



# ENVIRONMENTAL LEADERSHIP Pilot Training Course



# metavasea



Humans at the heart of  
maritime decarbonization



HELMEPA

# Shipping and the Protection of the Environment

Shipping transports about **90%** of global trade is, statistically, the least environmentally damaging mode of transport, when its productive value is taken into consideration vs. land-based industry.

## OILPOL

Functioning in 1959

*Prevention of pollution of the sea by oil*

First Ever Comprehensive Antipollution  
Convention

## MARPOL

in 1973  
Pollution from Oil

## MARPOL

73/78

Adoption: 1973 (Convention), 1978  
(1978 Protocol), 1997 (Protocol -  
Annex VI); Entry into force: 2  
October 1983 (Annexes I and II).

## Tanker safety - preventing accidental pollution

IMO's major function is to make shipping of all types safer, including tankers.

The measures incorporated in the numerous safety conventions and recommendations apply to these as well as other ships - and the safer a ship is, the less likely it is to be involved in an accident.

- SOLAS, Fire Prevention
- Inert gas systems
- Equipment duplication
- Mandatory towing arrangements
- MARPOL 73/78



## Major Historical Incidents in European waters

M/T  
ERIKA 1999



On 12th December 1999, the Erika, a 25 year-old single-hull oil tanker, broke in two off France, polluting almost 400 km of French coastline and causing unprecedented damage to marine environment, claiming the title of one of the most major environmental disasters of recent years.



HFO at sea: 31.000 tons  
Root Cause: Structural failure as she was crossing the Bay of Biscay in heavy weather.

M/T  
Prestige 2002



On 19th November 2002, the 26-year-old single hull Prestige oil spill occurred off the coast of Galicia, Spain during a storm while French, Spanish, and Portuguese governments refused to allow the ship to dock.



HFO at sea: 60.000 tons  
Root Cause: Tank burst leading to structural deficiency during storm.

Loss > \$2bn  
91.000tons = aprox. 7,5yrs of Hellas TTL consumption

## MARPOL 73/78

### Reducing the consequences of accidents

In any loading conditions, the ship can survive after being involved in a collision or stranding.

### Protective location of segregated ballast tanks

Ballast tanks are positioned where the impact of a collision or grounding is likely to be greatest. In this way the amount of cargo spilled after such an accident will be greatly reduced.

### Double hulls

1992 MARPOL was amended to make it mandatory for tankers of 5,000 dwt and more ordered after 6 July 1993 to be fitted with double hulls

following the **Erika** incident, accelerating the phase-out of single hull tankers

### Condition Assessment Scheme (CAS)

applicable to all single-hull tankers of 15 years, or older.

### Carriage of heavy grade oil

Bans the carriage of HGO in single-hull tankers of 5,000 tons dwt and above



## How Environmental Consciousness is connected Passage Planning?

## Stages of Passage Plan

### MARINE ENVIRONMENT

#### 1. Appraisal

GATHER  
ALL INFORMATION &  
DATA  
RELATED TO  
INTENDED  
VOYAGE

#### 2. Planning

LAY OUT

- THE ROUTE BASED ON CHARTS, APPRAISAL AND SAFETY PARAMETERS

DRAW ON-CHART LAYERS:

- MAPS,
- NAV. WARNINGS

CALCULATE UKC & CHECK ROUTE

IDENTIFY VOYAGE LIMITATIONS  
AND RISKS AND ARRANGE  
MITIGATING MEASURES

#### 3. Execution

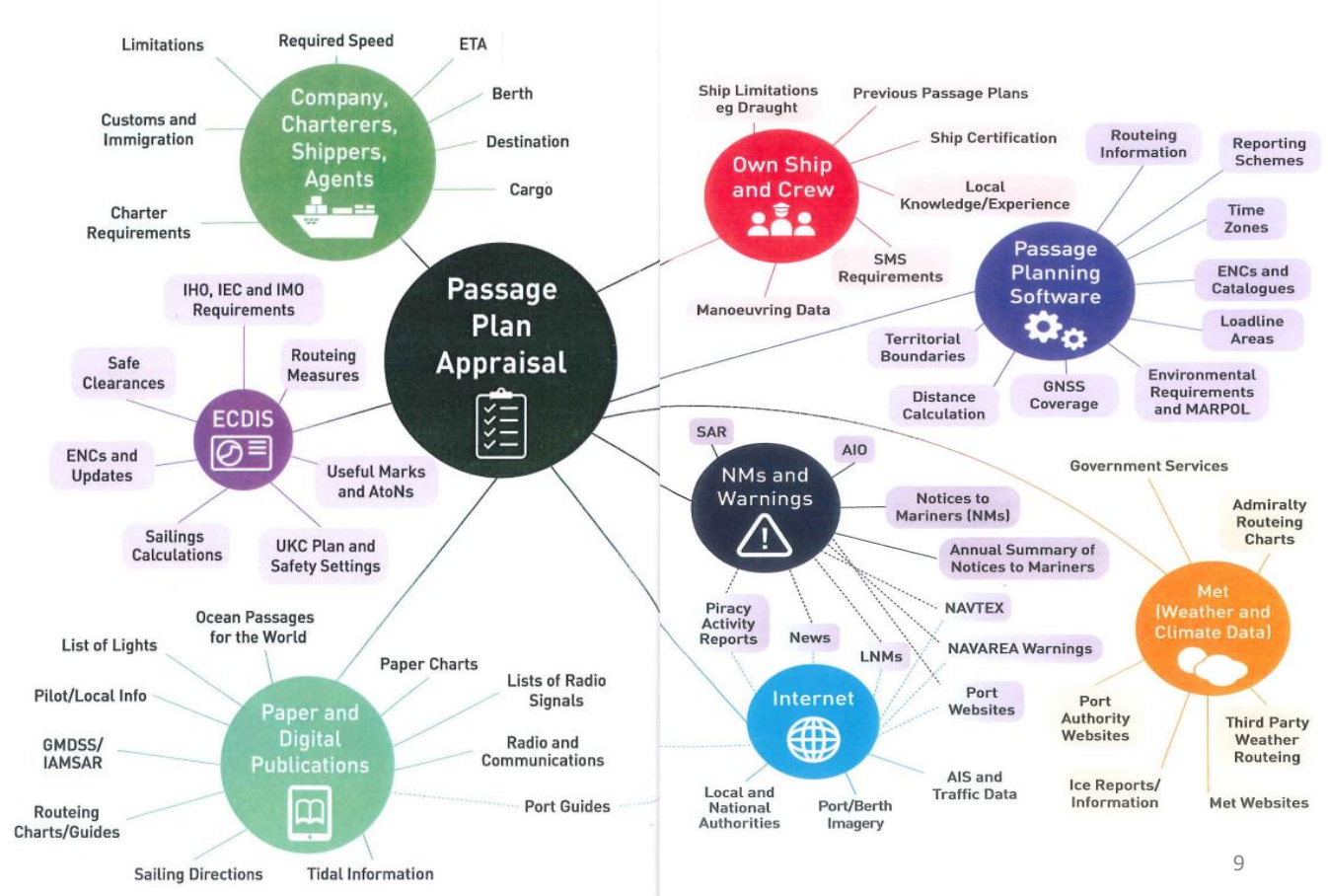
EXECUTE,  
REVIEW AREAS &  
MANAGE ALERTS,  
AMEND IF REQUIRED,  
FINALIZE CHECK ROUTE,  
COMPLY TO MARPOL OR  
LOCAL REGULATIONS FOR  
SA/ECA/PSSA AREAS.

#### 4. Monitoring

MONITOR  
VESSEL'S PASSAGE  
AGAINST PLANNED  
VOYAGE  
BY ALL AVAILABLE  
RESOURCES



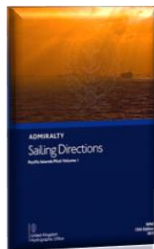
# 1. Appraisal



## 1. Appraisal

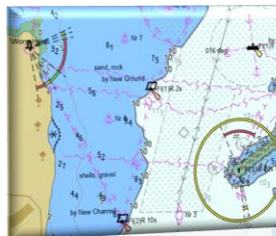
Collecting/ assessing all required information for **A SAFE, EFFICIENT AND ENVIRONMENTAL CONSCIOUS** passage.

- Areas
- Restrictions
- Weather
- Currents
- ECA/SECA Zones
- PSSA (Particularly sensitive sea areas)



### **PUBLICATIONS (Printed & Digital)**

- List of Lights
- List of Radio Signals
- Sailing direction and Pilot books
- Tide tables and tidal stream atlases
- MARPOL
- Ship's Routeing Guide
- Ocean Passages of the world
- Reporting Requirements



### **ENCs Collection**

- Approved IHO S-57
- Electronic
- Navigational Charts
- Presentation Library 4.0**

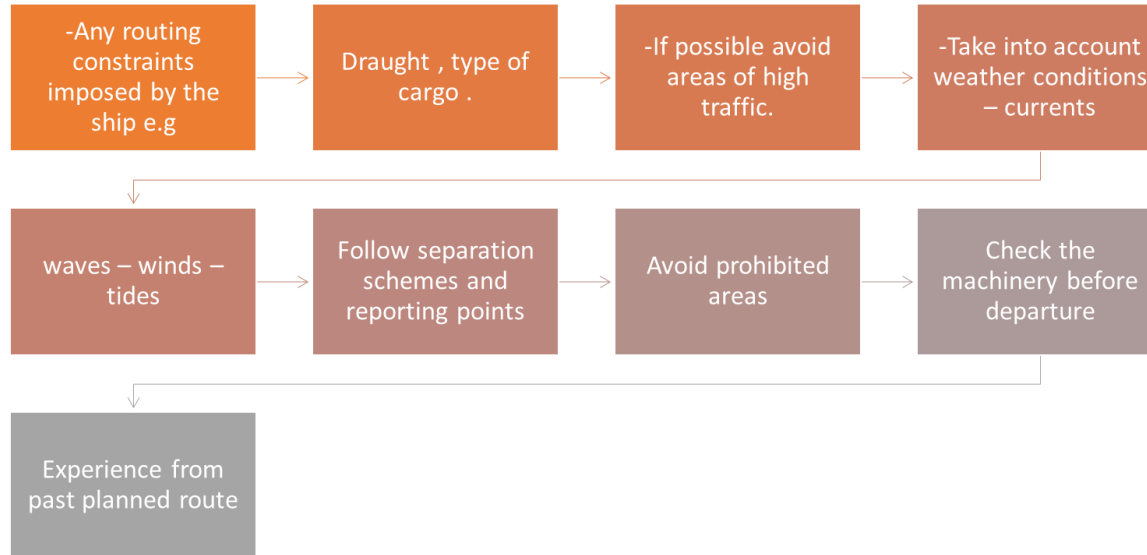


### **Company's SMS & Policies**

- Navigational Policy
- Environmental Guides
- Placards
- Forms & Checklists
- Learning Programs and Trainings
- Training Platforms

## 2. Planning

Use all info and data collected in stage 1 (Appraisal), Plus current vessel specifications to draw **SAFE, EFFICIENT AND ENVIRONMENTAL CONSCIOUS ROUTE**



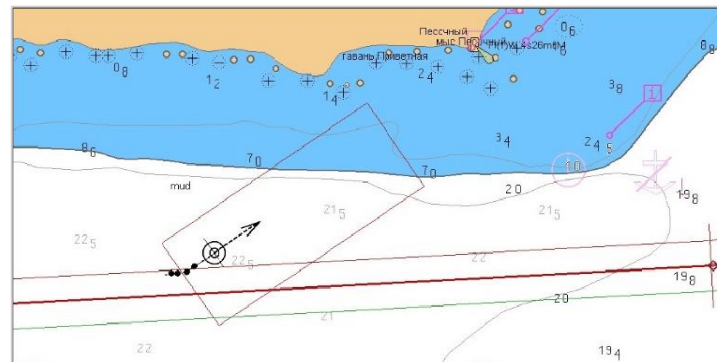
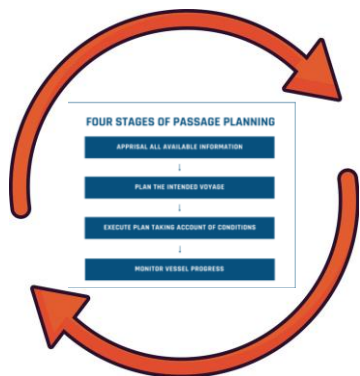
### 3. Execution

Consider the following during the voyage:

- Reliability of vessel's equipment, especially navigation equipment.
- Confirmation of actual passing times against ETA from each W.P. during the passage.
- Expected weather conditions while the vessel is on passage.
- MARPOL or Local regulations for SA/ECA/PSSA areas.



## 4. Monitoring



✓ Monitor and frequently confirm the **accurate execution** of Passage Plan.

✓ If you anticipate problems, allow flexibility in the plan to accommodate possible deviations with safety.

✓ Select appropriate position verification intervals and methods according to prevailing conditions regarding :  
o Weather  
o Traffic  
o Navigational area characteristics.





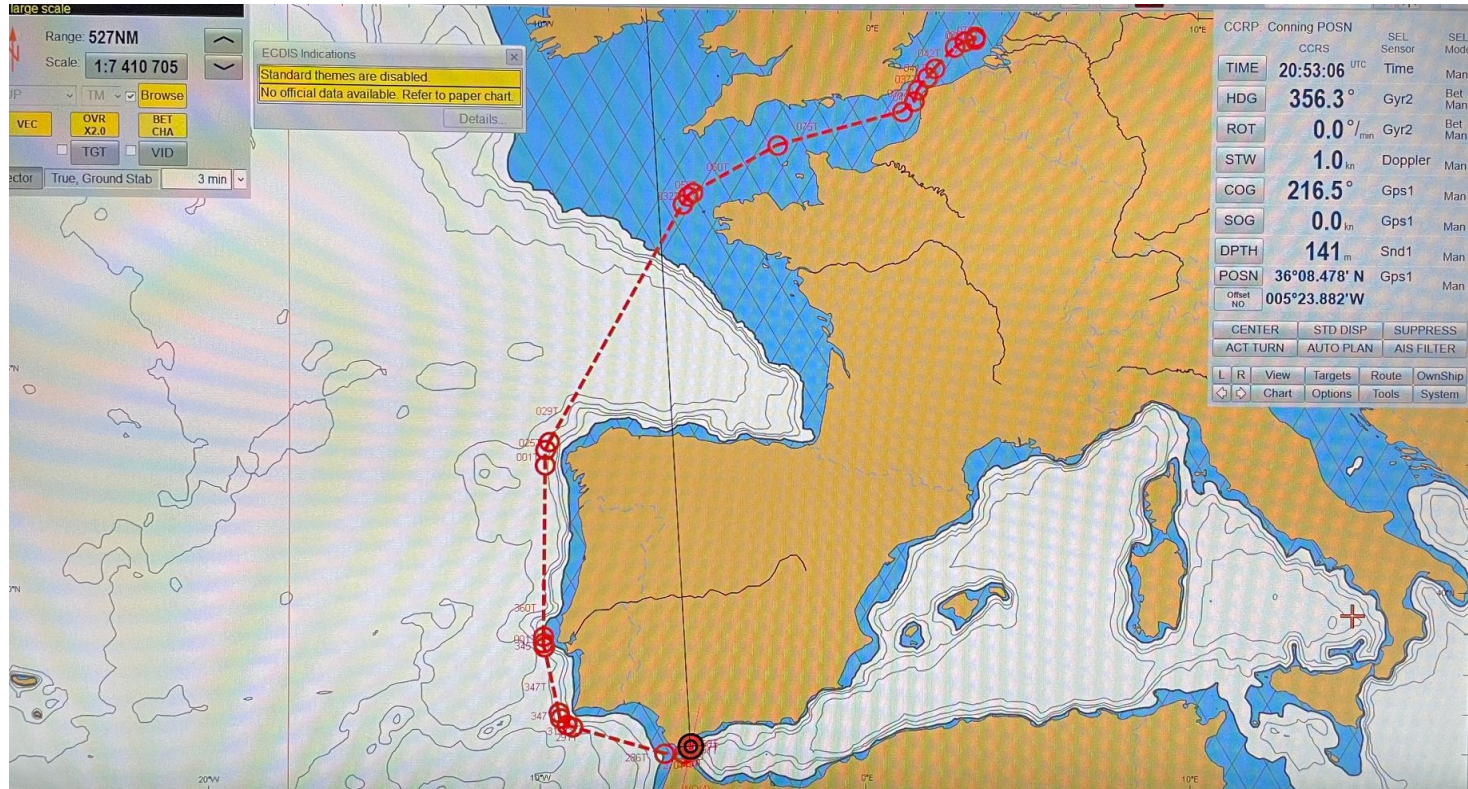
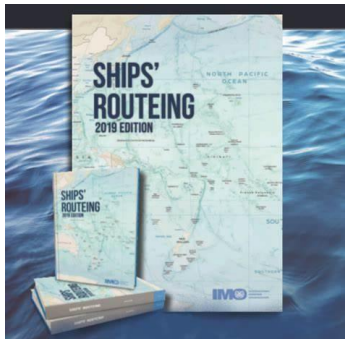
# VOY 052B

Gulf of Algeiras to Rotterdam Port in Ballast Condition

**READY TO SAIL WITH US?**

## 1. Appraisal

- ✓ Design of Draft Route
- ✓ Collect Charts



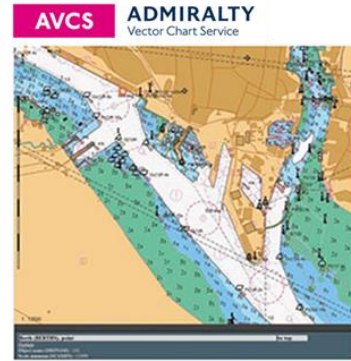
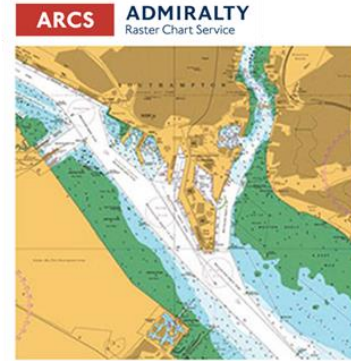
1. Appraisal

# VoyageCharts

**IHO AVCS SENCs**

- ✓ 54 Licensed
- ✓ 54 Installed
- ✓ 54 Updated

Name	Scale	Last update	Updated to	Expires	Format	Status
GB48182A	1:45,000	28-05-2019	WK28-20	31-8-2020	SENC	Licensed
GB401441	1:45,000	05-06-2020	WK28-20	31-8-2020	SENC	Licensed
GB48032B	1:22,000	05-06-2020	WK28-20	31-7-2020	SENC	Licensed
GB48031B	1:45,000	15-02-2019	WK28-20	31-7-2020	SENC	Licensed
GB60009B	1:22,000	20-03-2020	WK28-20	31-8-2020	SENC	Licensed
GB60008B	1:30,000	15-03-2020	WK28-20	31-8-2020	SENC	Licensed
MC030922	1:50,000	30-01-2020	WK28-20	31-8-2020	SENC	Licensed
MC048124	1:22,000	28-05-2019	WK28-20	31-7-2020	SENC	Licensed
MC482200	1:45,000	17-12-2019	WK28-20	31-8-2020	SENC	Licensed
NL302100	1:30,000	29-06-2019	WK28-20	31-7-2020	SENC	Licensed
NL482110	1:45,000	29-06-2020	WK28-20	31-7-2020	SENC	Licensed
NL505130	1:22,000	29-06-2020	WK28-20	31-7-2020	SENC	Licensed
NL505140	1:22,000	29-06-2020	WK28-20	31-7-2020	SENC	Licensed
NL505150	1:22,000	12-12-2019	WK28-20	31-7-2020	SENC	Licensed
NL507100	1:12,000	29-06-2020	WK28-20	31-7-2020	SENC	Licensed
PAS3A486	1:180,000	15-12-2015	WK28-20	31-8-2020	SENC	Licensed
PAS3A429	1:180,000	05-10-2018	WK28-20	31-8-2020	SENC	Licensed
PAS3A111	1:180,000	29-05-2020	WK28-20	31-8-2020	SENC	Licensed
PAS3A400	1:12,000	19-06-2020	WK28-20	31-8-2020	SENC	Licensed
PASC0001	1:10,000	20-06-2019	WK28-20	31-8-2020	SENC	Licensed
PASC0002	1:10,000	26-06-2019	WK28-20	31-8-2020	SENC	Licensed
PASC0003	1:10,000	09-07-2019	WK28-20	31-8-2020	SENC	Licensed
PASC0004	1:10,000	21-01-2020	WK28-20	31-8-2020	SENC	Licensed
PASC0005	1:10,000	14-06-2019	WK28-20	31-8-2020	SENC	Licensed
PASC0002	1:5,000	17-06-2019	WK28-20	31-8-2020	SENC	Licensed
PASC0001	1:5,000	05-12-2019	WK28-20	31-8-2020	SENC	Licensed
PE101000	1:1,500,000	30-06-2019	WK28-20	31-8-2020	SENC	Licensed
PE102000	1:1,500,000	30-11-2019	WK28-20	31-8-2020	SENC	Licensed
PE103000	1:1,500,000	29-05-2019	WK28-20	31-8-2020	SENC	Licensed



ARCS and AVCS Charts displayed side-by-side.

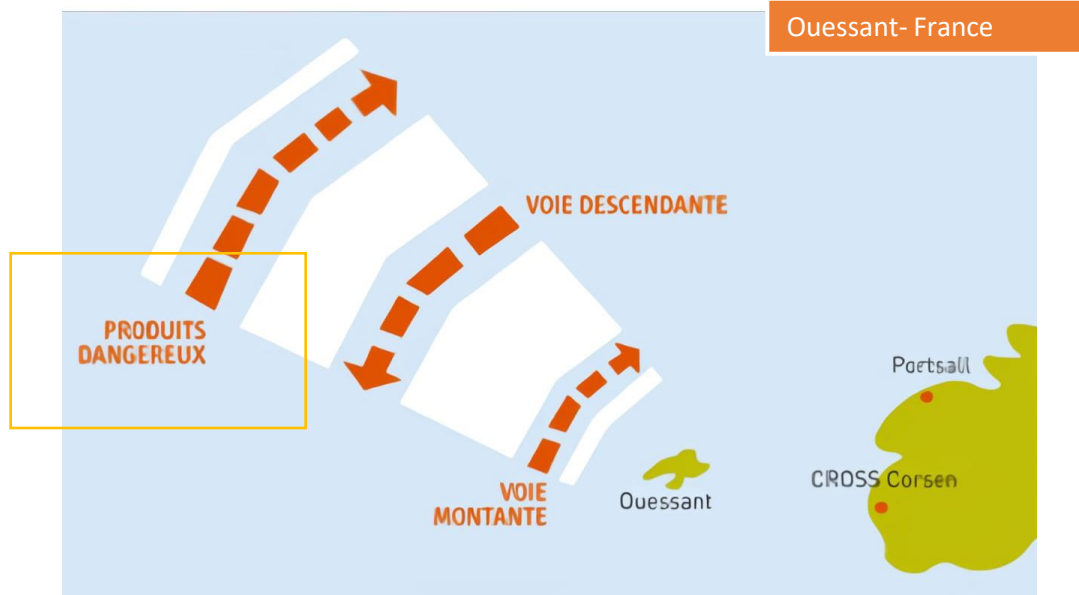
Static Vs. Dynamic



## 1. Appraisal

# Sailing Directions

- ✓ Essential information to support coastal navigation and port entry.
- ✓ How to draw the correct route
- ✓ Comply with local regulations
- ✓ Carrying dangerous goods means you increase the transit distance from shore

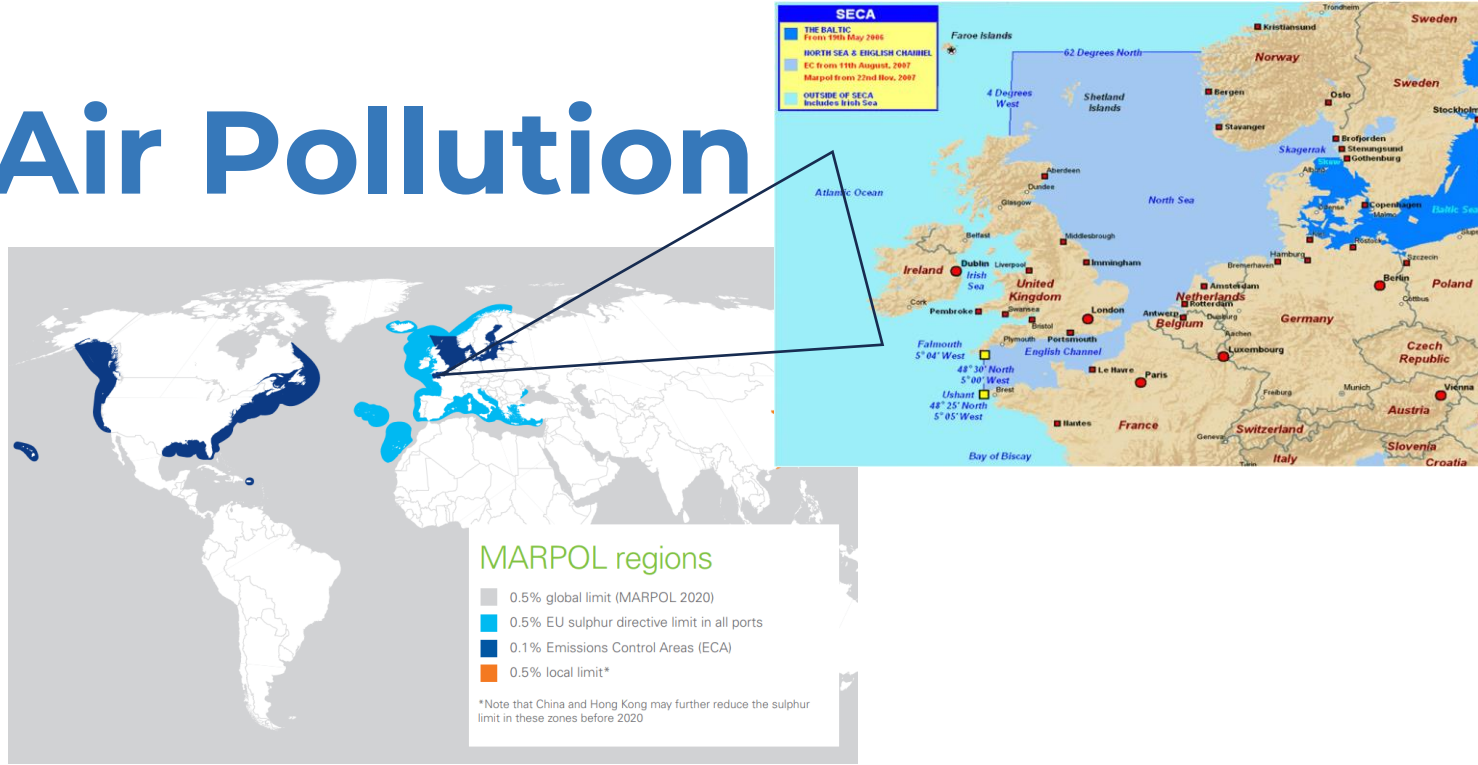


## 1. Appraisal

# Air Pollution

✓ A **SECA zone** is a maritime area where vessels' emissions are strictly limited and controlled. SECA stands for **Sulphur Emission Control Area** and requires ships to use fuels with low sulphur content.

✓ The International Maritime Organization (IMO) has designated waters off North American and European coasts as SECA zones., South Korea has also implemented SECAs for its major port areas.



## 1. Appraisal

# PSSA

## Worldwide Particularly Sensitive Sea Areas

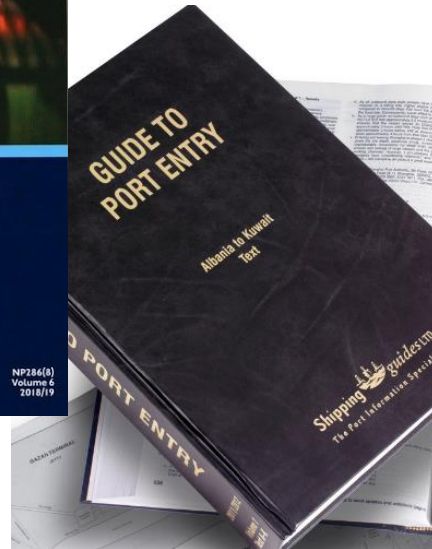
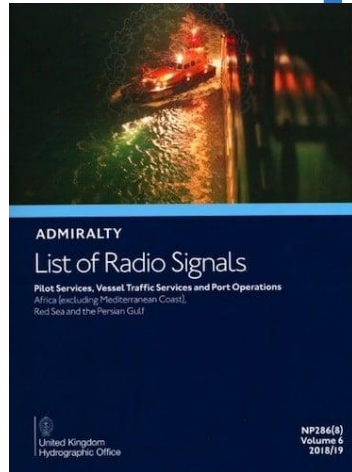


A **Particularly Sensitive Sea Area (PSSA)** is an area that needs special protection through action by IMO because of its significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities. The criteria for the identification of particularly sensitive sea areas and the criteria for the designation of special areas are not mutually exclusive. In many cases a Particularly Sensitive Sea Area may be identified within a Special Area and vice versa.

A PSSA can be protected by ships routing measures – such as an area to be avoided: an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or by certain classes of ships.

## 1. Appraisal

# VTS Reporting



- ✓ MANDATORY REPORTING SYSTEMS
- ✓ CARGO DECLARATION
- ✓ SAFETY OF NAVIGATION AND ENVIRONMENT

The **English Channel and Dover Strait Movement Report System (MAREP)** is a voluntary reporting system which applies to the following vessels:

1. All merchant vessels over 300 grt. Vessels of 300 grt and under are strongly encouraged to participate.
2. Any vessels "not under command" or at anchor in a Traffic Separation Scheme (TSS) or an Inshore Traffic Zone (ITZ).
3. Any vessel "restricted in its ability to manoeuvre."
4. Any vessel with defective navigational aids.

The reporting area is bounded by, as follows:

1. A line between the Ouessant SW Lanby (48°30'N., 5°50'W.) and Bishop Rock Light (49°50'N., 6°21'W.).
2. A line joining North Foreland (51°22'N., 1°28'E.) to the Belgian coast through Mid Falls Lighted Buoy (51°19'N., 1°47'E.).

**Mandatory reporting procedures apply to all vessels over 300 grt in the following areas:**

1. The TSS Off Ouessant (CORSEN OUESSANT) and its associated ITZs.
2. The TSS Off Casquets (MANCHEREP) and its associated ITZs.
3. The TSS in the Strait of Dover and its Adjacent Waters (CALDOVREP) and its associated ITZs.

Vessels should report to the appropriate shore station, as follows:

1. The TSS Off Ouessant—10 miles before entering the TSS or the associated ITZ.
2. The TSS Off Casquets—10 miles before entering the TSS or the associated ITZ.
3. The TSS in the Strait of Dover and its Adjacent Waters:
  - a. Northeastbound vessels—2 miles before crossing a line joining Royal Sovereign Light Tower (50°43'N., 0°26'E.) to the French coast through Bassurelle Lighted Buoy (50°33'N., 0°58'E.).
  - b. Southwestbound vessels—When within VHF range of North Foreland and not later than when crossing a line joining North Foreland to the Belgian coast through Mid Falls Lighted Buoy.
  - c. On departure from a port within the ITZ.

In addition, vessels should maintain a continuous listening watch on VHF channel 16, on VHF channel 80 for Jobourg Traffic, and, if possible, on the main calling frequencies of the relevant shore stations.

**Vessels with no defects should send a Position Report (POSREP).** Vessels with defects (not under command, restricted in their ability to manoeuvre, defective navigational aids, etc.) should send a Defect Report (DEFREP). If necessary, a subsequent amending report (CHANGEREP) should be sent.

All reports should be made in English and the following details should be given, as appropriate, prefixed MAREP and followed by POSREP, DEFREP, or CHANGEREP, as appropriate:

## 1. Appraisal

# SMS & Procedures

### ✓ ANTI-GROUNDING

- > Crossing Safety Contour (blue water navigation) guidelines to be found in Vol 10, Annex F para. 4.7- Configuring Method to Cross the Safety Contour.
- > Perform a UKC calculation for departure, arrival and for any area where the UKC falls below ½ vessel's static draft.
- > Comply with company's UKC policy at every Navigational Phase (Open Waters/ Coastal Waters/ Confined)

### ✓ MARPOL

- > Planner will insert a waypoint on the route and name it Start of Fuel Changeover in a position relevant to the time required for the operation before entry to the ECA. Chief Engineer to be consulted.
- > Create a waypoint naming it accordingly at the entry of a PSSA or ESSA area. Planner gathers information on Local restrictions of overboard discharges or venting over and above MARPOL rules. To be mentioned in the Supporting Information section.

PASSAGE PLAN BERTH TO BERTH		
2. APPRAISAL		
ITEM	CHK	COMMENTS
ENCs required available and updated, AIO updated <sup>1</sup>	<input type="checkbox"/>	
Appropriate scale charts for ocean, coastal, harbor and berthing phases	<input type="checkbox"/>	
New charts and licenses ordered as appropriate	<input type="checkbox"/>	
Notices to Mariners	<input type="checkbox"/>	
Routing and load line charts	<input type="checkbox"/>	
Paper Charts if required available and corrected <sup>2</sup>	<input type="checkbox"/>	
Safety Contour, Safety Depth XTD and Safety Frame values entered for each passage leg in Waypoint List <sup>3</sup>	<input checked="" type="checkbox"/>	
Crossing Safety Contour precautions marked on ENC <sup>4</sup>	<input checked="" type="checkbox"/>	
Under Keel Clearance calculations duly documented in C/L 17 and attached to this plan <sup>5</sup>	<input checked="" type="checkbox"/>	
ACUP's e-ENCs available and updated	<input type="checkbox"/>	
Guides to port entry	<input type="checkbox"/>	
EGC / NAVAREA / NAVTEX warnings <sup>7</sup>	<input type="checkbox"/>	
Ships Routing Guide consulted	<input type="checkbox"/>	
Waypoints in confined waters inserted in GPS <sup>8</sup>	<input type="checkbox"/>	
Load line zones taken into consideration	<input type="checkbox"/>	
Weather along the route accounted for	<input type="checkbox"/>	
Navigational equipment in good order. All respective alarm set properly <sup>9</sup>	<input type="checkbox"/>	
Aids to navigation adequate and reliable	<input type="checkbox"/>	
Ballast Water Exchange start and finish marked in Waypoints list – Salinity at discharging port (BWTS) <sup>10</sup>	<input checked="" type="checkbox"/>	
Start of fuel changeover (if necessary) marked on ENC <sup>11</sup>	<input checked="" type="checkbox"/>	
Entry /Exit ECA marked in Waypoints list	<input checked="" type="checkbox"/>	
PSSA, ESSA entry points checked and marked <sup>12</sup>	<input checked="" type="checkbox"/>	
Local restrictions of overboard discharges or venting <sup>13</sup>	<input checked="" type="checkbox"/>	
Special requirements accounted for <sup>14</sup>	<input type="checkbox"/>	
Cargo special requirements accounted for <sup>15</sup>	<input type="checkbox"/>	
Security issues accounted for <sup>16</sup>	<input type="checkbox"/>	
Health and infesting species issues <sup>17</sup>	<input type="checkbox"/>	

## 1. Appraisal

# SMS & Procedures

### ✓ DISTANCE-OFF POINTS OF LAND

#### 10.5.1.2 MIN. DISTANCE FROM POINTS OF LAND

**OOBW:** Apply the following when passing grounding areas:

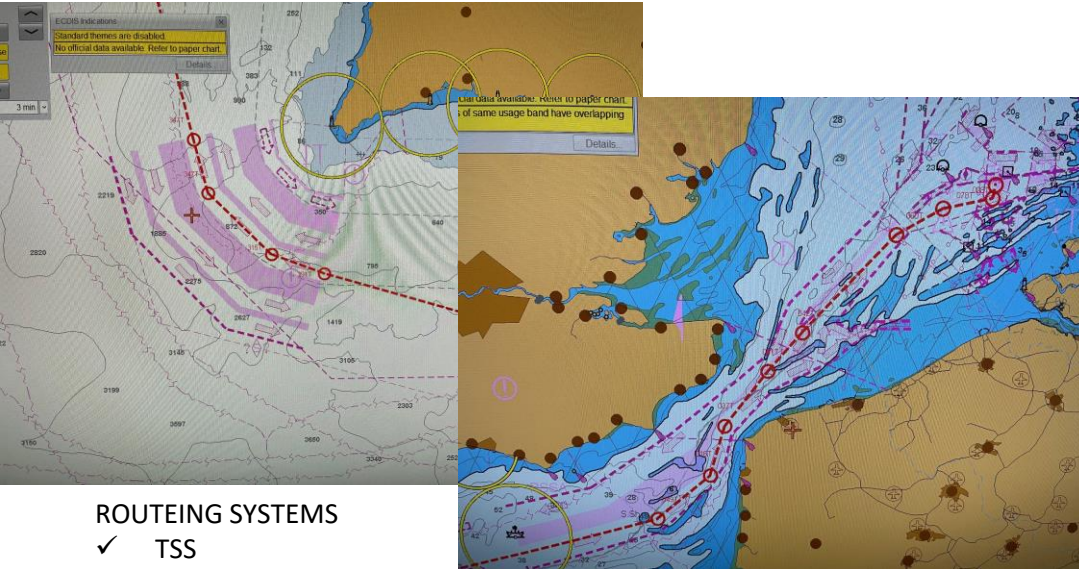
- If TSS exists, follow:
  - TSS (appropriate lane for the nature and draft of your vessel).
  - Recommended Routes.
- If TSS and recommended routes do not exist:
  - Maintain a min. distance of 10 nm from any dangerous ground around noticeable points.

<p><b>CAUTION</b></p>	<p><b>OOBW:</b></p> <ul style="list-style-type: none"> <li>• <b>DO NOT</b> reduce distance of 25 nm, unless if it is absolutely necessary for the safety of the vessel. 10 nm is a min. and not a recommended distance.</li> <li>• Always check charterer's instructions and follow these if stricter rules apply.</li> </ul>
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PASSAGE PLAN BERTH TO BERTH		
2. APPRAISAL		
ITEM	CHK	COMMENTS
ENCs required available and updated, AIO updated <sup>1</sup>	<input type="checkbox"/>	
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Crossing Safety Contour precautions marked on ENC <sup>4</sup>	<input checked="" type="checkbox"/>	
Under Keel Clearance calculations duly documented in C/L 17 and attached to this plan <sup>5</sup>	<input checked="" type="checkbox"/>	
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Local restrictions of overboard discharges or venting <sup>13</sup>	<input checked="" type="checkbox"/>	
Charters special requirements accounted for <sup>14</sup>	<input type="checkbox"/>	
Cargo special requirements accounted for <sup>15</sup>	<input type="checkbox"/>	
Security issues accounted for <sup>16</sup>	<input type="checkbox"/>	
Health and infesting species issues <sup>17</sup>	<input type="checkbox"/>	

# USE APPRAISAL DATA + ANALYSE NAUTICAL CHARTS

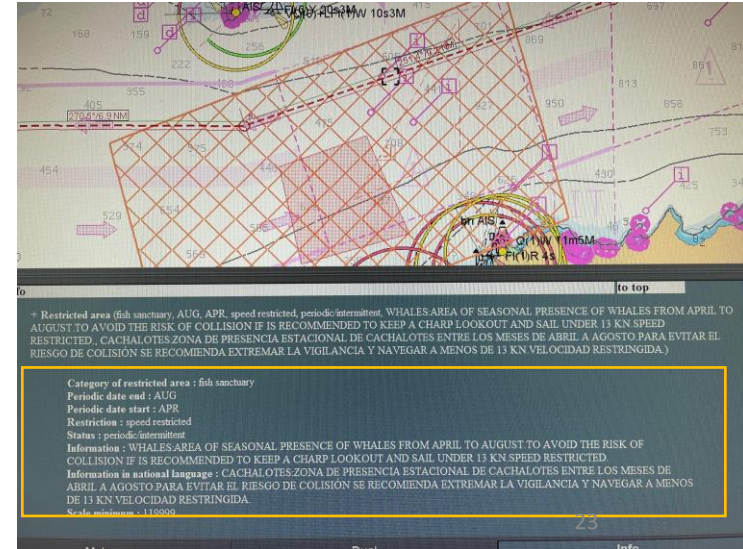
## 2. Planning



### ROUTING SYSTEMS

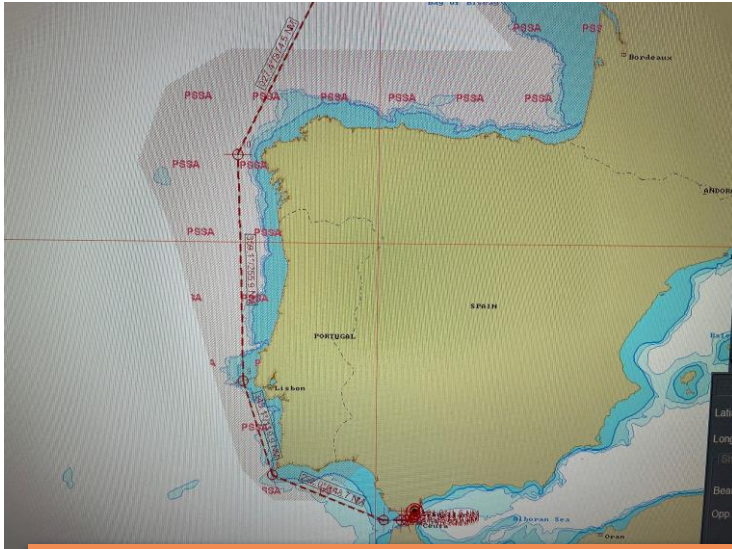
- ✓ TSS
- ✓ DW ROUTES
- ✓ RESTRICTIONS

### ✓ SEASONAL ENVIROMENTAL RESTRICTIONS

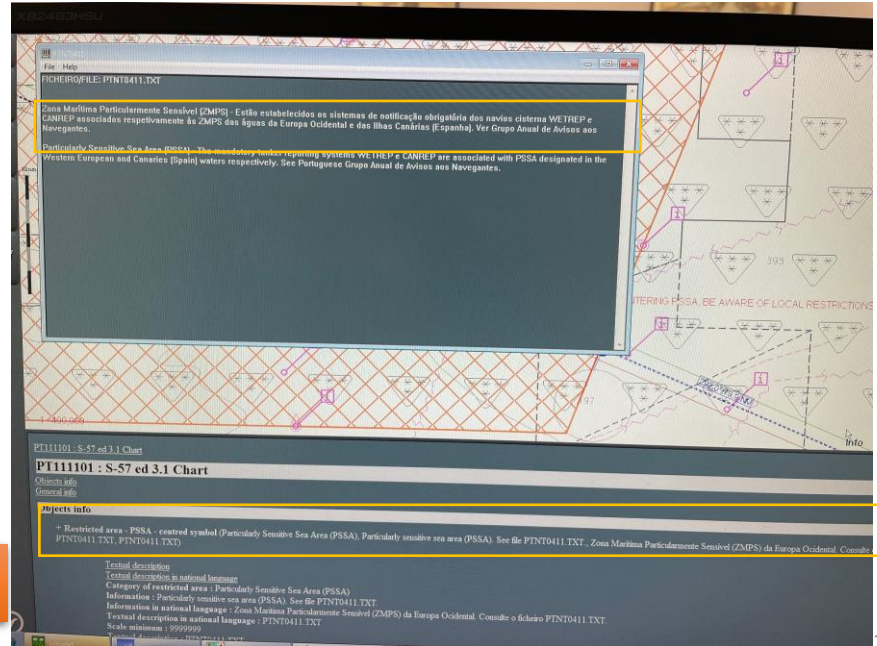


# USE APPRAISAL DATA + ANALYSE NAUTICAL CHARTS

## 2. Planning



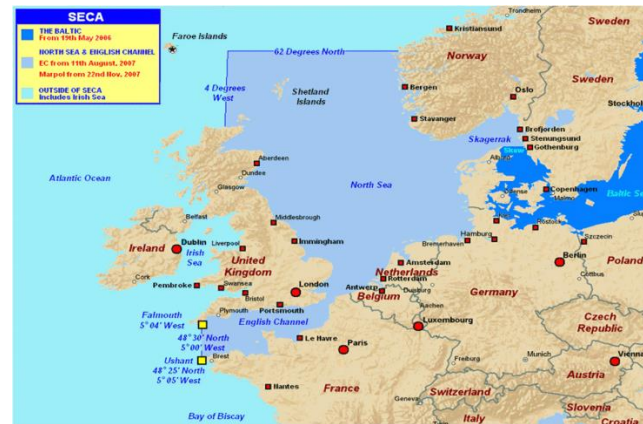
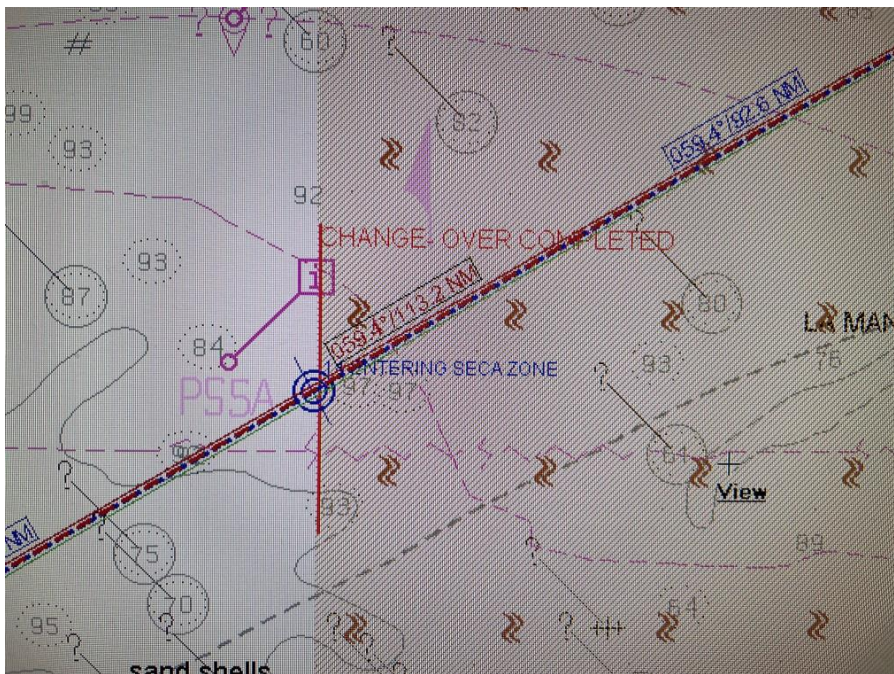
PSSA AREAS AND RESTRICTIONS THROUGH INFO





## USE APPRAISAL DATA + ANALYSE NAUTICAL CHARTS

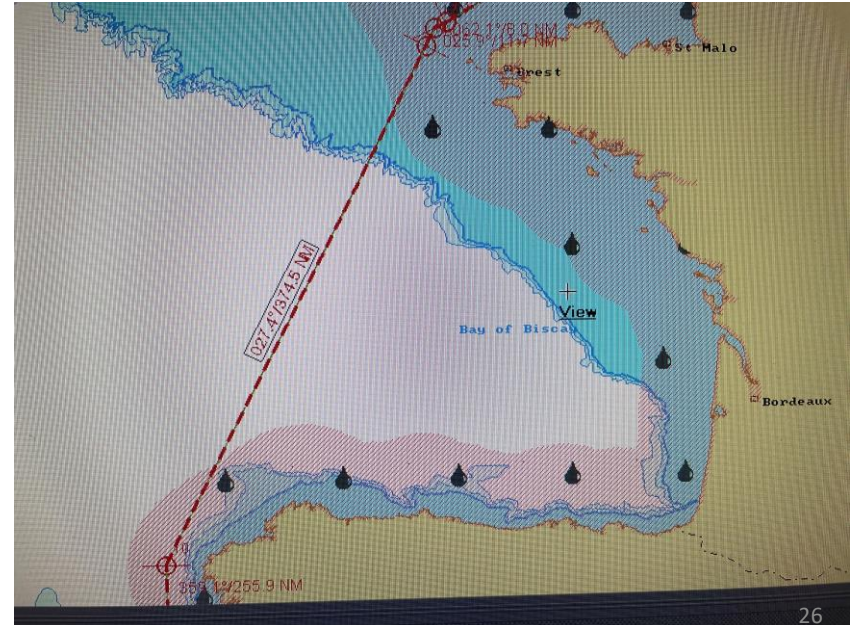
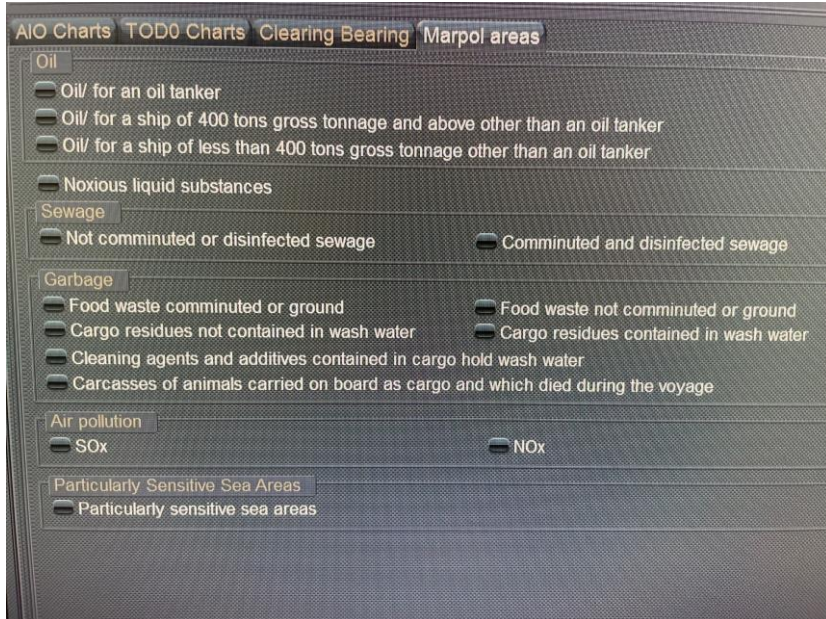
### 2. Planning



ECA ZONE ENTRANCE AND WAYPOINT

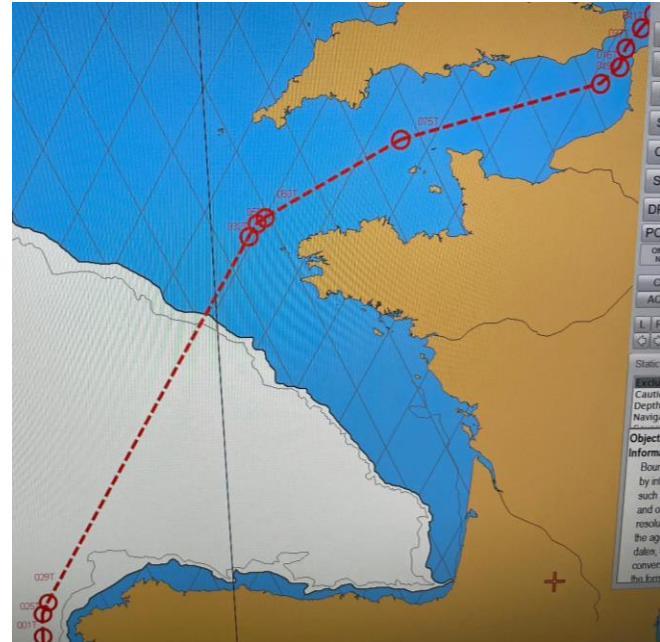
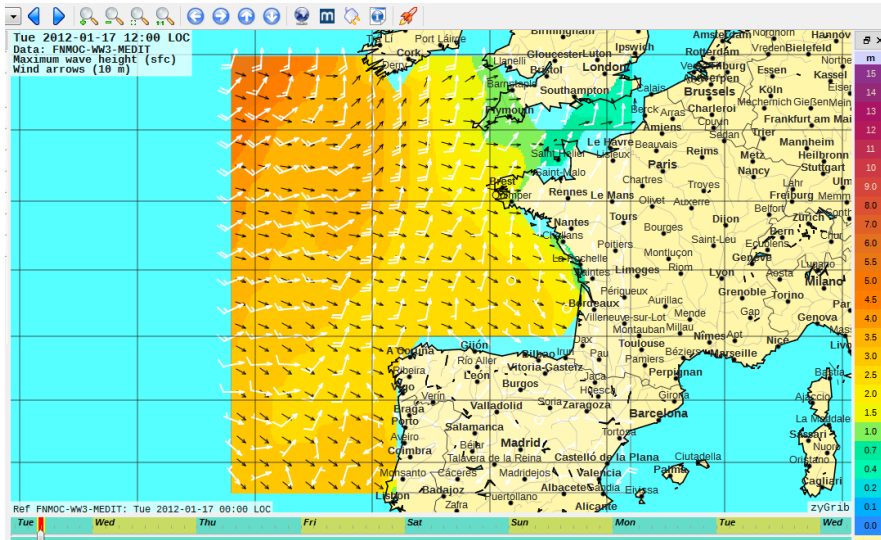
## USE APPRAISAL DATA + USE MARPOL OVERLAY

### 2. Planning



# USE WEATHER ROUTEING SYSTEMS

## 2. Planning



- ✓ ROUTE OPTIMIZATION WHEN NEEDED,
- ✓ CONTINGENCY ROUTES/ ANCHORAGES, REFUGE PORTS

# CHART LEGEND, VERTICAL DATUM FOR ACCURATE UKC CALCULATIONS

## 2. Planning

+ Magnetic variation - cursor pick site for magnetic variation

+ Coverage (coverage available)

+ Depth area (200m, 300m)

+ Depth area (300m, 400m)

**General info**

Presentation Library: edition 4.0.0

Producing Agency Code: ES (Instituto Hidrografico de la Marina (IHM))

Producing Country Code: ES (Spain)

Compilation scale: 1:45000

Edition Number: 9; Update Number: 4

Issue Date: 17 Feb 2020

Last Update Date: 14 Sep 2020

Horizontal Datum: WGS 84

Vertical Datum: Mean sea level

Sounding Datum: Lowest astronomical tide

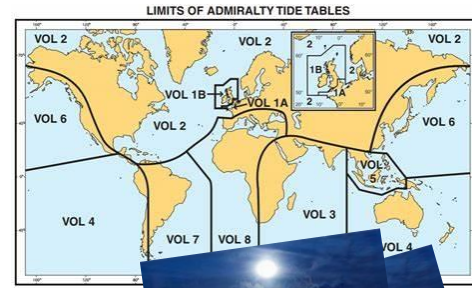
Depth Units: metres

Height Units: metres

+ Update records

Status Page

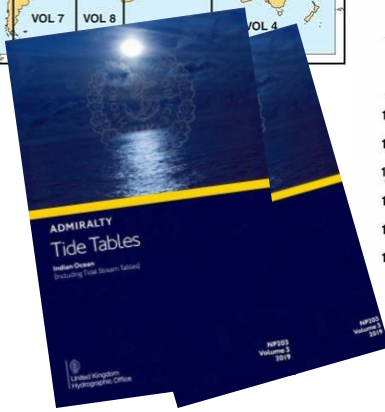
23.8" FHD BLUE LIGHT Display Port HDMI



ENGLAND - BRIGHTLINGSEA

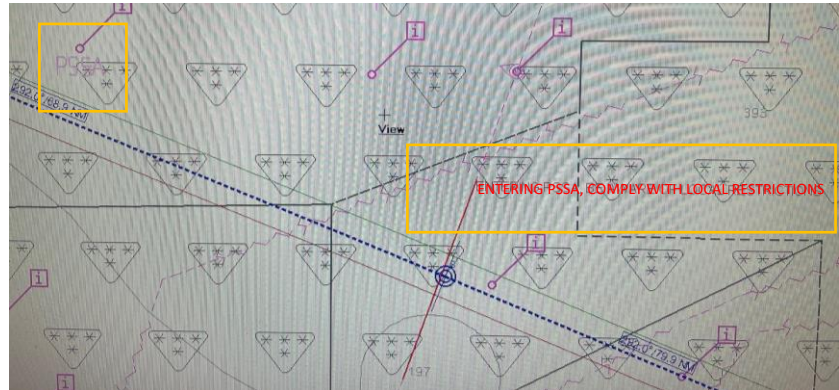
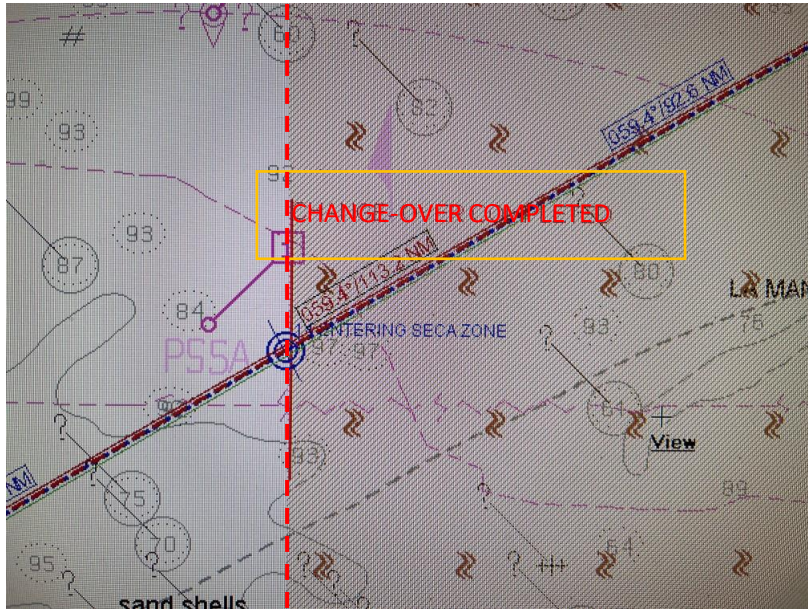
TABLES ARE HEIGHTS OF HIGH AND LOW WATERS

TIME (ZONE GMT)		JUNE		JULY		AUGUST	
	TIME	TIME	TIME	TIME	TIME	TIME	TIME
1	16	16	16	16	16	16	16
2	17	17	17	17	17	17	17
3	18	18	18	18	18	18	18
4	19	19	19	19	19	19	19
5	20	20	20	20	20	20	20
6	21	21	21	21	21	21	21
7	22	22	22	22	22	22	22
8	23	23	23	23	23	23	23
9	24	24	24	24	24	24	24
10	25	25	25	25	25	25	25
11	26	26	26	26	26	26	26
12	27	27	27	27	27	27	27
13	28	28	28	28	28	28	28
14	29	29	29	29	29	29	29
15	30	30	30	30	30	30	30
31							



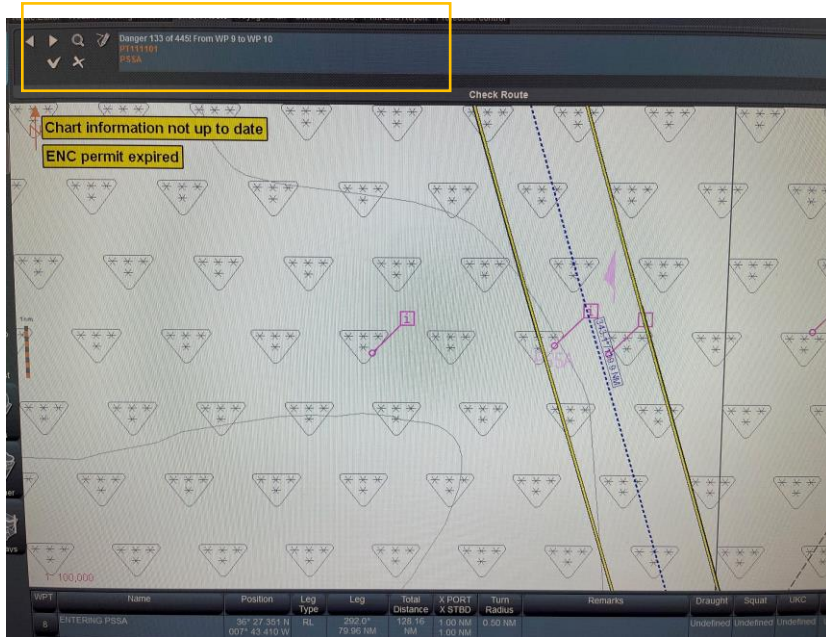
# DRAWING OF USER CHARTS: VOYAGE SPECIFIC OVERLAY

## 2. Planning



# AUTOMATED ROUTE CHECK BEFORE DEPARTURE

## 2. Planning



Page 11 of 23

Voyage No.: Ship's Name: MINERVA FROM TO: Master's Name: CPT.  
ROXANNE

Route name: VOY 054B ALGECRAS TO RTM

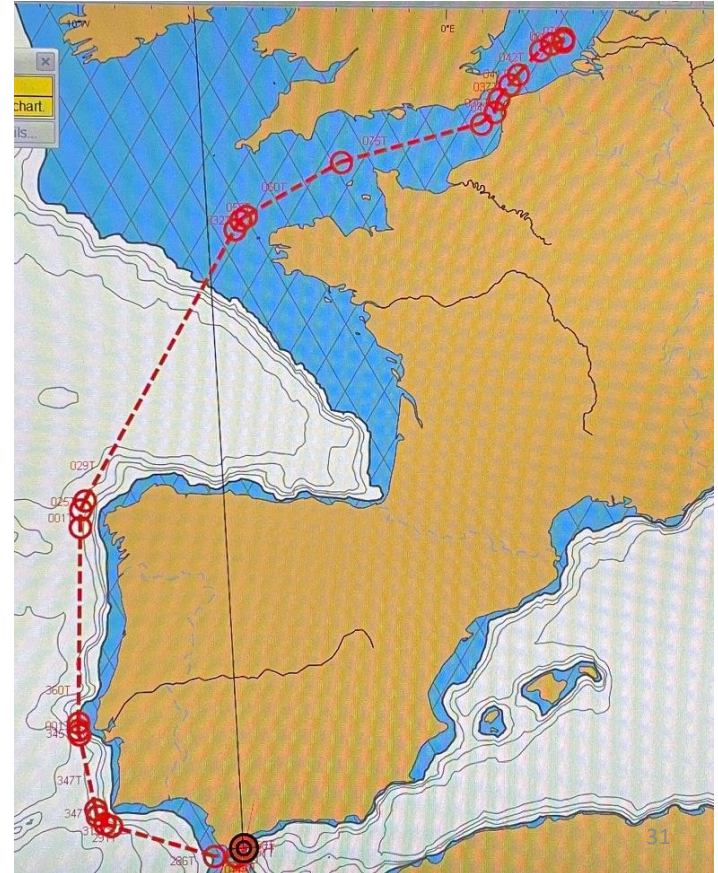
SAFETY PARAMETERS				
WPT	Name	Safety contour	Safety width	List of accepted alarms
11		30.0 m		PT11101 PSSA
12		30.0 m	30.0 m	PT11101 PSSA FRZ73110 Recommended Traffic Lane FRZ73110 Exclusive Economic Zone FRZ73110 PSSA
13		30.0 m	30.0 m	FRZ73110 Recommended Traffic Lane FRZ73110 Exclusive Economic Zone FRZ73110 PSSA
14		30.0 m	30.0 m	FRZ73110 Recommended Traffic Lane FRZ73110 Recommended Traffic Lane FRZ73110 Exclusive Economic Zone FRZ73110 PSSA

Printed: 04/03/24 11:35:07 Prepared by: nav. Officer Checked by: Master Page 11

## 2. Planning

### Voyage Overview

- Total voyage distance, **1.383 NMs**
- Pilot to pilot distance, **1.374,5 NMs**  
(Breakdown: Algeciras Anch. A → Algeciras P/S : 1.5 NMs & Maas P/S → Rotterdam Tankers Anch. : 7 NMs)
- Distance in ECA, **385 NMs**
- Distance from land is less than 12 NM. **For 38,5 NMs we sail in distance less than 12NMs outside ECA.**  
**Dates and times will be reflected on time schedule.**



### 3. Execution

- Voyage speed and duration

Operational speed of

**8.0** Knots

Is agreed as avg. voyage speed,  
which will lead to  
VOY duration of 7,2Days.

ETA	Stay	Time Zone	ETD	TTG	Total Time	Speed	Average Speed
XX-XX-XX XX:XX	XX-XX-XX XX:XX	01:00 E	01-05-24 08:00	XX-XX-XX	XX-XX-XX	XXX.X	XXX.X
01-05-24 08:11		01:00 E	01-05-24 08:11	00 d 00 h 11 min	00 d 00 h 11 min	8.0 kn	8.0 kn
01-05-24 08:34		01:00 E	01-05-24 08:34	00 d 00 h 23 min	00 d 00 h 34 min	8.0 kn	8.0 kn
01-05-24 09:00		01:00 E	01-05-24 09:00	00 d 00 h 26 min	00 d 01 h 00 min	8.0 kn	8.0 kn
01-05-24 09:15		01:00 E	01-05-24 09:15	00 d 00 h 15 min	00 d 01 h 15 min	8.0 kn	8.0 kn
01-05-24 10:25		01:00 E	01-05-24 10:25	00 d 01 h 09 min	00 d 02 h 25 min	8.0 kn	8.0 kn
01-05-24 11:17		01:00 E	01-05-24 11:17	00 d 00 h 52 min	00 d 03 h 17 min	8.0 kn	8.0 kn
01-05-24 14:01		01:00 E	01-05-24 14:01	00 d 02 h 43 min	00 d 06 h 01 min	8.0 kn	8.0 kn
02-05-24 00:01		01:00 E	02-05-24 00:01	00 d 09 h 59 min	00 d 16 h 01 min	8.0 kn	8.0 kn
02-05-24 08:35		01:00 E	02-05-24 08:35	00 d 08 h 34 min	01 d 00 h 35 min	8.0 kn	8.0 kn
02-05-24 23:35		01:00 E	02-05-24 23:35	00 d 15 h 00 min	01 d 15 h 35 min	8.0 kn	8.0 kn
04-05-24 08:34		02:00 E	04-05-24 08:34	01 d 07 h 58 min	02 d 23 h 34 min	8.0 kn	8.0 kn
06-05-24 07:24		02:00 E	06-05-24 07:24	01 d 22 h 49 min	04 d 22 h 24 min	8.0 kn	8.0 kn
06-05-24 08:50		02:00 E	06-05-24 08:50	00 d 01 h 26 min	04 d 23 h 50 min	8.0 kn	8.0 kn
06-05-24 09:51		02:00 E	06-05-24 09:51	00 d 01 h 00 min	05 d 00 h 51 min	8.0 kn	8.0 kn
07-05-24 00:00		02:00 E	07-05-24 00:00	00 d 14 h 08 min	05 d 15 h 00 min	8.0 kn	8.0 kn
07-05-24		02:00 E	07-05-24	00 d 03 h	05 d 18 h	8.0 kn	8.0 kn



### 3. Execution

#### Voyage Plan Briefing and acknowledgement prior departure:

- ✓ Compliance with MARPOL or Local regulations for SA/ECA/PSSA areas.

#### Actions needed:

- Reporting Requirements: Report to relevant sectors and systems Via E-Mail/VHF upon entering sectors or in advance.
- SECA: Follow Change-over procedure to comply with low sulphur emissions.
- PSSA: Comply with restrictions sailing Western European Waters PSSA (coasts of the United Kingdom, Ireland, Belgium, France, Spain and Portugal, from the Shetland Islands in the North to Cape S. Vicente in the South, and the English Channel and its approaches).
  - fourteen traffic-separation schemes ✓
  - two deepwater routes ✓
  - seven areas to be avoided ✓
  - four mandatory ship-reporting systems. ✓

*Discussed, Signed for acknowledgement,  
Plotted on chart*



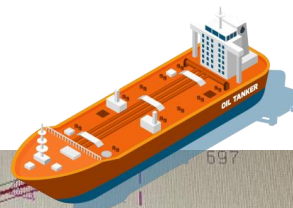
## 4. Monitoring

# VOY 052B

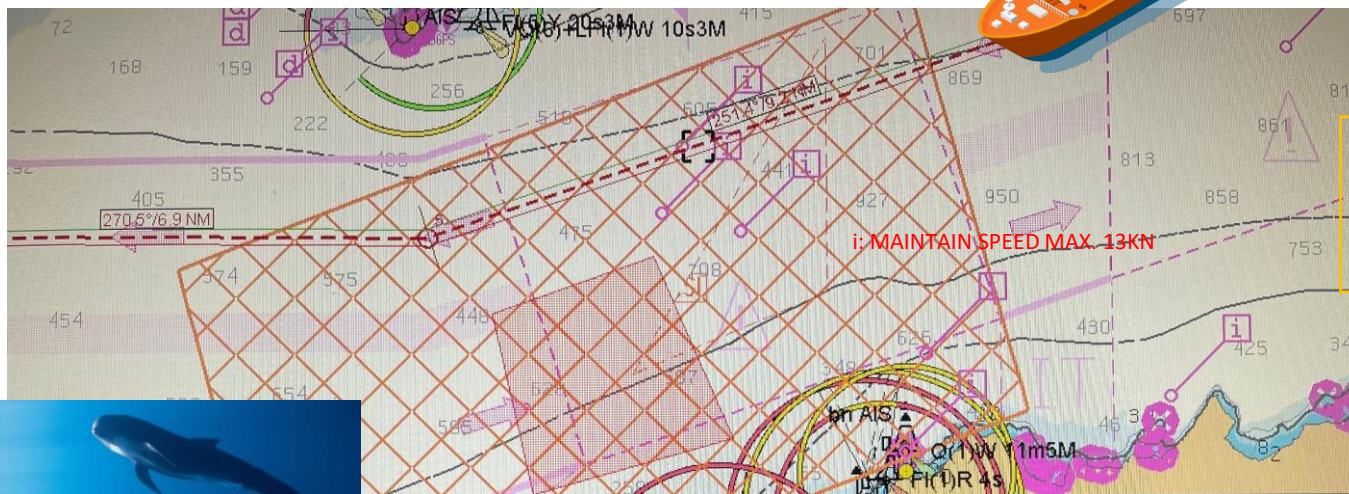
Gulf of Algeciras to Rotterdam Port in Ballast Condition

**MAY 2024**

**VESSEL DEPARTS AT 08:00 am under heavy weather conditions**



**Continuous  
Monitoring of speed  
<13kn**



Category of restricted area : fish sanctuary  
Periodic date end : AUG  
Periodic date start : APR  
Restriction : speed restricted  
Status : periodic/intermittent  
Information : WHALES-AREA OF SEASONAL COLLISION IF IS RECOMMENDED TO KEEP  
Information in national language : CACHALO ABRIL A AGOSTO.PARA EVITAR EL RIESG DE 13 KN.VELOCIDAD RESTRINGIDA.  
Scale minimum : 119999

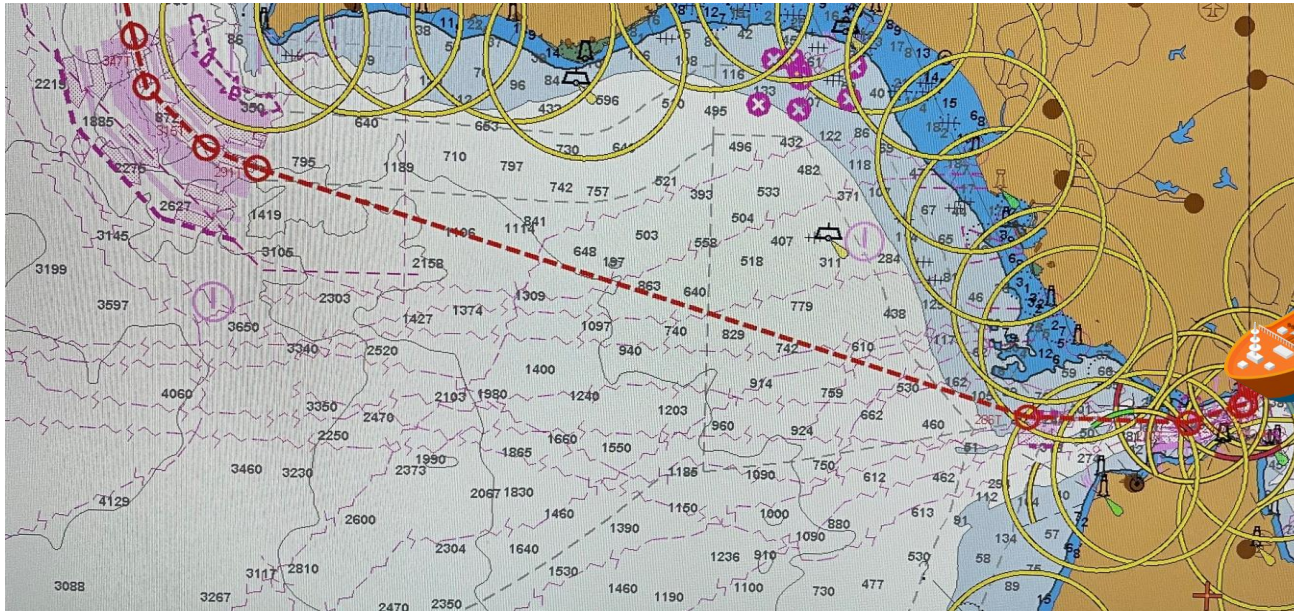
## 4. Monitoring

# VOY 052B

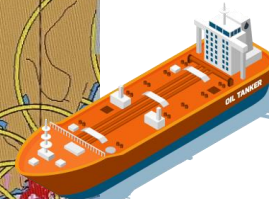
Gulf of Algeciras to Rotterdam Port in Ballast Condition



**WIND FORCES HAVE BEEN INCREASED SIGNIFICANTLY**



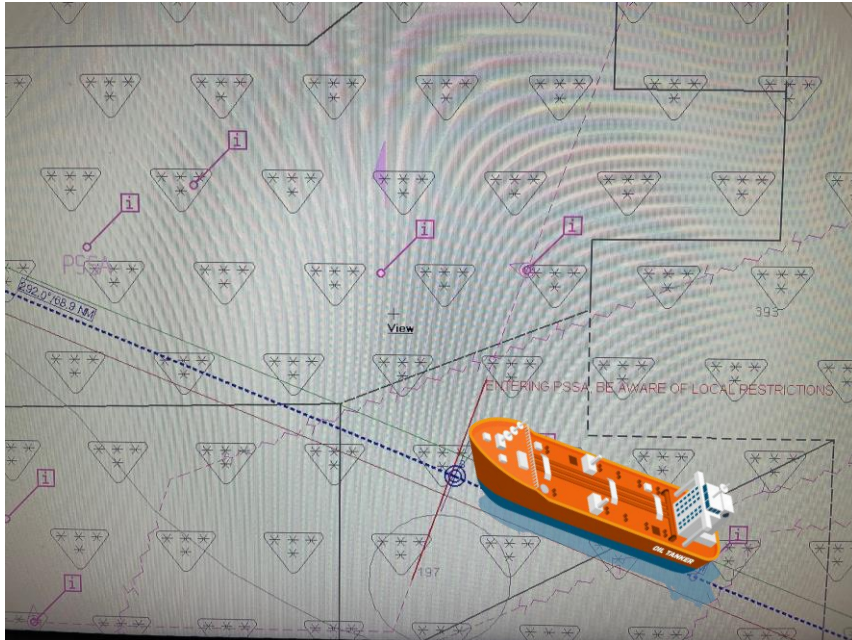
✓ **Master decides**  
**Ballasting of**  
**Heavy Weather ballast**  
**Tanks**  
to improve vessels  
Stability, increasing  
safety during the  
passage until further  
forecast for conditions  
improvement.



## 4. Monitoring

# VOY 052B

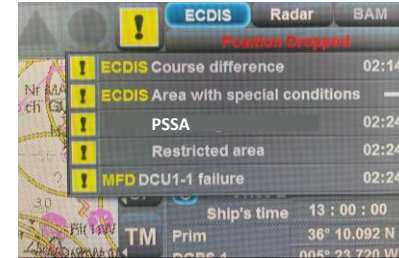
Gulf of Algeciras to Rotterdam Port in Ballast Condition



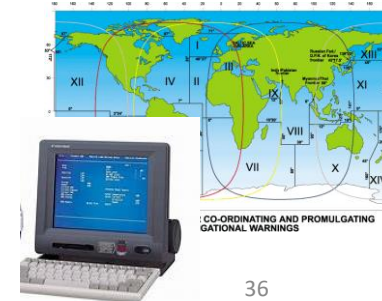
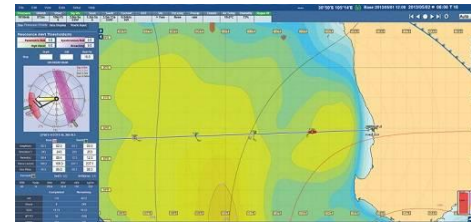
✓ WETREP Reporting



✓ Alert Management



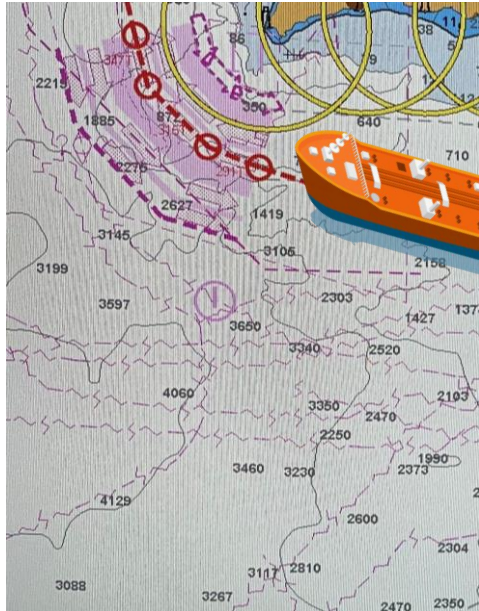
✓ Continuous Weather monitoring



## 4. Monitoring

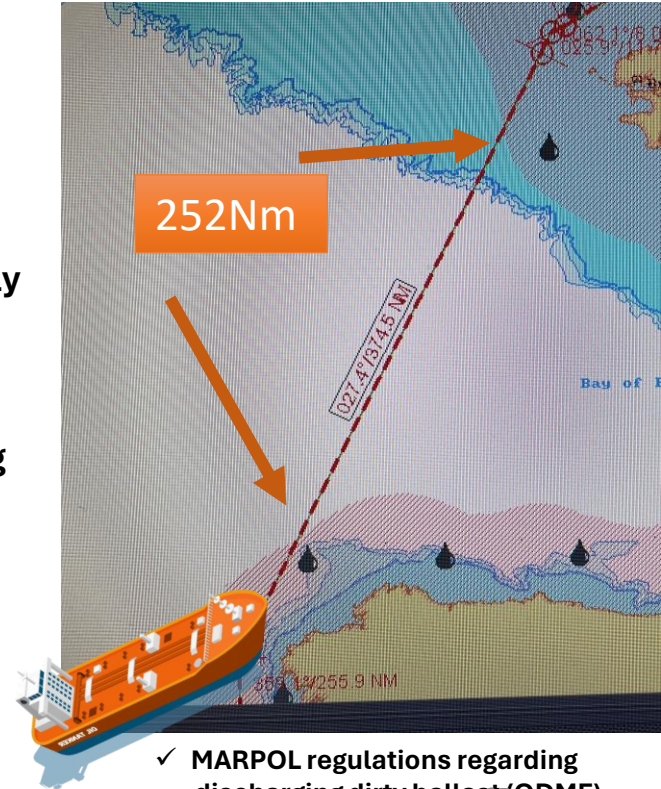
# VOY 052B

Gulf of Algeciras to Rotterdam Port in Ballast Condition



- ✓ Weather improved significantly
- ✓ Awaiting 36hrs for settling
- ✓ Proceed to HWBT deballasting through O.D.M.E.

Sailing duration  
 $252\text{Nm}/8\text{kn} = 31\text{hrs } 30\text{min}$



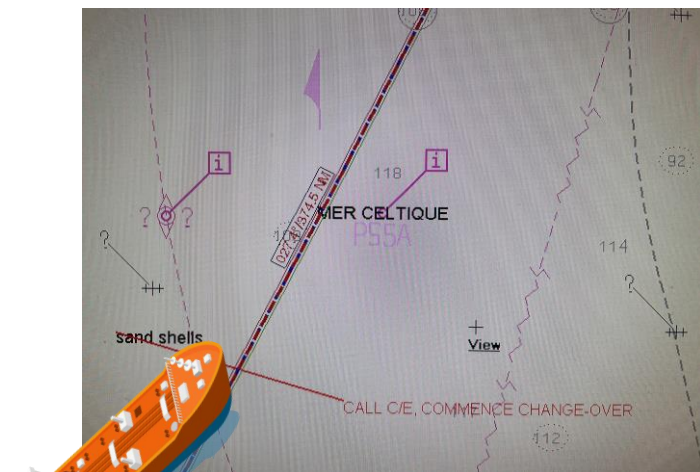
✓ MARPOL regulations regarding  
discharging dirty ballast (ODME)

## 4. Monitoring

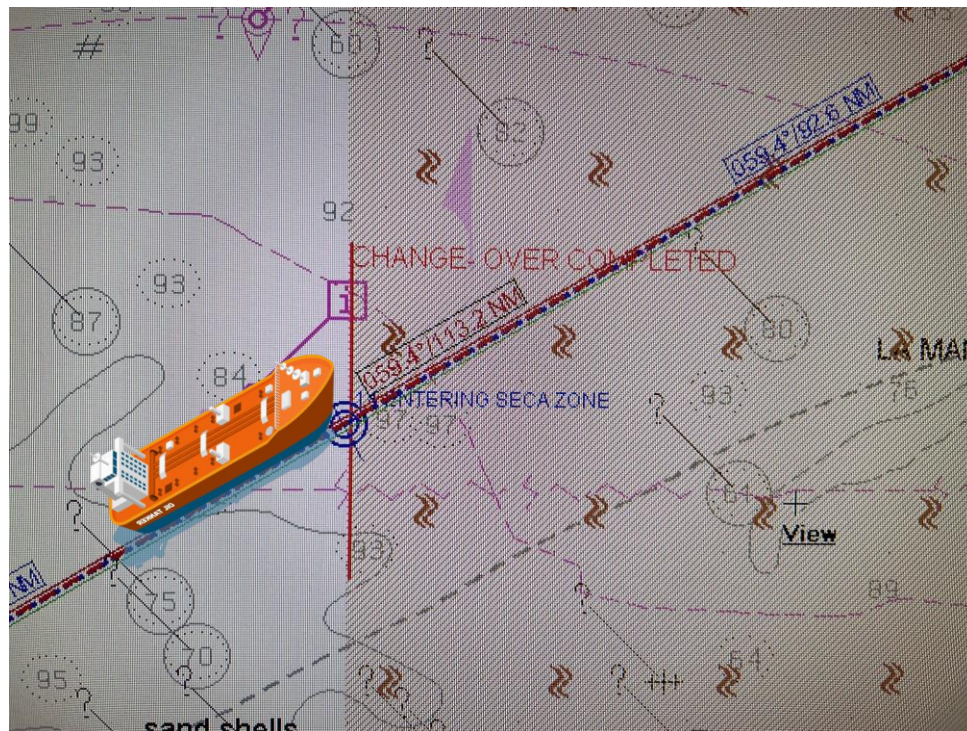
# VOY 052B

Gulf of Algeciras to Rotterdam Port in Ballast Condition

## Prior Entering SECA



Bridge team providing notifications in advance to E/R for commencement of Change-Over Procedure.



Engineers report upon completion of change-over procedure And vessel reports accordingly to the reporting points about bunker consumption.

# VOY 052B

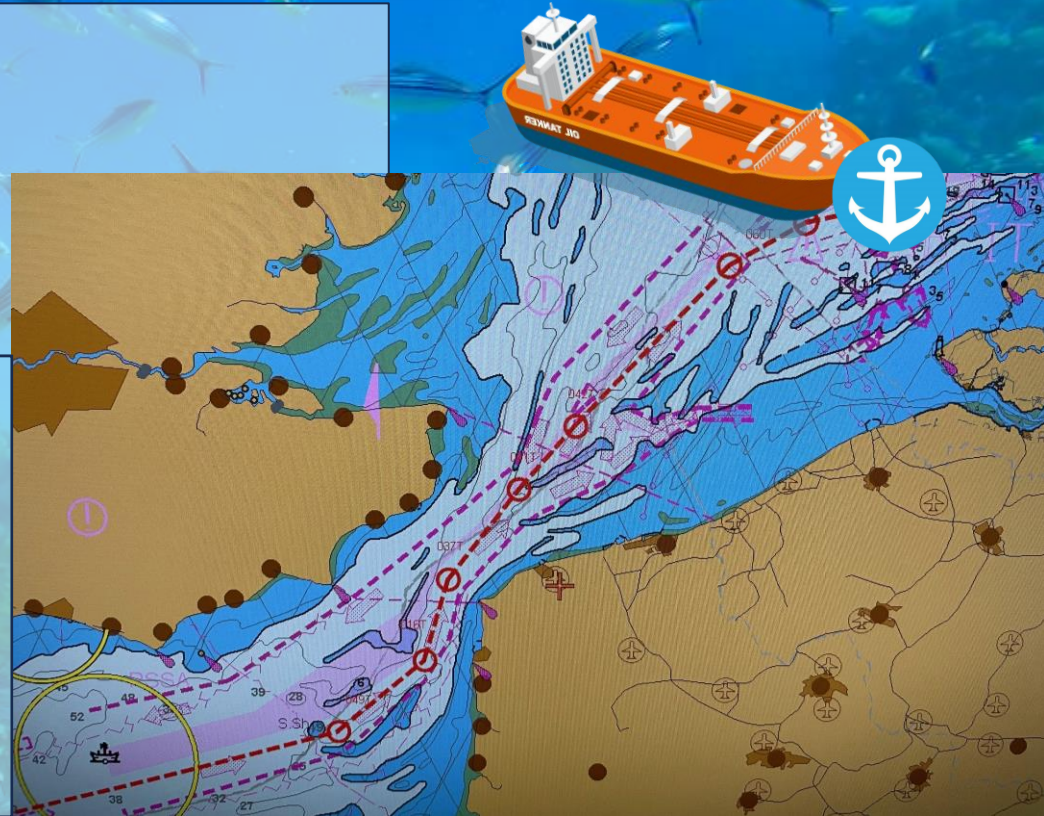
Gulf of Algeciras to Rotterdam Port in Ballast Condition

**Vessel transits English Channel and  
Safely drops anchor in NLRTM  
approx. 7 days after departure from Algeciras,  
awaiting loading instructions**

**Crew sailed safely,  
respecting:**

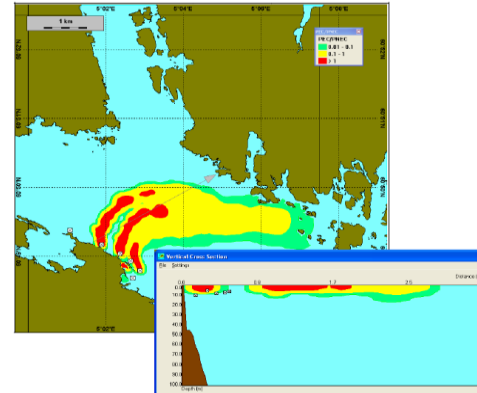
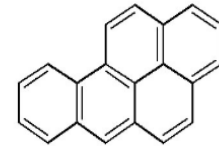
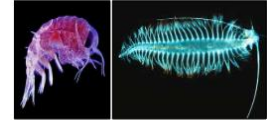
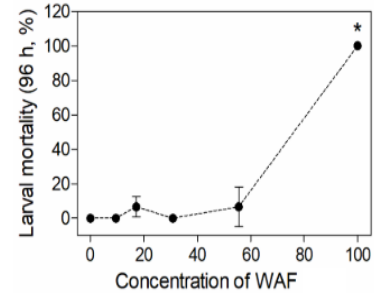
✓ Marine Environment

✓ Marine Life



## How ship-generated permissible discharges are established?

- ❖ **Oil (E/R bilge water, dirty ballast, etc.)**  
**Acute & Chronic toxicity testing (LC 50, EC 50)**  
**From 100 ppm to 15 ppm. PAHs < 0.5 ppm**
- ❖ **BWTS Active Substances – Other Chemicals**  
**NOAEC, NOEC (LC<sub>x</sub>)**  
**PEC vs PNEC**  
**Predicted Environmental Concentration**  
**Predicted No Effect Concentration**





# MARPOL ANNEX I

Regulations for the Prevention of Pollution by Oil  
(entered into force 2 October 1983)


## Special Areas

Special Areas are those areas their oceanographic and ecological conditions and to the particular character of their maritime traffic, the adoption of special mandatory methods for the prevention of sea pollution is required.

For the purposes of MARPOL Annex I, Special Areas are the following:

1. the Mediterranean Sea,
2. the Baltic Sea,
3. the Black Sea,
4. the Red Sea,
5. the “Gulfs” Area,
6. the Gulf of Aden,
7. the Antarctic area, south of latitude 60° S,
8. the North West European waters including the North Sea, the Irish Sea, the Celtic Sea, the English Channel and part of the North East Atlantic west of Ireland,
9. the Oman area of the Arabian Sea, and
10. The Southern Waters of South Africa.

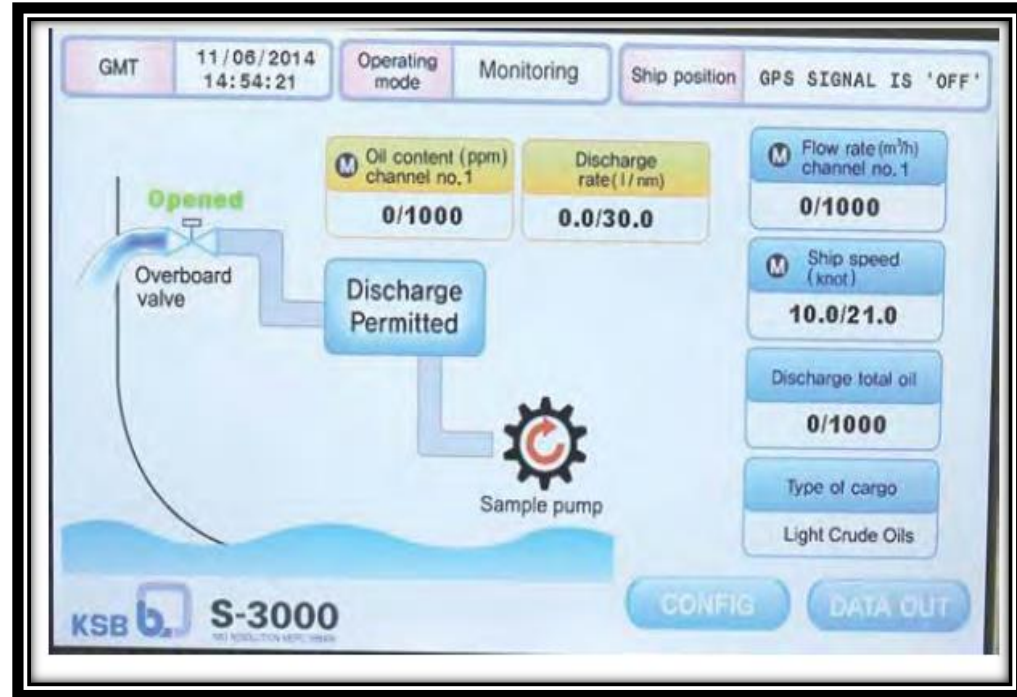
# DECANTING OF SLOP/ CARGO TANKS

OIL DISCHARGE FROM THE CARGO AREA OF OIL TANKERS	
<b>WITHIN</b> Special Areas	Any discharge into the sea of oil or oily mixtures from the cargo area is prohibited
<b>OUTSIDE</b> Special Areas and at a distance greater than 50 nautical miles from the nearest land  	<p>Any discharge into the sea of oil or oily mixtures from the cargo area is prohibited, except when all the following conditions are satisfied:</p> <ul style="list-style-type: none"> <li>⊙ the tanker is proceeding en route,</li> <li>⊙ the instantaneous rate of discharge of oil content does not exceed 30 litres per nautical mile,</li> <li>⊙ the total quantity of oil discharged into the sea does not exceed 1/30,000 of the total quantity of the particular cargo of which the residue formed a part, for tankers delivered after 31 December 1979 (for tankers delivered before that date, the discharge must not exceed 1/15,000 of the total quantity of the cargo), and</li> <li>⊙ the tanker has in operation an Oil Discharge Monitoring and Control system and a slop tank arrangement.</li> </ul>

## MEANING OF CALCULATIONS – COMPUTING UNIT

### INSTANTANEOUS RATE OF DISCHARGE

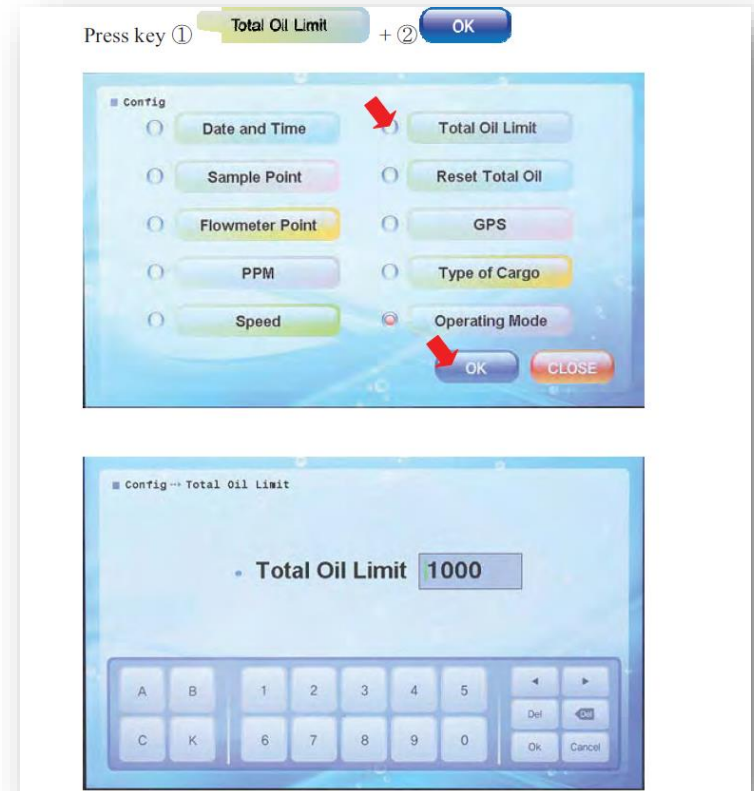
$$\text{OIL (LT/NM)} = \frac{\text{Oil Content (PPM)} \times \text{Flow Rate (m}^3\text{/HR)}}{\text{Speed (NM/HR)} \times 1000}$$



## MEANING OF CALCULATIONS – COMPUTING UNIT

**Total permissible volume of oil  
that can be discharged**

**1 m<sup>3</sup> of oil per 30.000 m<sup>3</sup> of cargo**



## ODME SPECIFICATIONS

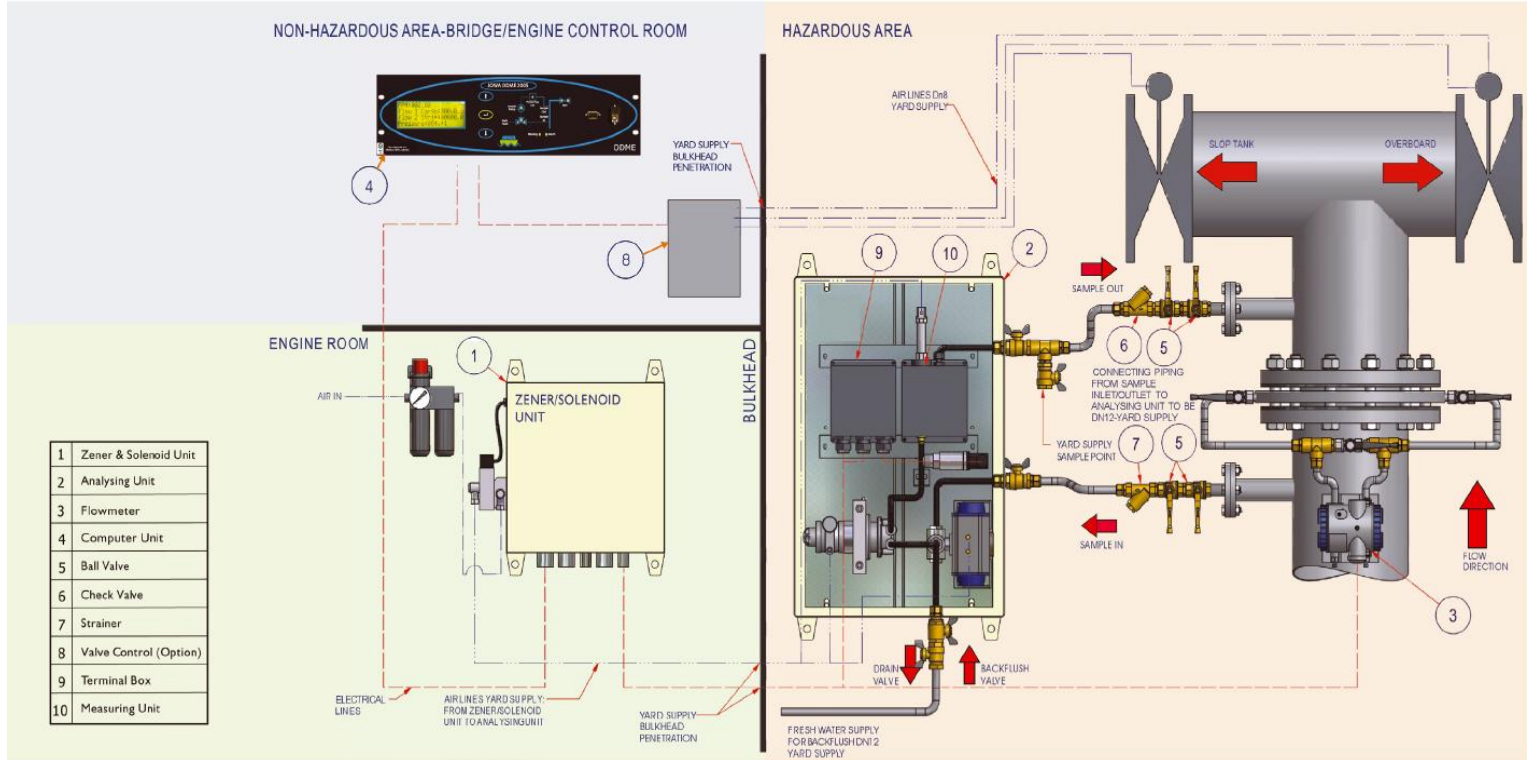
- **Ships of keel laying date on/after 1/1/2015**

ODME should be type approved according to **MEPC.108(49) “Revised Guidelines and Specifications for Oil Discharge Monitoring and Control Equipment”**

Components that should be type-approved apart from the whole unit:

- Oil Content Meter
- Computing Unit (receipt and processing of signals from flow, speed, etc.)
- Recording Device
- Alarms
- Control Section (valves opening/closing)
- Data Display

## ODME OPERATIONAL PRINCIPLE



## RECORDED DATA

- Ship's speed in knots
- Status of overboard discharge control
- Oil type selector setting (where applicable)
- Alarm condition failure (e.g. no flow, fault)
- Override action (e.g. manual, flushing, and calibration)



## RECORDED DATA

Any information inserted manually shall be identified on the printout as a manual input. Audio-visual alarms shall be activated by any of the following conditions:

- Instantaneous rate of discharge exceeds thirty (30) litres per n.
- Total quantity of oil discharged reaches one-thirty-thousandth (1/30,000) of previous cargo
- Power failure
- Loss of sample
- Significant failure of the measuring or recording system
- When input of any sensor exceeds the effective capacity of the system.

## DISCHARGING CARGO TANK BALLAST (HEAVY WEATHER BALLAST)

Discharge of dirty ballast through the ODME must always be performed under strict control of pumping and in compliance with Regulation 34 of Annex I of MARPOL. This equipment must never be by-passed.

Heavy Weather ballast can only be discharged when the discharge is being controlled by the ODME and subject to the provisions regarding slop handling.

The discharge of dirty ballast is prohibited within a “**Special Area**”, as per MARPOL Annex I.

## FAILURE OF THE ODME EQUIPMENT

The ODME shall be operational whenever there is any discharge of effluent into the sea, and that any discharge of oily mixture is stopped when the instantaneous rate of discharge of oil exceeds the permitted maximum level as required by Regulation 31 of MARPOL Annex I.

## Letter Codes - Explanations – Oil record book part II

### E. Ballasting of cargo tanks

18. Position of ship at start and end of ballasting

19. Ballasting process

- .1 identity of tank(s) ballasted;
- .2 time of start and end; and
- .3 quantity of ballast received. Indicate total quantity of ballast for each tank involved in operation, in m<sup>3</sup>.

## Letter Codes - Explanations – Oil record book part II

### **G. Cleaning of cargo tanks**

27. Identity of tank(s) cleaned.

28. Port or ship's position.

29. Duration of cleaning.

30. Method of cleaning.

31. Tank washings transferred to:

.1 reception facilities (state port and quantity, in m<sup>3</sup>) and

.2 slop tank(s) or cargo tank(s) designated as slop tank(s) (identify tank(s); state quantity transferred and total quantity, in m<sup>3</sup>).

## Letter Codes - Explanations – Oil record book part II

### **H. Discharge of dirty ballast**

32. Identity of tank(s).
33. Time and position of ship at start of discharge into the sea.
34. Time and position of ship on completion of discharge into the sea.
35. Quantity discharged into the sea, in m<sup>3</sup>.
36. Ship's speed(s) during discharge.
37. Was the discharge monitoring and control system in operation during the discharge?
38. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?
39. Quantity of oily water transferred to slop tank(s) (identify slop tank (s)). State total quantity, in m<sup>3</sup>.
40. Discharged to shore reception facilities (identify port and quantity involved, in m<sup>3</sup>)

## Letter Codes - Explanations – Oil record book part II

### I. Discharge of water from slop tanks into the sea

41. Identity of slop tanks.
42. Time of settling from last entry of residues, or
43. Time of settling from last discharge.
44. Time and position of ship at start of discharge.
45. Ullage of total contents at start of discharge.
46. Ullage of oil/water interface at start of discharge.
47. Bulk quantity discharged, in m<sup>3</sup> and rate of discharge, in m<sup>3</sup>/hour.
48. Final quantity discharged, in m<sup>3</sup> and rate of discharge, in m<sup>3</sup>/hour.
49. Time and position of ship on completion of discharge.
50. Was the discharge monitoring and control system in operation during the discharge?
51. Ullage of oil/ water interface on completion of discharge, in metres.
52. Ship's speed(s) during discharge.
53. Was regular check kept on the effluent and the surface of water in the locality of the discharge?
54. Confirm that all applicable valves in the ship's piping system have been closed on completion of discharge from the slop tanks.

## Letter Codes - Explanations – Oil record book part II

### **M. Condition of oil discharge monitoring and control system**

- 70. Time of system failure.
- 71. Time when system has been made operational.
- 72. Reasons for failure.

### **N. Accidental or other exceptional discharges of oil**

- 73. Time of occurrence.
- 74. Port or ship's position at time of occurrence.
- 75. Approximate quantity, in m<sup>3</sup>, and type of oil.
- 76. Circumstances of discharge or escape, the reasons therefore and general remarks.

### **O. Additional operational procedures and general remarks**



IOPPC

Certificate No.: 18265458-6067854-505 FORM B

### SUPPLEMENT TO THE INTERNATIONAL OIL POLLUTION PREVENTION CERTIFICATE (IOPP CERTIFICATE)

#### RECORD OF CONSTRUCTION AND EQUIPMENT FOR OIL TANKERS

In respect of the provisions of Annex I of the  
International Convention for the Prevention of Pollution from Ships, 1973, as modified by the  
Protocol of 1978 relating thereto (hereinafter referred to as "the Convention").

Notes:

- This form is to be used for the first two types of ships as categorized in the IOPP Certificate, i.e. "oil tankers" and "ships other than oil tankers with cargo tanks coming under regulation 2.2 of Annex I of the Convention." For the third type of ships as categorized in the IOPP Certificate, Form A shall be used.
- This record shall be permanently attached to the IOPP Certificate. The IOPP Certificate shall be available on board the ship at all times.
- If the language of the original Record is neither English nor French nor Spanish, the text shall include a translation into one of these languages.
- Entries in boxes shall be made by inserting either a cross ( x ) for the answer "yes" and "applicable" or a dash ( - ) for the answer "no" and "not applicable" as appropriate.
- Unless otherwise stated, regulations mentioned in this Record refer to regulations of Annex I of the Convention and resolutions refer to those adopted by the International Maritime Organization.

**1. Particulars of Ship**

1.1 Name of ship:	MINERVA ZENOBIA	
1.2 Distinctive Number or Letters:	12561 SVD42	
1.3 Port of Registry:	Piraeus	
1.4 Gross Tonnage:	63485	
1.5 Carrying Capacity of Ship:	134990.2	(m <sup>3</sup> )
1.6 Maximum Deadweight of Ship (Regulation 1.23):	114661 MT	(metric tons)
1.7 Length of Ship (Regulation 1.19):	242.241 m	(m)
1.8 Date of Build:		
1.8.1 Date of Building Contract:	30 June 2015	
1.8.2 Date on Which Keel was Laid or Ship was at Similar Stage of Construction:	18 December 2015	
1.8.3 Date of Delivery:	28 June 2018	
1.9 Major Conversion (if applicable)		
1.9.1 Date of Conversion Contract:	N/A	
1.9.2 Date on which Conversion Was Commenced:	N/A	
1.9.3 Date of Completion of Conversion:	N/A	
1.10 Unforeseen Delay in Delivery:		
1.10.1 The ship has been accepted by the Administration as a "ship delivered on or before 31 December 1979" under regulation 1.28.1 due to unforeseen delay in delivery		<input type="checkbox"/>
1.10.2 The ship has been accepted by the Administration as an "oil tanker delivered on or before 1 June 1982" under regulation 1.28.3 due to unforeseen delay in delivery		<input type="checkbox"/>
1.10.3 The ship is not required to comply with the provisions of regulation 26 due to unforeseen delay in delivery		<input type="checkbox"/>

IOPPC B REV 104.02 Page 1 of 8

Certificate No.: 18265458-6067854-505 FORM B

1.11 Type of Ship:

1.11.1 Crude oil tanker	<input type="checkbox"/>
1.11.2 Product carrier	<input type="checkbox"/>
1.11.3 Product carrier not carrying fuel oil or heavy diesel oil as referred to in regulation 20.2, or lubricating oil.	<input type="checkbox"/>
1.11.4 Crude oil/product carrier	<input checked="" type="checkbox"/>
1.11.5 Combination carrier	<input type="checkbox"/>
1.11.6 Ship, other than oil tanker, with cargo tanks coming under regulation 2.2 of Annex I of the Convention	<input type="checkbox"/>
1.11.7 Oil tanker dedicated to the carriage of products referred to in regulation 2.4	<input type="checkbox"/>

**2. Equipment for the Control of Oil Discharge from Machinery Space Bilges and Oil Fuel Tanks (Regulations 16 and 14)**

2.1 Carriage of ballast water in oil fuel tanks:

2.1.1 The ship may, under normal conditions, carry ballast water in oil fuel tanks

2.2 Type of oil filtering equipment fitted:

2.2.1 Oil filtering (15 ppm) equipment (regulation 14.6)

2.2.2 Oil filtering (15 ppm) equipment with alarm and automatic stopping device (regulation 14.7)

2.3 Approval standards:<sup>1</sup>

2.3.1 The separating /filtering equipment:

.1 has been approved in accordance with resolution A.393(X);	<input type="checkbox"/>
.2 has been approved in accordance with resolution MEPC.60(33);	<input type="checkbox"/>
.3 has been approved in accordance with resolution MEPC.107(49);	<input checked="" type="checkbox"/>
.4 has been approved in accordance with resolution A.233(VII);	<input type="checkbox"/>
.5 has been approved in accordance with national standards not based upon resolution A.393(X) or A.233(VII);	<input type="checkbox"/>
.6 has not been approved.	<input type="checkbox"/>

2.3.2 The process unit has been approved in accordance with resolution A.444(X)

2.3.3 The oil content meter:

.1 has been approved in accordance with resolution A.393(X)	<input type="checkbox"/>
.2 has been approved in accordance with resolution MEPC.60(33)	<input type="checkbox"/>
.3 has been approved in accordance with resolution MEPC.107(49)	<input checked="" type="checkbox"/>

2.4 Maximum throughput of the system is: 5.0 m<sup>3</sup>/h

2.5 Waiver of regulation 14:

2.5.1 The requirements of regulation 14.1 or 14.2 are waived in respect of the ship in accordance with regulation 14.5. The ship is engaged exclusively on voyages within special areas(s).

<sup>1</sup> Refer to Recommendation on international performance and test specifications of oil-water separating equipment and oil content meters adopted by the Organization on 14 November 1977 by resolution A.393(X), which superseded resolution A.233(VII). Further reference is made to the Guidelines and specifications for pollution prevention equipment for machinery space bilges adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33), which, effective on 6 July 1983, incorporated resolutions A.393(X) and A.444(X), the 2011 Guidelines and specifications for oil-on equipment for separating resolution MEPC.60(33), compliance of filtering equipment, adopted by resolution MEPC.20(22), and the revised Guidelines and specifications for pollution prevention equipment for machinery spaces of ships adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.107(49), which, effective from 1 January 2005, superseded resolutions MEPC.60(33), A.393(X) and A.444(X).

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## Operational discharges of oil from machinery spaces

### Oily bilge definition:

Oily bilge water can be handled in two ways:

- Collection in the holding tank and subsequent discharge to shore facilities through the standard connection. Collection and discharge is carried out by a designated bilge pump or by an independent pump used exclusively for that purpose.
- Discharge at sea using the OWS. The supply of equipment is carried out using its integral pump. The suction of this pump is connected directly to the bilge lines or the holding tank.



## Operational discharges of oil from machinery spaces

Any discharge into the sea of bilge water from a ship shall be prohibited while within or without a special area except when **ALL** following conditions are satisfied:

- The ship is proceeding en route.
- The oil content of the effluent without dilution does not exceed fifteen parts per million (15 ppm).
- The ship has, in operation, oil filtering equipment complying with Regulations 14.7 of Annex I of MARPOL.
- The filtering system is equipped with a stopping device, which will ensure that the discharge is automatically stopped when the oil content of the effluent exceeds fifteen parts per million (15 ppm).
- The bilge water does not originate from cargo pump room bilge.
- The bilge water is not mixed with oily cargo residues

## Operational discharges of oil from machinery spaces

Discharge of oil from machinery spaces	
<p>Discharge of oil bilge water at sea from the machinery spaces is allowed provided that:</p>	<ul style="list-style-type: none"> <li>▪ the ship is proceeding en route, and</li> <li>▪ the ship has in operation an oil filtering equipment with arrangements for an alarm and for automatically stopping any discharge of oily mixture when the oil content in the effluent exceeds 15 ppm, and</li> <li>▪ oil in the effluent without dilution does not exceed 15 ppm, and</li> <li>▪ bilge water is not mixed with any oil cargo residues or cargo pump room bilges (on oil tankers).</li> </ul>



***En Route*** means that the vessel proceeds to its intended destination, self-propelled and at a minimum speed capable in producing wake.

## Effective Operation of the OWSE

- Vessel operators must not add substances that drain to the bilge water that are not produced in the normal operation of the vessel.
- Operation of the OWS should be permitted only during the daylight normal working hours. The starting and shut down operations of the OWS shall be under the direct supervision of the Chief Engineer or the 2<sup>nd</sup> Engineer (if authorized by the C/E).
- In the event of a high 15 ppm Oil Content Monitoring (OCM) alarm, the Chief Engineer and / or the 2<sup>nd</sup> Engineer are to attend to the OWS until alarm has been cleared or the OWS shut down.
- Bilge overboard discharge valve must always be padlocked and shall not be opened/used without permission from the Chief Engineer. Relevant notice must be posted in a nearby location. The OWS Operation Checklist should be used prior to operating the OWS, during start-up operation, and after completion of the OWS operation, and the checklist should be in the Engine Room Log Book.

## Effective Operation of the OWSE

To ensure that the OWS system is functioning properly, checks or tests shall be carried out at regular intervals in order to verify the proper operation according to the PMS.

- The correct running of pump, absence of leakage in the piping system, and correct functioning of controlled valves
- That the simulation test of the oil content monitoring (OCM) equipment has been performed satisfactorily
- That the fifteen parts per million (15 ppm) alarm activates the three-way valve and/or stops the pump
- When the system is turned off, the overboard discharge valve is padlocked properly and the key retained by the Chief Engineer

## Effective Operation of the OWSE

### **Any Oil Content Monitor (OCM), approved by the MEPC 107(49):**

- should record date, time and alarm status, and operating status of the OWS.
- the recording device (e.g. memory card) should also store data for at least eighteen (18) months and should be able to display or print a protocol for official inspections as required.
- a bilge alarm must be activated when clean water is used for cleaning or calibration of the unit.



## Effective Operation of the OWSE

1. OWS Type Approval Certificate
2. OWS 15ppm automatic stopping device manual and certification (Good operation)
3. OWS, the rated treatment capacity (m<sup>3</sup>/hour) must be well known and displayed.
4. The discharge/overboard valves must be sealed.
5. OWS, spare filters always must be available on board.
6. The 15 ppm equipment every year must be calibrated and provided with certification
7. In general the appearance of OWS must be excellent (PSC inspection)

## Effective Operation of the OWSE

8. The OWS must be in good order, free of any unauthorized modification and the engineers must be well familiar with its operation and data recovery procedures.
9. All Engineer Officers must be familiar with the 15 ppm TEST.
10. The maintenance of OWS or any equipment related to that must be recorded PMS or to engine log book.
11. On bridge console must have stop button of OWS.  
The bridge must authorize the operation of OWS.





# MARPOL ANNEX IV

Prevention of Sewage Pollution from Ships  
(entered into force 19 May 2005)

## Definitions

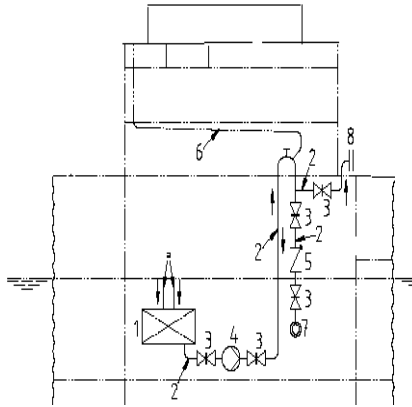
The term “**sewage**” refers to:

- a) Drainage and other wastes from any form of toilets, urinals.
- b) Drainage from medical premises (e.g. dispensary, sick bay, etc.) via washbasins, wash tubs and scuppers located in such premises.
- c) Other wastewaters when mixed with the drainage defined above but not controlled by other MARPOL Annexes.

The term “**greywater**” refers to:

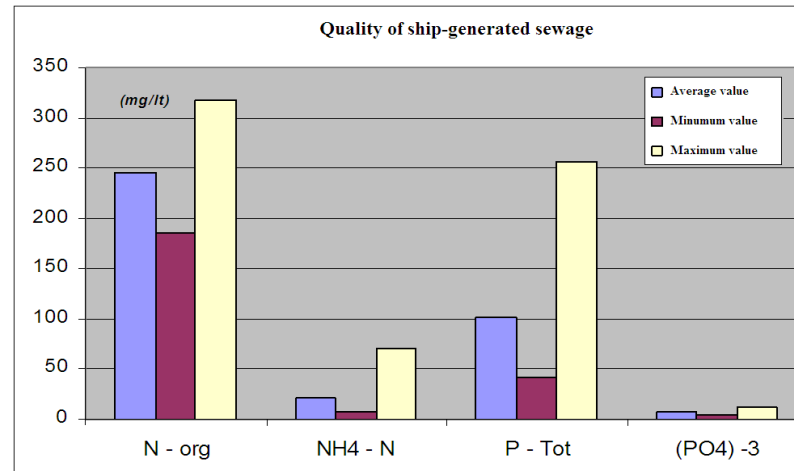
Other waste water, such as from kitchen, bathroom (not the toilet), and laundry cycles.

## Sewage Quantity and Quality



1. Holding tank
2. Discharge piping
3. Isolation valve
4. Sewage pump
5. Non return valve
6. Venting line
7. Discharge outlet
8. Shore connection to Reception Facilities

Type of vessel	Quantity of sewage per person and day (liters)			
	Conventional flushing system		With vacuum system	
	Sewage	Sewage and grey waters	Sewage	Sewage and grey waters
Passenger ship	70	230	25	185
Other than passenger ship	70	180	25	135



Discharge of sewage at sea			
Level of treatment	> 12 n. miles	3 – 12 n. miles	< 3 n. miles
Comminuted and disinfected sewage	Allowed	Allowed	Prohibited
Treated sewage through an approved treatment plant	Allowed	Allowed	Allowed
Sewage stored in holding tanks	Allowed	Prohibited	Prohibited

## Permissible discharges at sea



## Permissible Discharges of Sewage

Subject to national or local regulations, according to Regulation 11 of the Annex IV of MARPOL, the discharge of sewage into the sea is permitted when:

- The ship is discharging **comminuted and disinfected sewage** using approved system at a distance of more than three (3) nautical miles from the nearest land.
- The ship is discharging sewage **which is not comminuted or disinfected** at a distance of more than twelve (12) nautical miles from the nearest land, provided that the sewage shall not be discharged instantaneously but at a moderate rate while the ship is en route and proceeding at not less than four (4) knots.
- The ship has in operation an **approved sewage treatment plant** satisfying the requirements of the IMO of the IMO resolution MEPC.2 (VI) or MEPC.159 (55) (for a ship on or after 1 January 2010) or Flag State requirements regarding effluent standards.

## Permissible Discharges of Sewage

The maximum permissible discharge rate for untreated sewage is 1/200,000 (or one 200,000th part) of swept volume, calculated as per the following formula:

$$DR_{\max} = 0.00926 VDB,$$

where:

DR<sub>max</sub> is maximum permissible discharge rate (m<sup>3</sup>/h)

V is ship's average speed (knots) over the period

D is Draft (m)

B is Breadth (m)

The maximum permissible discharge rate specified above refers to the average rate as calculated over any 24-hour period, or the period of discharge if that is less, and may be exceeded by no more than 20% when measured on an hourly basis.



## Permissible Discharges of Sewage

SPEED (kt)	4	6	8	10	12
DRAFT (m)					
5	4.63	6.94	9.26	11.57	13.89
6	5.56	8.33	11.11	13.89	16.67
7	6.48	9.72	12.96	16.20	19.45
8	7.41	11.11	14.82	18.52	22.22
9	8.33	12.50	16.67	20.83	25.00





# MARPOL ANNEX VI

Prevention of Air Pollution from Ships (entered into force 19 May 2005)

## Sulphur oxides (SOx)

### Maximum sulphur content (% per weight)

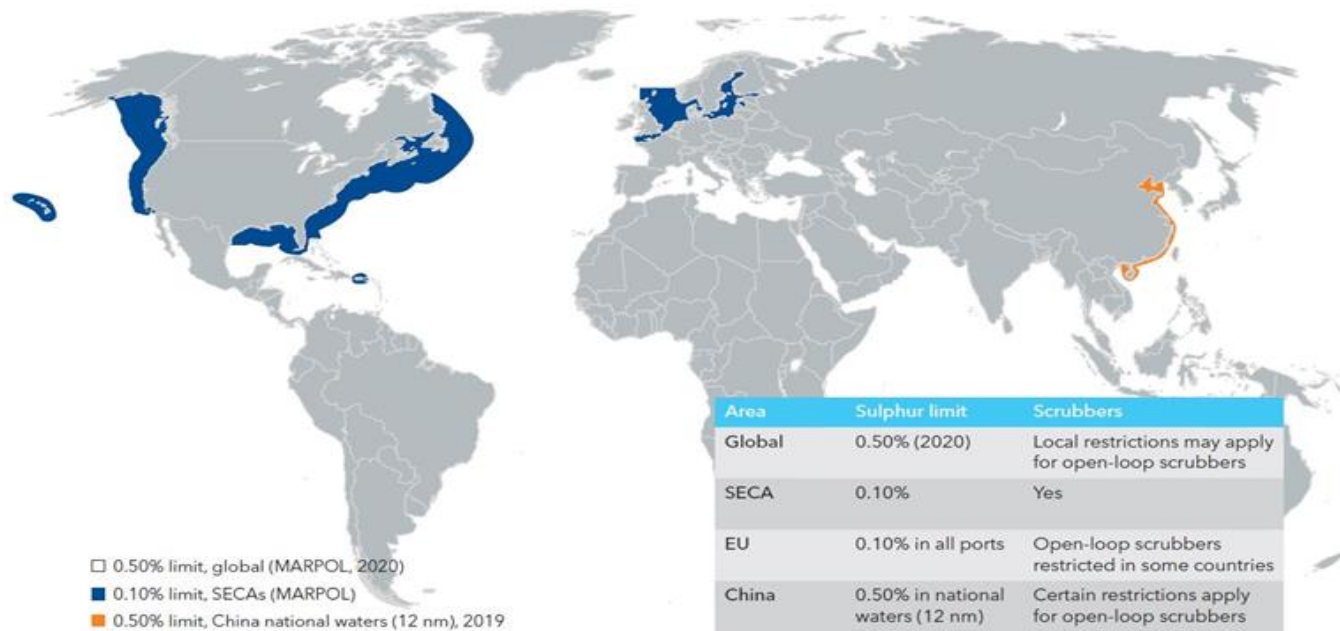
Globally

- 4,5% before 1 January 2012
- 3,5% after 1 January 2012
- **0,5% after 1 January 2020**



## Sulphur oxides (SOx)

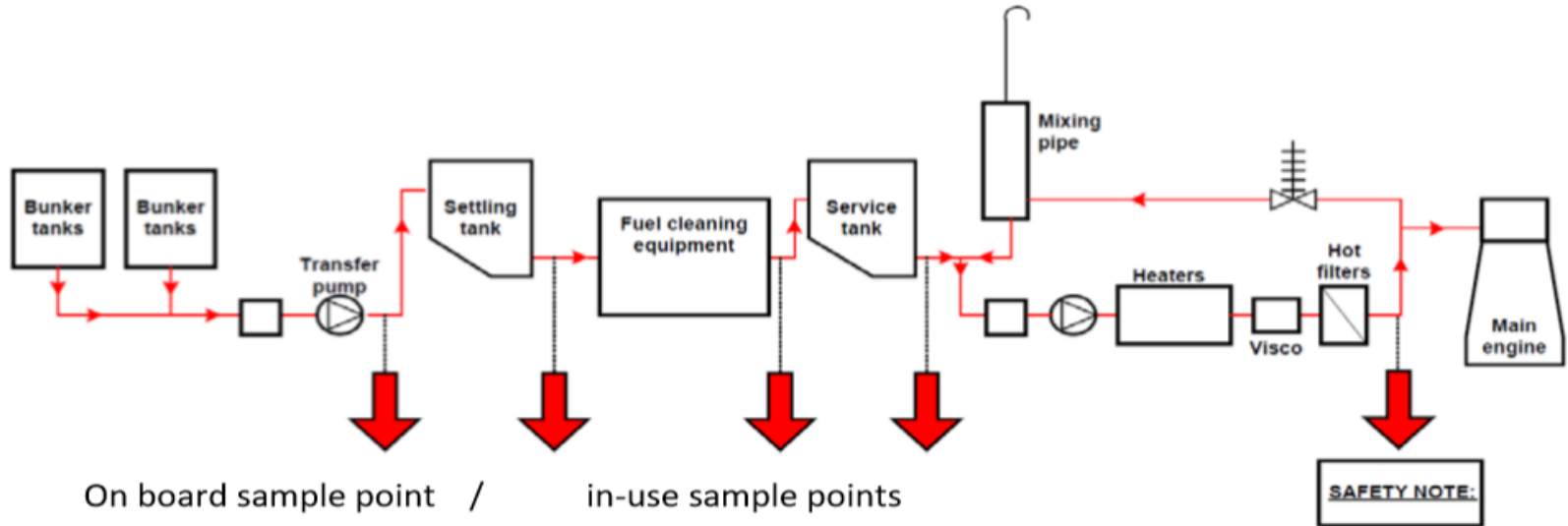
- 0,1% since 1 January 2015



## Sulphur oxides (SO<sub>x</sub>)

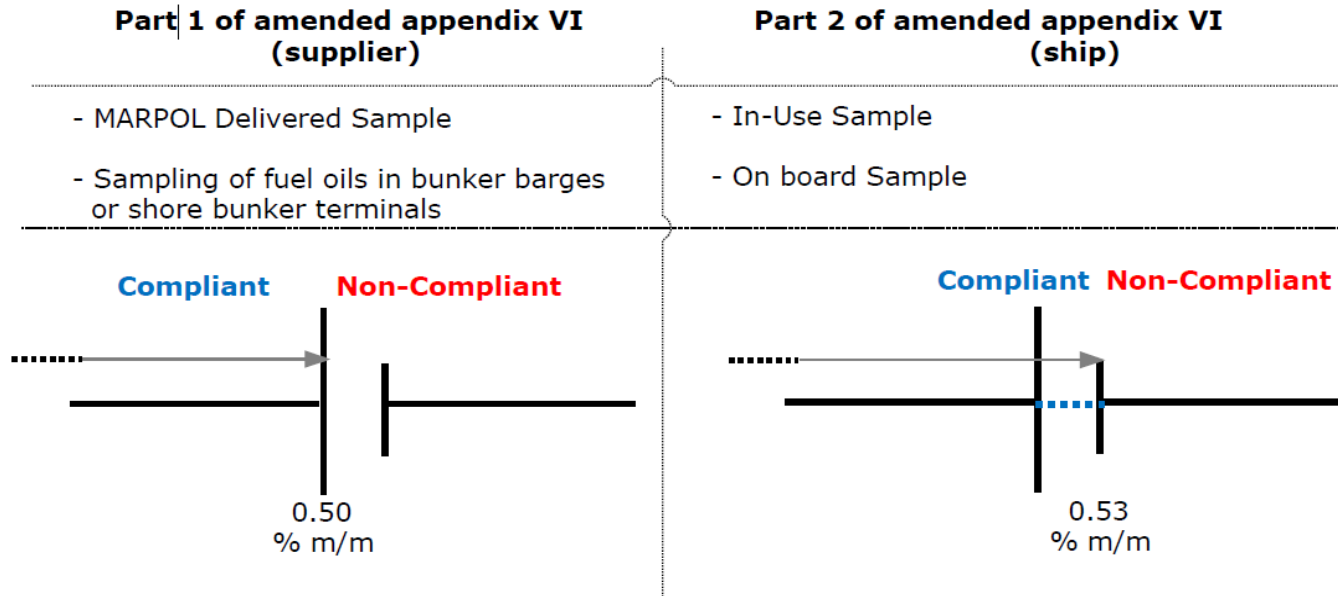
1. Ban on the carriage of non-compliant fuel as a fuel – adopted MEPC 73 ( 01 March 2020)
2. Reg 2 Defining: sulphur content of fuel oil; Low-flash point fuel: “MARPOL delivered sample”, “in-use sample” and “on board sample”.
3. Reg 14 on “in-use” and on “board sampling and testing”
4. Reg 14 – in use sampling point – fitted or designated for representative samples
5. Appendix I - ‘fuel oil sampling point’ to be stated as being fitted on IAPP Cert.
6. Appendix VI [fuel verification procedure](#) for Annex VI fuel oil samples (Reg 14 and 18)

## Sulphur oxides (SOx)



(Figure 4. Source: CIMAC Recommendation No.25, Fig.8.4<sup>10</sup>)

## Sulphur oxides (SOx)





## Sulphur oxides (SOx)

### Prevention Measures

#### Bunker Delivery Note (BDN)

- Retention for at least 3 years
- Must contain information:
  - ✓ Name - Ship IMO number
  - ✓ Bunkering Port
  - ✓ Date of bunkering
  - ✓ Supplier's contacts
  - ✓ Name of product
  - ✓ Quantity (in metric tones)
  - ✓ Density to 15° C
  - ✓ Sulfur content (% per weight)
  - ✓ Supplier's statement about the sulfur content in fuel, that do not contain inorganic acids and other substances which might put at risk the safety of the ship.



## FUEL OIL CHANGE OVER PROCEDURES

1. Fuel oil change over in 2020. Company policy for 2 Fuel Oil Service Tanks and 2 FO Settling tanks.
2. Company policy to manage max. 3 different types of F.oil.  
Vessel with Scrubber → 3.5max% H.F.O, 0.5% V.L.S.F.O, 0.1% U.L.S.M.G.O  
Vessels without Scrubber → 0.5% V.L.S.F.O, 0.1% U.L.S.F.O, 0.1% U.L.S.M.G.O
3. Proper selection of change over Forms from the Fuel Oil Management Plan.
4. Use of Change Over Calculator (FOBAS).

## FUEL OIL CHANGE OVER PROCEDURES

FOBAS\_Change\_over\_calculator\_v6\_1\_ - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Clipboard Clipboard Font Alignment Number Styles Cells Editing

D85 0,1

A B C D E F G H I J K L M N O P Q R S T

Working together for a safer world

### FOBAS Change-Over Calculator (Service System - Main Engine)

Version 6

Calculations are based on the assumption that the following setup is being used

At start of change over:

Rate of fuel consumption (engines)	1.50	t/hr
Service system - fuel oil quantity (as marked in red on diagram opposite - includes all in-line components: booster pump, heater shaft, filter plus return / spill line and mixing column)	1.20	t

HSFO sulphur content: 2.50 %/m

LSFO sulphur content: LSFO 0.012 %/m

Required sulphur content at engine inlet (i.e. ECA-SOX limit): 0.100 %/m

Change-over time to achieve required fuel oil sulphur value at engine inlet: 2.60 hr

Notes:

- Minimum value for service system (incl. mixing tank): 0.1 tonne
- Maximum calculated change over time: 200 hrs
- Change over time given in increments of 0.10 hrs (6 minutes) and has a minimum changeover time of 0.30 hours (18 minutes)
- Service system - fuel oil quantity (t): Sum of internal volumes of component units and pipes (litres) x fuel oil density (kg/l) / 1000
- Volume of 1 metre tube / piping: Bore 10 cm - 8 litres, 15 cm - 18 litres, 20 cm - 31 litres, 30 cm - 71 litres

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Guidance Notes FOBAS Calculator Summary

## FUEL OIL CHANGE OVER PROCEDURES

5. When calculate the time which is necessary for the change over with the help of FOBAS change over Calculator we are in close contact with the Bridge regarding the time Entering the ECA(s).
6. Same time of Change over for Engine Log Book and Bridge Log Book.
7. Flushing all necessary piping (Transfer Pumps/Purifier Lines) reduce engine speed etc. and we perform the Change over.

## FUEL OIL CHANGE OVER PROCEDURES

8. We perform the change over always allowing more time from the one which calculated from the FOBAS Program.(i.e FOBAS mentions 7.2 Hrs we perform the change over 8 hrs before enter the ECA.)
9. After the end of change-over, we complete the respective forms and we make an entry in Engine Log Book.(Time Start/Complete change over, time entering the ECA. Also we inform bridge for the time of change over.)
10. Entry in the Engine Log Book.(Operational Problems-EU Ports)

## FUEL OIL CHANGE OVER PROCEDURES

- i. During normal operation, a small amount of fuel leaks through the main engine fuel pumps. This is clean fuel which, traditionally, is lead back to the HFO settling tank. As the new SECA rules will enforce more operation time on distillates or ULSFO, we recommend that the drain system is updated to either of the options below.
  - a. Two overflow tanks. One tank with piping leading to the HFO settling tank and one tank with piping leading to the distillate or ULSFO tank.
  - b. Installing an extra line from the overflow tank. The overflow tank will have piping both to the HFO settling tank and to the distillate or ULSFO tank. The overflow tank has to be emptied before switching to a different fuel.
- ii. Prior to change over procedure there are specific thermal & flow rules in order to prevent thermal shock of fuel equipment (fuel pump, suction v/v, fuel valve) & piping. Distillate fuel (MGO) must not be on a viscosity less than 2cSt. Residual fuel (HFO) must not be on a viscosity higher than 20cSt (temperature reduction prior to change over to be based on viscosity max 20cSt). This (20cSt) is to prevent excess load (even for short periods) to the fuel roller guides & cams. Temperature reduction shall be under the rule of thumb of 2°C/min. MAN Diesel & Turbo considers viscosity limits as the primary rule during change over. There is no limitation regarding the temperature difference between HFO & MGO at the time of change over. This will be compensated by the 25-40% load during change over. This load limitation is in order fuel consumption of the main engine to be rather low, meaning that fuel will keep recirculating in the FO system and only a small amount of MGO is going to be added.

# metavasea

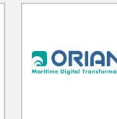
People-centred transition for Maritime  
Decarbonization in the East Mediterranean



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with the  
support of



associate partners

# thank you