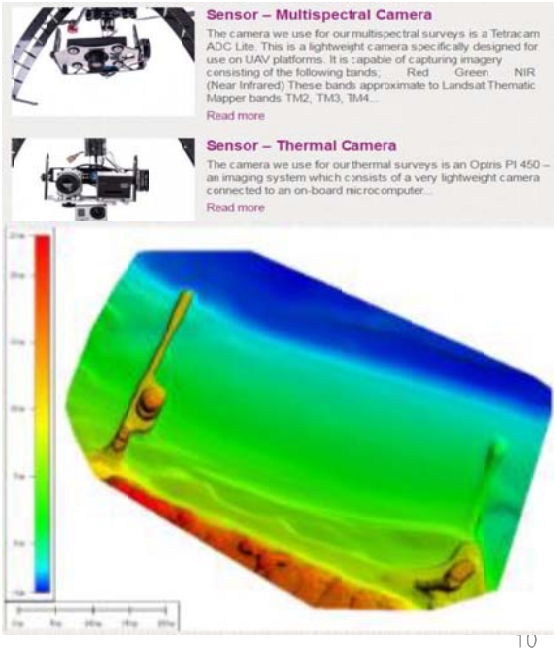
→ 4th Industrial Revolution
→ 4 Is
→ 4 Strategies
  - ***Intelligent Innovation Project***
  - Tech. for Growth Engine
  - Industry Infrastructure & Ecosystem
  - Readiness for Future Change

9

Intelligent Innovation Project : Smart Mobility

- Deep Learning Based Thermal Imaging-





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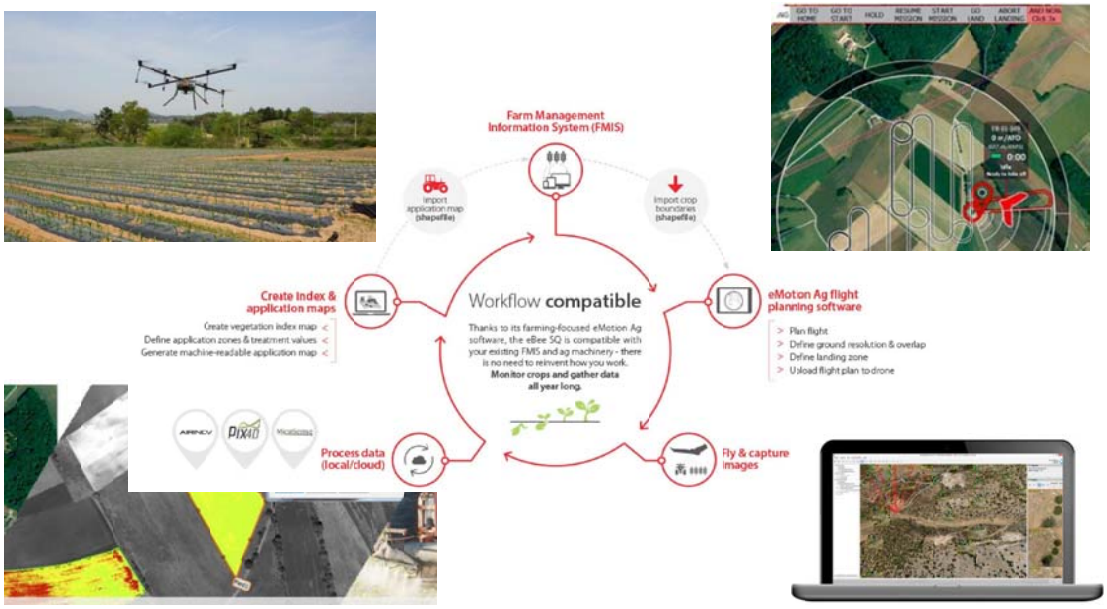
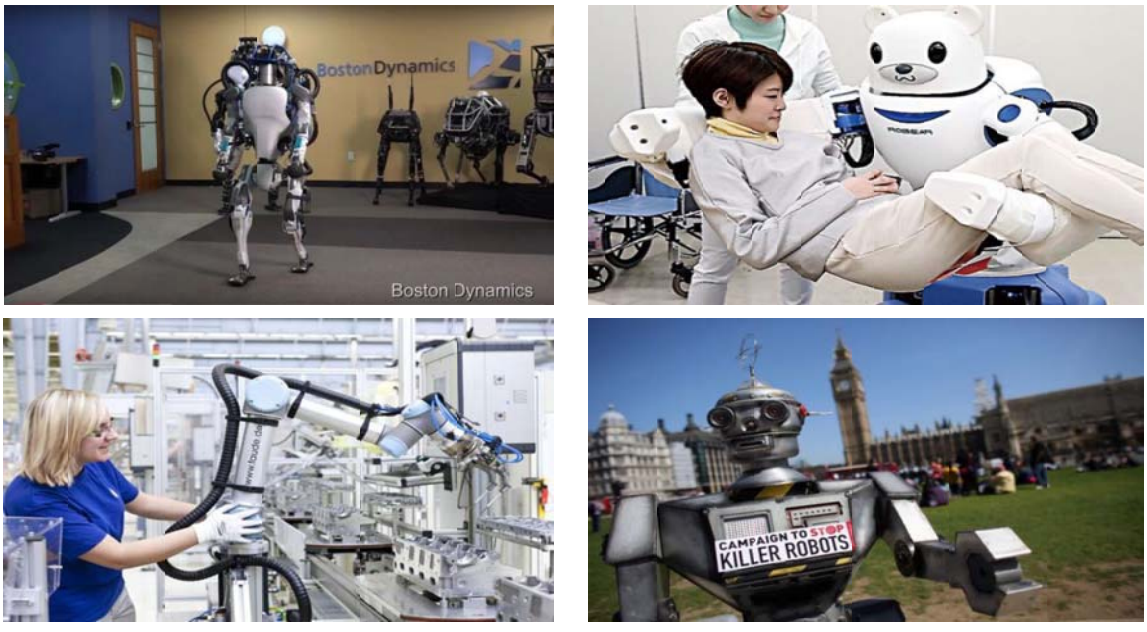
Intelligent Innovation Project : Smart Mobility

- Drone and Smart Farm Management-



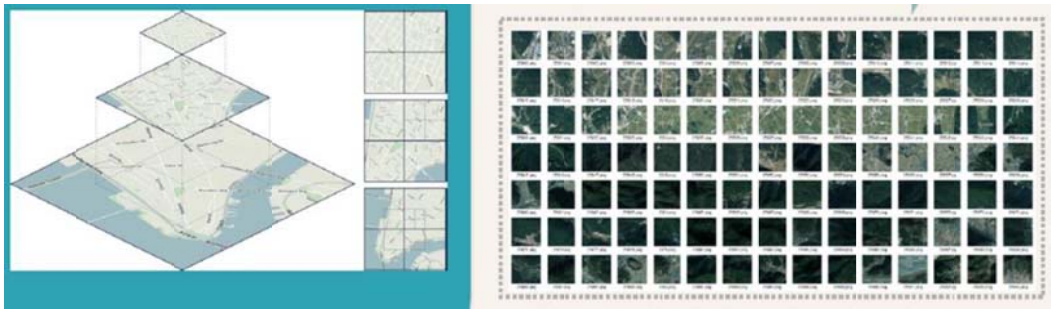
Intelligent Innovation Project : Robotics

- Robot Development: Pros and Cons -



Intelligent Innovation Project : Environment

- Deep Learning Based Real-time Weather Forecast -



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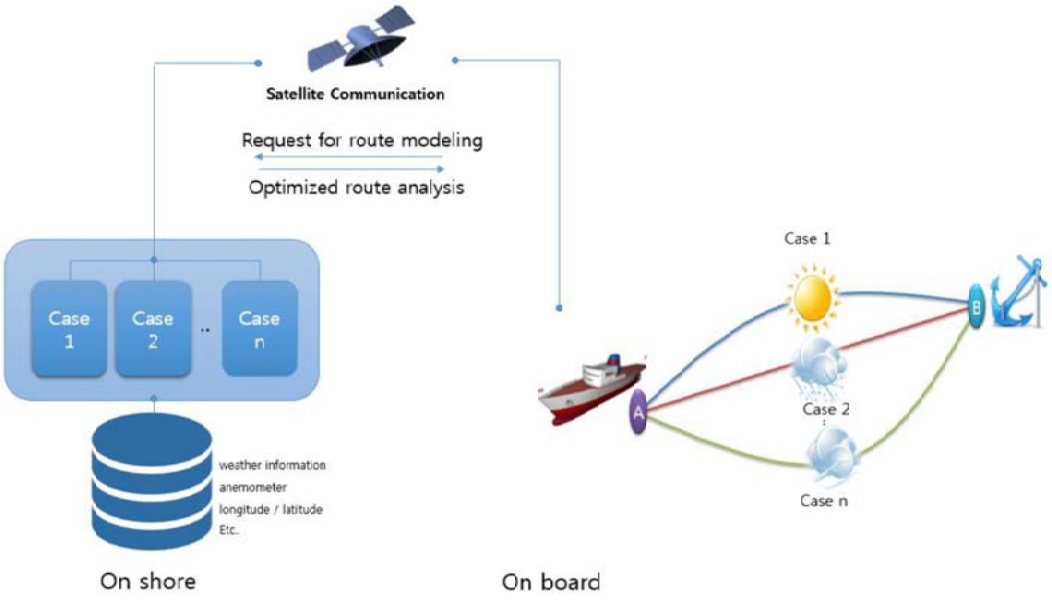
Intelligent Innovation Project : Transportation

- Traffic Accident Early Warning System-

14

Intelligent Innovation Project : Maritime Transportation

- Machine Learning Based Route Optimization -



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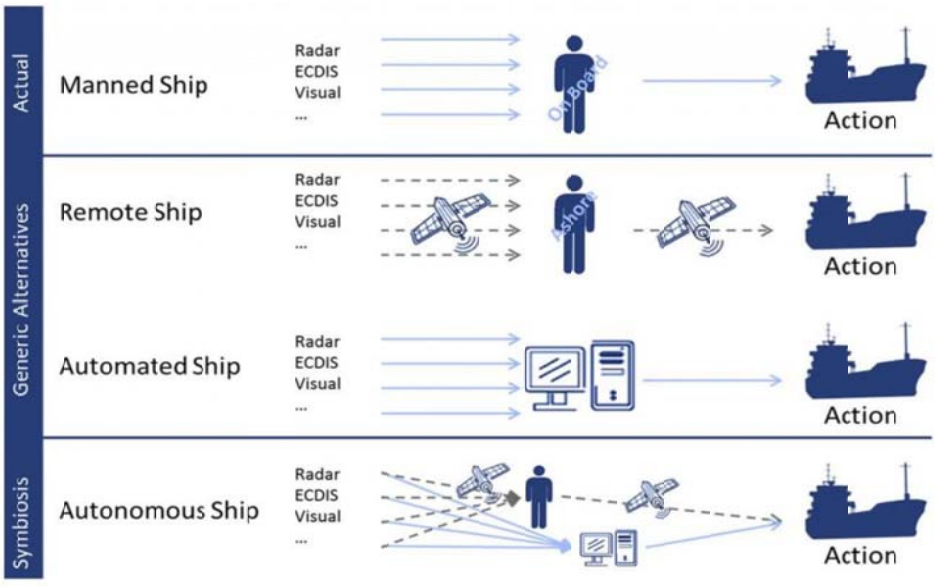
Intelligent Innovation Project : Maritime Transportation

- Roadmap for Unmanned Ship (MUNIN Project)-



http://www.unmanned-ship.org/munin/about/the-autonomus-ship/

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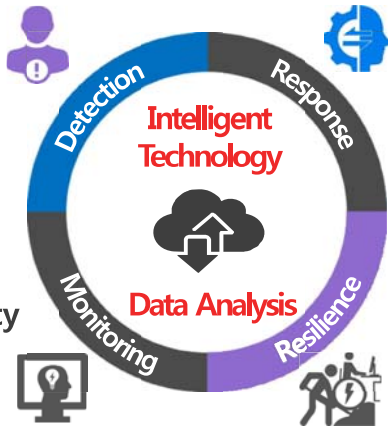
Future Challenges in Maritime Disaster Response

- ✓ Abnormality Detection
- ✓ Early Warning



- ✓ Situation Analysis
- ✓ Spread prediction
- ✓ Onsite-activities

- ✓ Weather
- ✓ Vessels / Facility
- ✓ Accident
- ✓ Wreckage

- ✓ Damage: Economic, Ecological, Social, and Psychological
- ✓ Recovery Program

17

CSF: Building Maritime Data Ecosystem

IoT | Mobile | Cloud & Big Data | Artificial Intelligence

Datafication In a real-time bases

Increased Use of Data and Analytics

Intelligent Decision-making

18

Thank You

Young-Joo Lee

(lyj@nia.or.kr)

The Development of Surveillance, Modelling and Visualisation in Oil Spill Response

Chris Moore

Technical Manager

Oil Spill Response Ltd

◆ *Abstract*

The Development of Surveillance, Modelling and Visualisation (SMV) tools to support a response effort – With the release of a number of IOGP/IPIECA Good Practice guidance documents on SMV, along with an explosion of available hardware and software for surveying and modelling oil spills and visualising data, there is much that can be shared and learned in this rapidly evolving arena. The presenter will focus on how the evolution of SMV tools and techniques have changed the landscape for gathering, predicting and presenting information in a response and how that improved situational awareness has influenced response management, informed decision making and how the improvements in tools have also aided and enhanced efficiency in tactical response activities.

◆ *Profile of the presenter*

Education

- BEng. in Mechanical Engineering, Sheffield University, United Kingdom

Biography

- 2016-2017: Technical Manager, OSRL
- 2012-2016: Operations Manager, OSRL
- 2003-2012: Oil Spill Responder, Response Supervisor and Team Leader, OSRL

Field of interest

- Chris has a wealth of spill response practical and response management experience from a range of incidents in the UK, Europe, USA, New Zealand and West Africa including the Deepwater Horizon, MSC Chitra, MSC Rena to name a few. Chris' area of expertise includes the aerial application of dispersant and aerial surveillance. Recently Chris has been leading multiple projects involving the integration of new surveillance tools and capabilities into OSRL.

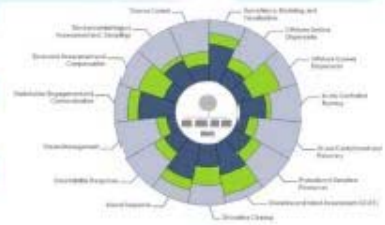
Oil Spill Response

Surveillance Modelling & Visualisation

Chris Moore, Technical Manager

Introduction

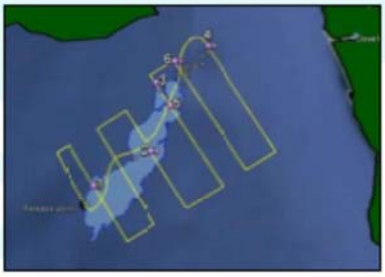
- An industry perspective
- OSR JIP projects
- One of the 15 Capabilities of the Tiered Preparedness and Response framework
- The evolution of the available tools and resources to support response to oil spills



What is SMV

- 'Surveillance' utilises platforms and sensors from the sky to the seabed
- 'Modelling' helps predict the movement of oil and
- 'Visualisation' brings it all together, presenting response data in a way that allows the incident management team to make informed strategic and tactical decisions.





SMV in Response

Strategic Decision Making

- Verification & Source
- Characterisation and trajectory
- Quantification
- Identifying Sensitive Resources
- Situational Awareness
- Improved Decision Making

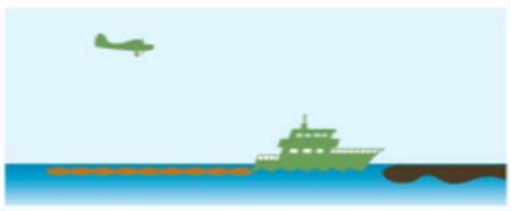
Tactical Support

- Directing Response Assets
- Targeting heaviest oil concentrations
- Improving encounter rates
- Increasing Response Efficiency
- Validating Techniques

Situational Awareness

Tactical Support

- Encounter rate
- Improving the effectiveness
- Increasing recovery or treatment
- Historical use of aircraft and verbal instruction by radio
- Advances in available technology

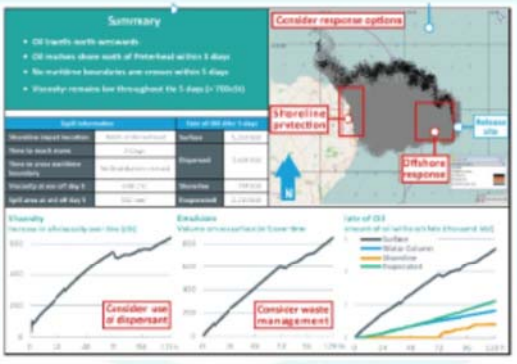


Evolution of equipment

- Small aircraft
- Manual observations
- Paper recording
- Development of sensors eg IR, UV
- Availability of satellite radar systems
- Mission systems and live data communications

Modelling

- Evolution from 2D to 3D
- Metocean data
- Forecast weather
- Visual and graphical outputs
- Model development and validation

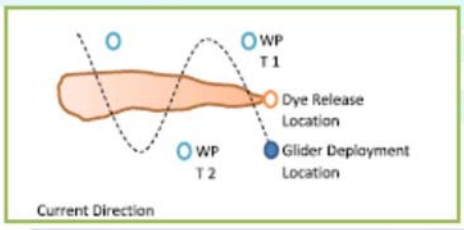


Unmanned Aerial Systems

- Fixed and rotary winged
- Strategic and tactical uses
- Benefits and limitations
- Safety
- Regulations
- Generation of data
- Adding value

Autonomous Systems

- Autonomous Surface and Underwater Vehicles
- Application in spill response and monitoring
- Spatial resolution of data
- Integration of data outputs

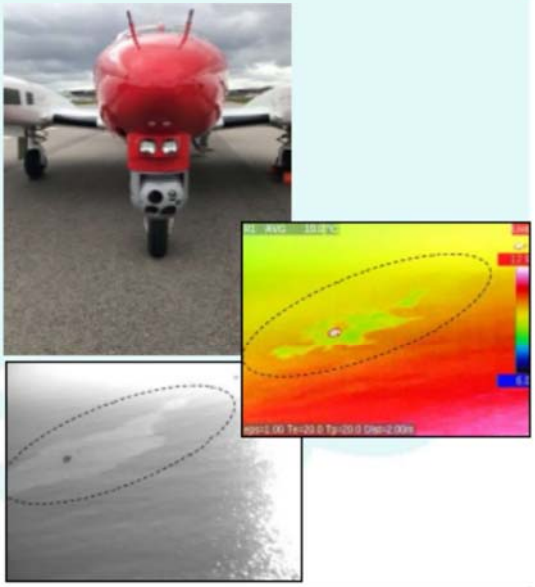


Aerostats and Kites

- Constant start
- Birds eye view
- Helium filled balloon or kite
- Visual camera
- Infra-red sensor
- Reliable deployment
- Long endurance
- Tactical Support

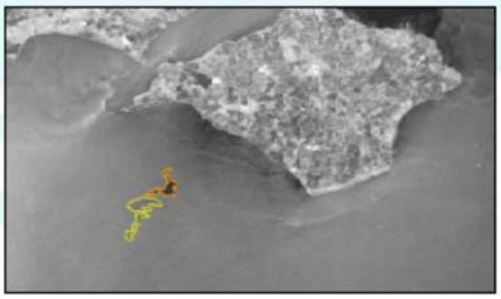
Aircraft based systems

- Traditional IR and UV
- Hyperspectral cameras
- Specific bands or wavelengths
- Increase detection window
- Detection of thin layers of oil
- Development of oil type classification



Satellite

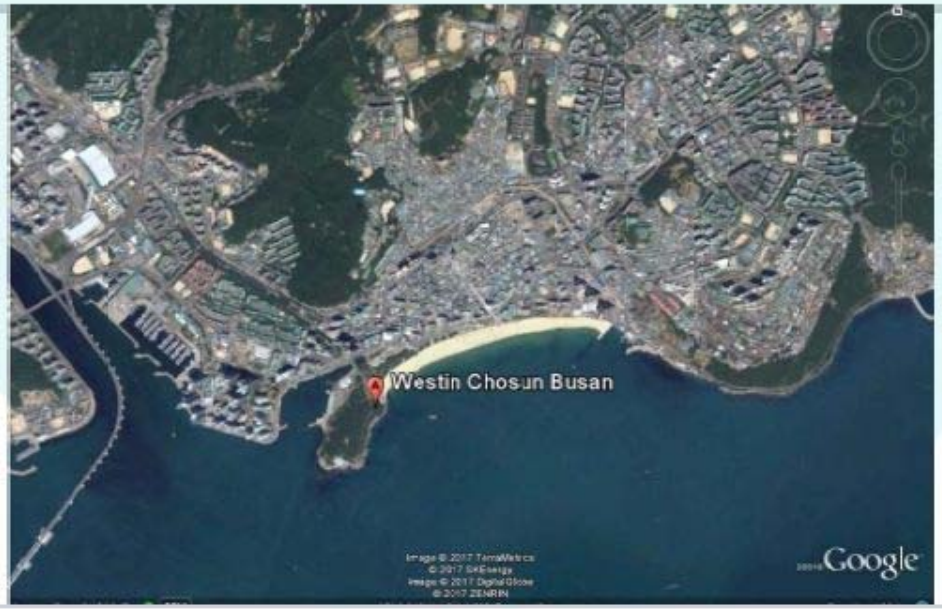
- Synthetic Aperture Radar
- Optical
- Miniaturisation
- Digital innovations
  - scheduling and ordering
  - post processing and
  - image analysis
  - automation of the detection algorithms
  - elimination of false positives



Visualisation

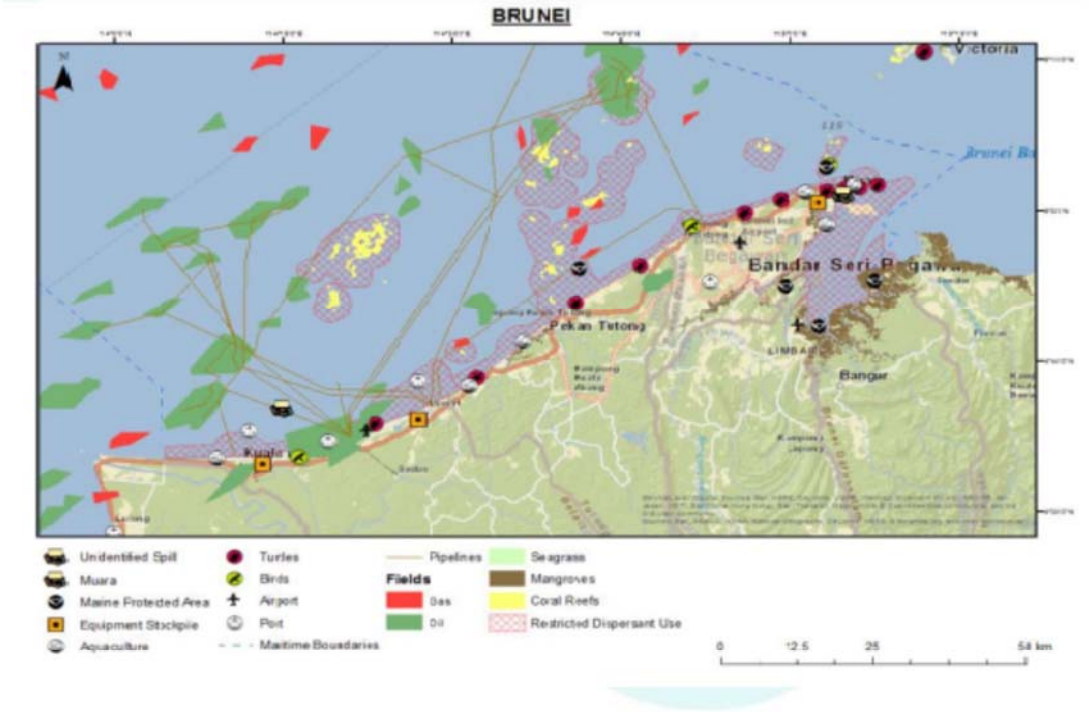
35 9.3 N
129 9.3 E

Visualisation

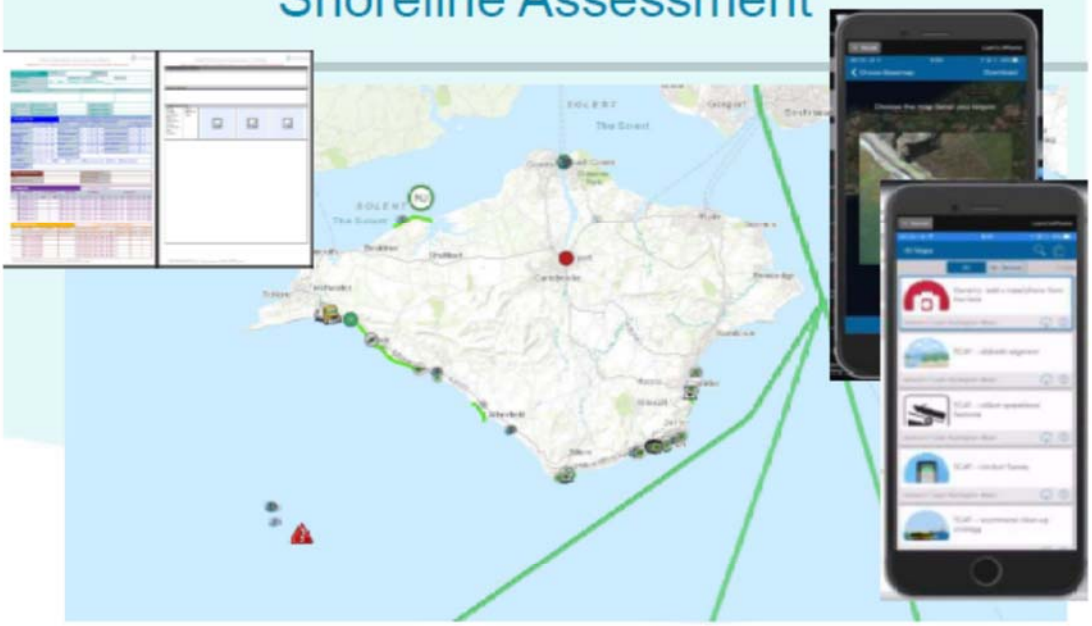


The difference between Visualisation and the COP

- Visualisation
  - The data
  - The visual representation of data – a mental imagery
  - An image, diagram, or animation that communicates a message
- COP
  - The platform for displaying & disseminating that data
  - A user friendly internet map for sharing situational awareness amongst users
  - A consolidated and integrated single platform displaying what and where things are happening - real-time feeds
  - A tool which inform the 'Situation Awareness' of decision makers and responders improving information access + understanding



Shoreline Assessment



Technology Evaluation

- Oil On Water Exercise
- Summer 2017 –
- 500 litre controlled release
- Testing and validating a suite of surveillance tools and evaluating performance in open-water conditions.

Oil Spill Response

Thank you

Staying in touch

www.oilspillresponse.com

Subsea Well Intervention Service

- subseaservices@oilspillresponse.com
- http://swis-appreciation.cotoco.com/

Training courses

- **www.oilspillresponse.com/training**
  training_uk@oilspillresponse.com
  training_sg@oilspillresponse.com

Find us on

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- www.youtube.com/user/OilSpillResponseLtd
- www.twitter.com/oilspillexperts

Regional cooperation on marine pollution preparedness and response in the NOWPAP Region

Seong-Gil Kang
Director
NOWPAP MERRAC
Principal Researcher
KRISO

◆ *Abstract*

Oil and HNS spill incidents were identified as one of the threatening elements to the marine and coastal environments. The Northwest Pacific region, covering the four states, namely Japan, People's Republic of China, Republic of Korea and Russian Federation, have also been severely exposed to oil and HNS spills due to its high shipping density and high levels of industrial and economic development of the Northwest Pacific region and became a hotspot worldwide. In fact, over 310 oil spills and 60 chemical spill incidents over 10 tons have been occurred during the last 25 years in the region. In order to respond such high risk of oil and chemical spills occurring in the region, the regional countries have increased their respective national capabilities and has also launched relevant regional co-operative activities by establishing the Marine Environmental Emergency Preparedness and Response Regional Activity Center (MERRAC) under the framework of Northwest Pacific Action Plan (NOWPAP), as a UNEP's Regional Seas Programme. Since the NOWPAP countries are geographically contiguous, major oil and HNS spill incidents in the region can affect the neighboring countries because of the transboundary nature. Therefore, it was important that the regional countries exchange information on national policies and resources, find improvement measures and collectively identify oil and HNS risks in the region at national and regional level. Since its establishment in 2000 at KRISO (Korea), MERRAC has been successfully building a partnership among NOWPAP countries in the field of oil spill preparedness and response in the NOWPAP region, with professional supports from IMO and UNEP. Especially, adoption of the NOWPAP Regional Oil and HNS Spill Contingency Plan and its MoU are meaningful. This is the first agreement actually signed under NOWPAP, and it clearly demonstrates a spirit of co-operation for the protection of the precious and delicate marine and coastal environments in the NOWPAP region. Also the MERRAC Focal Points Meetings and NOWPAP Intergovernmental Meetings (IGM) are held annually and MERRAC Expert Meetings are held

biannually in various forms, which aims to increase exchange of relevant information and data, and implement relevant co-operative activities. The response exercises, such as, BRAVO (communication) exercises, DELTA (operational) exercises are conducted on a regular basis to have dialogues between the NOWPAP member states. Various specific projects were also implemented together with experts of the NOWPAP countries. At this presentation, we will look into more details what MERRAC has achieved during last 20 yrs and discuss challenges MERRAC may face in the future.

◆ *Profile of the presenter*

Education

- Ph. D.: Marine Ecology from The Seoul National University, Korea in 2000, especially focusing on marine environmental monitoring to reveal trace metal pollution in Korean waters, using a benthic organism

Biography

- 2000 - Present: covered the variety of R&D related to marine science and technology, including marine pollution preparedness and response in KRISO
- 2005 - Present: manager of R&D project to develop technologies relevant to carbon dioxide storage in marine geological structure, which is regarded as one option of technologies to mitigate global warming

NOWPAP MERRAC

Northwest Pacific Action Plan
Marine Environmental Emergency Preparedness and Response
Regional Activity Centre
Website - http://merrac.nowpap.org

Regional Co-operation on Marine Pollution Preparedness and Response in the Northwest Pacific : Achievements of MERRAC activities over last 20 years and future challenges

Seong-Gil KANG

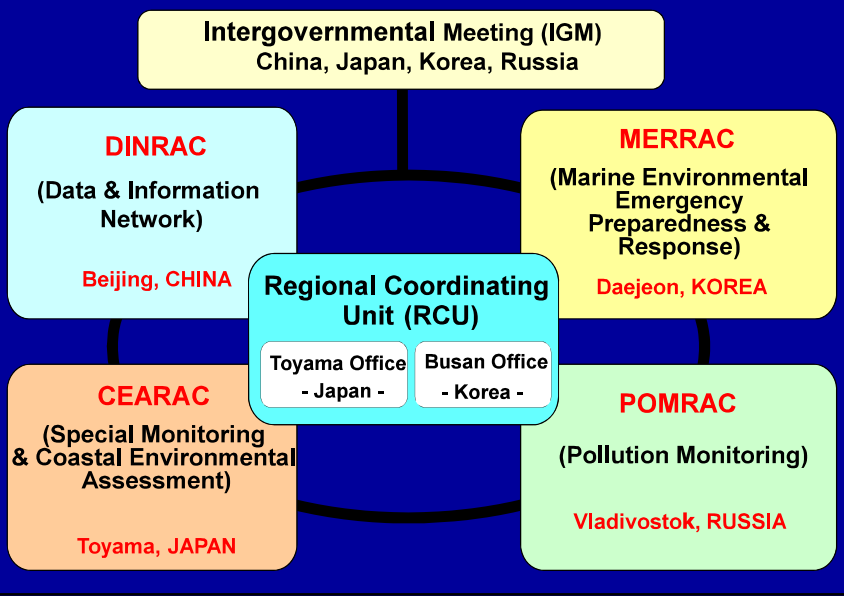
Director
NOWPAP MERRAC, KRISO

I. NOWPAP MERRAC?



NOWPAP (Northwest Pacific Action Plan)
Adopted by China, Japan, R. Korea and Russia in 1994

NOWPAP structure



Development of regional co-operative mechanism on marine pollution preparedness and response in the NOWPAP region

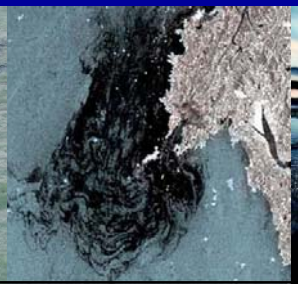
Oil Spill accident (Hebei Spirit, '07.12)

HNS accident (Firecracker, '06.3)

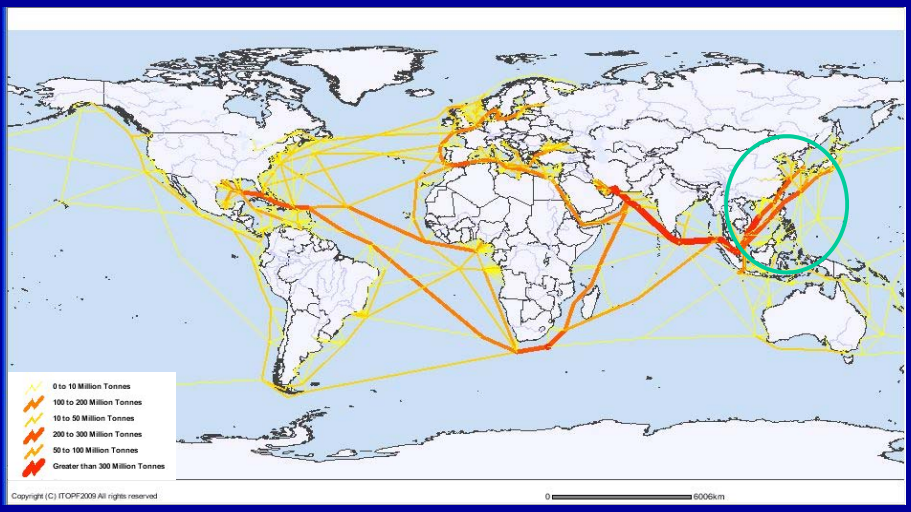
Oil pipeline explosion
(Dalian, China,'10, 7)

Sea based marine litter

II. Oil and HNS Spill Risks in the NOWPAP Region

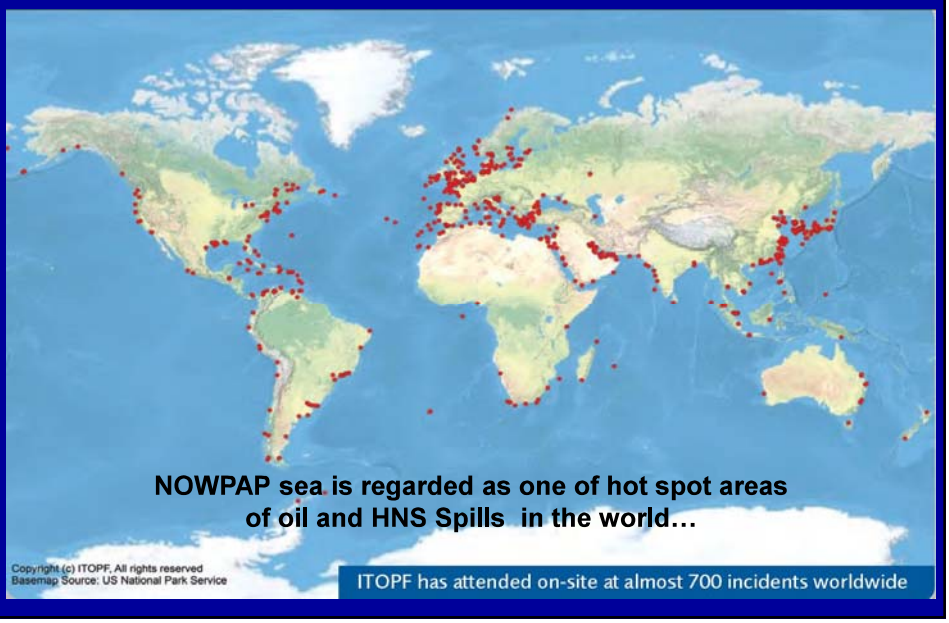


Volume of oil traffic & major sea routes (ITOPF, 2011)



Due to rapid economic growth & extension of trade,
the quantity of Oil & HNS transported is dramatically being increased
in East Asian region including the far-eastern Asia (NOWPAP) sea area

Oil and HNS Spill Incidents (ITOPF, 2012)

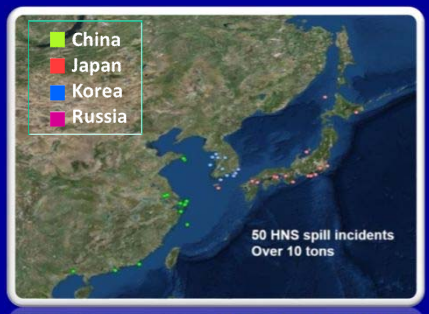


NOWPAP sea is regarded as one of hot spot areas
of oil and HNS Spills in the world…

Spill accidents in NOWPAP area (>10t)

Oil spills

HNS spills



Data: MERRAC (2016)

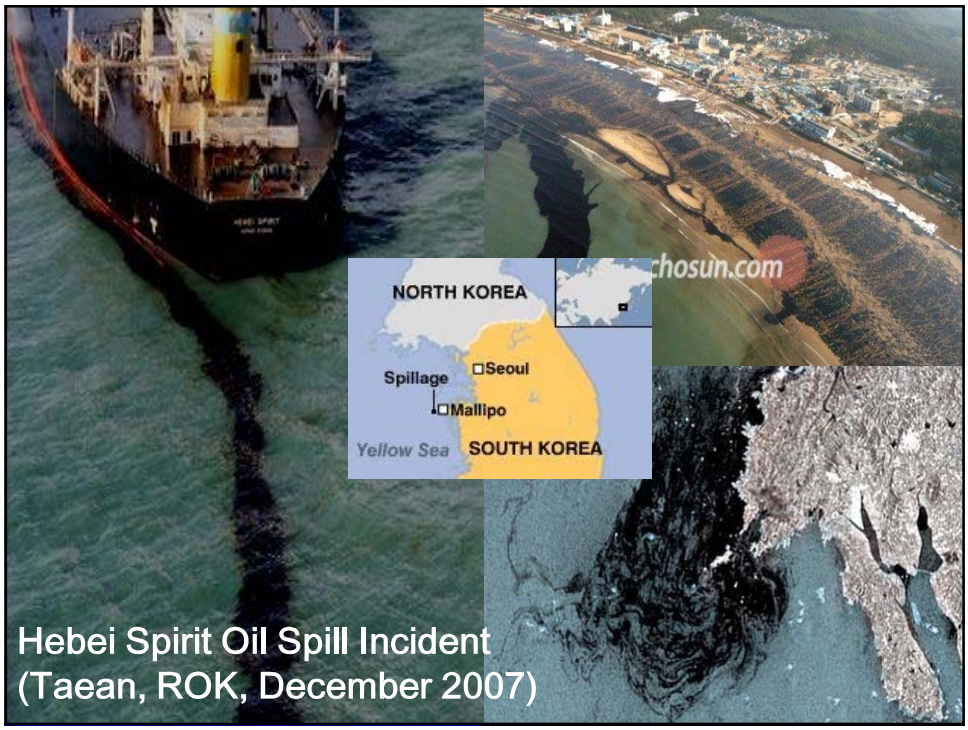
Marine pollution preparedness and response issue is still regarded as one of major important co-operative areas to be implemented under the NOWPAP framework (SOMER-2, new draft MTS)

Oil & HNS Spills in NOPWPAP('90-'16)

Category	No. of Oil Spills	No. of HNS Spills
Major Spills (>1,000 tons)	15	11
Intermediate Spills (50~1,000)	176	26
Small Accidents (<50)	several thousand	7 (>10tons)
Unknown	6	16

(Source: MERRAC website, merrac.nowpap.org)

Kill by Oil Spill,
by Richard Mock (1991)



Hebei Spirit Oil Spill Incident
(Taean, ROK, December 2007)

Oil pipeline explosion
(Dalian, China, July 2010)

Bohai bay Oil Spill
(Penglai 19-3 Oilfield, China, June 2011)

Nakhodka Oil Spill Incident (Jan 1997)

- The Russian Tanker Nakhodka (from Shanghai to Petropavlovsk) with a cargo of 19,000t of Medium Fuel Oil broke up in heavy seas some 110 km north-east of the Oki Island
- **6,200 tons of oil spilled**
- Largest oil spill in Japan- Establishment of the Response capacity

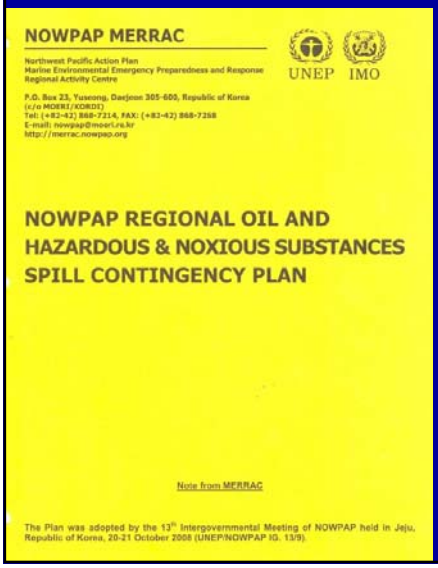
NOWPAP area- High risk of marine spill accidents, but low level of preparedness against them

The Mission of MERRAC is…..

to develop the regional cooperative system on marine pollution preparedness and response in the NOWPAP region

III. MERRAC Activities

1) Adoption of NOWPAP Regional Oil and HNS Spill Contingency Plan (RCP)


NOWPAP MERRAC

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

UNEP IMO

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NOWPAP REGIONAL OIL AND HAZARDOUS & NOXIOUS SUBSTANCES SPILL CONTINGENCY PLAN

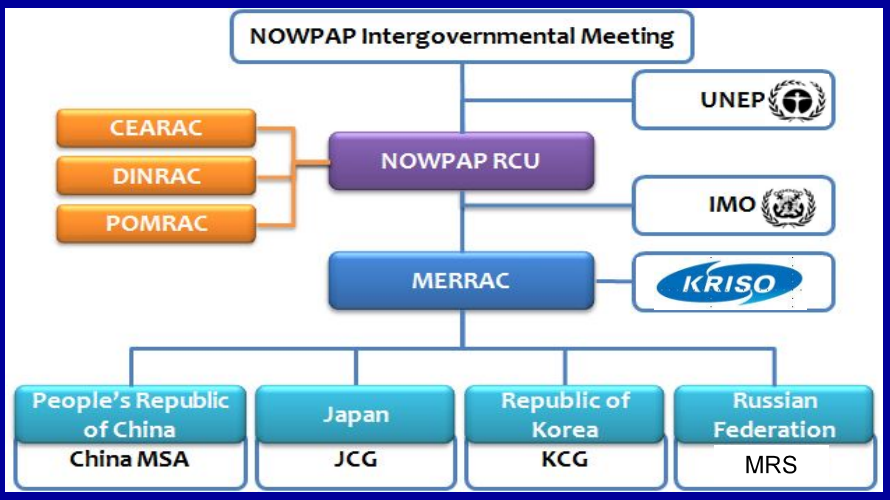
Note from MERRAC

The Plan was adopted by the 13th Intergovernmental Meeting of NOWPAP held in Jeju, Republic of Korea, 20-21 October 2008 (UNEP/NOWPAP IG. 13/9).

- To provide a framework under which NOWPAP Members can co-operate at the operational level in responding to major oil and HNS spill incidents
- Adopted originally by 8th NOWPAP IGM in 2003 as a technical and operational guidelines for regional co-operation during major oil spill in NOWPAP sea
- HNS has been added to this existing Plan & its Resolution adopted by 13th IGM in 2008
- MERRAC is the secretariat for the administration and co-ordination of the RCP in co-operation with members

Coordination Structure During Joint Response Operation

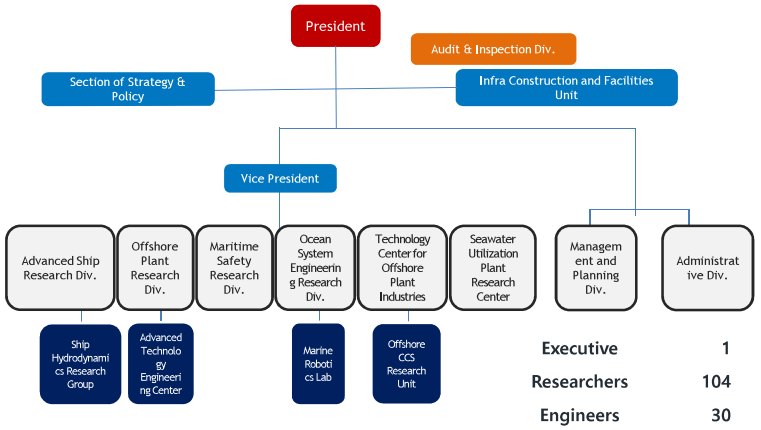
2) Institutional arrangement for relevant regional cooperative activities among CNAs



"MERRAC is operating the system of National Focal Point for MERRAC, who is nominated by each country and is responsible for the marine pollution preparedness and response in the respective NOWPAP Members"

KRISO Organization
- Ship & Ocean Engineering Research Institute

20



Executive	1
Researchers	104
Engineers	30
Administrators	28
Sub-total	162
Contracted-total	140
(As of Nov. 2016) Total Staffs	362

3) Organization of Annual MERRAC FPMs and CNA Meetings (since 2000)

- Review of MERRAC activities including routine tasks, specific projects, and identification of future works
- Update RCP, including relevant annexes
- Report on oil and HNS pollution incident
- Update of the Information System
- Planning of the training and exercises, etc.
- Exchange of information (national policies, laws, incidents etc.)

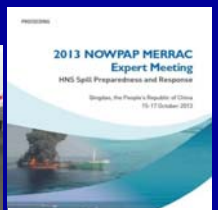
4) Organization of Expert Meetings

- To deal with scientific and technical issues on oil/HNS for implementing the regional cooperation in the region:
  - 2009 Expert Meeting (Forum on Sakhalin Projects, Wakkanai, Japan, September 2009)
  - 2013 Expert Meeting on HNS Spill Preparedness and Response (Qingdao, Russia, October 2013)
  - 2015 Expert meeting on oiled wildlife response (Vladivostok, Russia, October 2015)

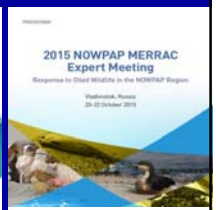
*** 2017 Symposium on Hebei Spirit (Busan, Korea, Dec 2017)**


2005 MERRAC EM
Incheon, Korea


2009 MERRAC EM
Hokkaido, Japan



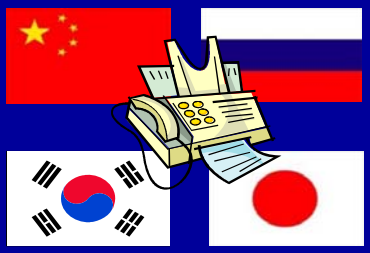
2013 MERRAC EM
Qingdao, China (HNS)



2015 MERRAC EM
Vladivostok, Russia

5) Conduction of Exercises

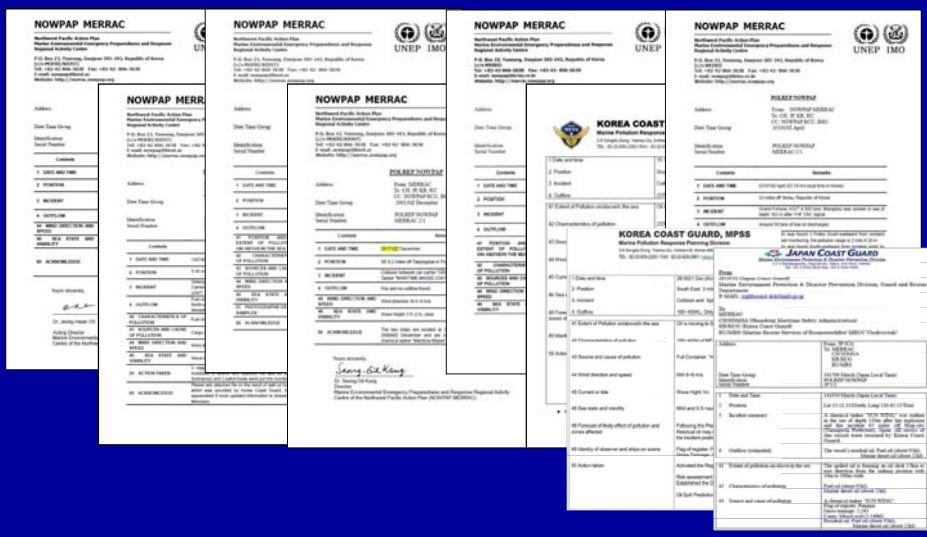
- **NOWPAP BRAVO (communication) Exercises (Once/year): 19 times in total**
- **Table top exercise (during CNA meeting)**
- **NOWPAP regional OPRC training course (IMO Level 2)**
- **DELTA (operational) exercises**



NOWPAP DELTA Exercises

- ✓ 1st DELTA Exercise (‘06, Russia/Japan, Sakhalin, Russia)
- ✓ 2nd DELTA Exercise (‘08, China/Korea, Qingdao, China)
- ✓ 3rd DELTA Exercise (‘10, Japan/Russia, Wakkanai, Japan)
- ✓ 4th DELTA Exercise (‘12, Korea/China, Yeosu, Korea)
- ✓ 5th DELTA Exercise (‘14, Russia/Japan, Vladivostok, Russia)
- ✓ 6th DELTA Exercise (’16, China/ Korea, Weihai, China)

6) Exchange of POLREPs



Case of Activation of RCP
Hebei Spirit Incident (December 2007)

Reports and communications between NOWPAP Members

- **Inform of the oil spill incident by POLREP**
  - ► Initial information of incident (7 Dec)
  - ► midterm information (8 Dec/ 9 Dec)
- **Activation/Deactivation of the Plan**
  - ► Activation of NOWPAP Regional Contingency Plan (10 Dec)
    - inform the LOSC, NOSC, NOCP, JERC
  - ► Deactivation of NOWPAP Regional Contingency Plan (14 Jan)
- **Upload the general information to MERRAC website**

Assistance of mobilization of response resources

- Ask the available amount (kg) of sorbents, its cost and transportation method (10 Dec)
- As the request of the Korean Government, NOWPAP members provided the sorbents

► China: About 56 tons of the sorbents were shipped
- New Golden Bridge 5: Incheon port from Qingdao port (15 Dec)
- Haibaio 24: Daesan port from Shanghai port (16 Dec)

► Japan: 10 tons of sorbents provided free of charge via air and dispatched the 7 experts for technical advice



Assistance at the incident area

- MERRAC staff was dispatched to the incident area

► to provide the technical assistance to the Korean Government related to oil spill response operation
(Dr. Seong-Gil Kang & Jeong-Hwan OH, 10-13 Dec)

► to provide technical comments with assisting experts from UN/EC
(Dr. Seong-Gil Kang, 16-20 Dec)



7) Implementation of MERRAC specific projects

- To facilitate the designated mandates of MERRAC
- Expert groups consisted of NOWPAP members: technical advice

- Guideline on sensitivity mapping, shoreline cleanup, use of dispersants
- Minimum level of preparedness, oil spill prediction model

- HNS operation guidelines
- HNS DB
- Manual for HNS training
- Regional Report on HNS Preparedness and Response

Future technical challenges in oil pollution preparedness and response in the NOWPAP region

- Prompt and early assessment of the status oil spill (especially amount of spilled oil) ;
- Exact numerical modelling for of spilled oil, especially applicable under bad weather;
- Establishment of reliable and/or scientific guidelines for response operation and its termination (to avoid over-response works)
- Net environmental benefit analysis for dispersant uses
- Health and Safety issue for responders, volunteers and residents
- Long-term environmental monitoring after the spill, etc.

8) Collection and dissemination of information

http://merrac.nowpap.org

- **Information on Focal Points and Organizations**
- **Database on Response equipment**
  - Oil recovery boat
  - Oil recovery system
  - Oil booms
  - Aircraft
- **National laws related to the use of the response equipment**
  - Oil transfer pump
  - Beach cleaner
  - Dispersant
  - Sorbents

9) Marine Litter activities

- The implementation of marine litter activities (MALITA) to cover the sea-based marine litter issue as MERRAC activity (2006-2007) & RAP MALI (2008-present)

Review of Key elements for MERRAC's future activities

Elements	Evaluations
Political Will of Member States	Due to high risk of oil/HNS spills, political wills are strong (signed by MoU/RCP)
Institutional Framework	All of competent national authorities for RCP are participating for MERRAC activities
Detailed Workplan	Core activities were identified under the RCP/, but slow and weak implementation (preparing to JOSR)
Stable financing	Increment needed (for mobilizing outside expertise & stable operation of RAC)
Capacity of Secretariat	To be strengthened (especially for technical staffs)

IV. Conclusion and summary

- Risks of oil and HNS spills are very high in the NOWPAP area, due to high maritime traffic.
- All countries should establish their respective national response capacities, as necessary, in line with their national contingency plan and OPRC '9O
- Also, regional co-operation are also needed to increase their regional level of preparedness in case that major spill accidents occur in the region, which may impact seriously their common marine environments.

- MERRAC has been building a partnership among NOWPAP Members in the field of oil spill preparedness and response in the NOWPAP region, with professional supports from IMO, NOWPAP RCU and UNEP.
- Especially, adoption of the Plan and its MoU are meaningful this is the first agreement actually signed under NOWPAP, and it clearly demonstrates a spirit of co-operation for the protection of the precious and delicate marine and coastal environments in the NOWPAP region.

- In addition to oil spills, MERRAC has newly to cover new HNS activities. Strong support from member stages and International bodies including UNEP and IMO under the global frameworks of relevant conventions are still required.

- In order to activate the RCP and implement Joint Response Operation in case of major spill accidents as the RCP requires, MERRAC and member states should continuously strengthen their co-operative activities to resolve a lot of relevant technical and administrative issues, such as immigrations, customs, technical joint response guidelines.

- Weak financial framework – In order for MERRAC (and other RACs) to implement its designated activities, Contribution from Trust Fund should be largely increased. Also, there is a need for the mobilization of outside financial sources to carry out RAC-related technical/academic projects.