Ministerie van Infrastructuur en Milieu

Ballastwater verdrag De IMO afspraken

Dick Brus

Ministerie van Infrastructuur en Milieu

Platform Scheepsemissies

27 januari 2012

Ballastwaterverdrag

- Ballastwaterverdrag is in 2004 bij de IMO tot stand gekomen
- Op 10 mei 2010 is Nederland partij geworden bij het verdrag
- Verdrag is nog niet in werking, gebeurd met 30 landen met vloot van minstens 35% van het wereld brutotonnage
- Nu hebben 30 landen het verdrag geratificeerd, met 26% van tonnage
- Veel landen zijn druk bezig ratificering voor te bereiden


THE MINISTER
OF FOREIGN AFFAIRS
OF THE KINGDOM OF THE
NETHERLANDS,

Wanneer hoef je wel/niet aan verdrag te voldoen?

- Wel voor alle schepen onder vlag partij en alle schepen die havens partij aandoen
- Schip is drijvend voertuig, ongeacht type, inclusief afzinkbare vaartuigen, vaartuigen in drijvende toestand, drijvende platforms, FSUs en FPSO’s
- Niet schepen die alleen varen in eigen wateren (tenzij partij anders bepaalt)
- Niet schepen die alleen varen in eigen wateren en op volle zee

Het probleem

- Introductie schadelijke inheemse organismen voorkomen
- Jaarlijks wordt tussen de 3 en 4 duizend miljoen ton onbehandeld ballastwater in havens en kustgebieden geloosd
- Dagelijks worden meer dan 10 duizend mariene soorten getransporteerd en geïntroduceerd in een uitheemse omgeving


Ten of the Most Unwanted
Marine plants, animals and microbes are being carried around the world attached to the hulls of ships and in ships' ballast water.
When discharged into new environments, they may become invaders and seriously disrupt the native ecology and economy.
Introduced pathogens may cause diseases and death in humans.
Cholera
Vibrio cholerae (various strains)
Native to: Various strains with broad ranges.
Introduced to: South America, Gulf of Mexico and other areas.
Impacts: Some cholera epidemics appear to be directly associated with ballast water. One example is an epidemic that began simultaneously at three separate ports in Peru in 1991, sweeping across South America, affecting more than a million people and killing more than ten thousand by 1994. This strain had previously been reported only in Bangladesh.
North American Comb Jelly
Mnemiopsis leidyi
Native to: Eastern Seaboard of the Americas
Introduced to: Black, Azov and Caspian Seas
Impacts: Reproduces rapidly (self fertilising hermaphrodite) under favourable conditions. Feeds excessively on zooplankton. Depletes zooplankton stocks; altering food web and ecosystem function. Contributed significantly to collapse of Black and Azov Sea fisheries in 1990s, with massive economic and social impact. Now threatens similar impact in Caspian Sea.
Some of the areas these species have been introduced to.
Cladoceran Water Flea
Cercopagis pengoi
Native to: Black and Caspian Seas
Introduced to: Baltic Sea
Impacts: Reproduces to form very large populations that dominate the zooplankton community and clog fishing nets and trawls, with associated economic impacts.
North Pacific Seastar
Asterias amurensis
Native to: Northern Pacific
Introduced to: Southern Australia
Impacts: Reproduces in large numbers, reaching 'plague' proportions rapidly in invaded environments. Feeds on shellfish, including commercially valuable scallop, oyster and clam species.
Mitten Crab
Eriocheir sinensis
Native to: Northern Asia
Introduced to: Western Europe, Baltic Sea and West Coast North America
Impacts: Undergoes mass migrations for reproductive purposes. Burrows into river banks and dykes causing erosion and siltation. Preys on native fish and invertebrate species, causing local extinctions during population outbreaks. Interferes with fishing activities.
Zebra Mussel
Dreissena polymorpha
Native to: Eastern Europe (Black Sea)
Introduced to: Western and northern Europe, including Ireland and Baltic Sea; eastern half of North America
Impacts: Fouls all available hard surfaces in mass numbers. Displaces native aquatic life. Alters habitat, ecosystem and food web. Causes severe fouling problems on infrastructure and vessels. Blocks water intake pipes, sluices and irrigation ditches. Economic costs to USA alone of around US$750 million to $1 billion between 1986 and 2000.
Toxic Algae (Red/Brown/Green Tides)
Various species
Native to: Various species with broad ranges.
Introduced to: Several species have been transferred to new areas in ships' ballast water.
Impacts: May form Harmful Algae Blooms. Depending on the species, can cause massive kills of marine life through oxygen depletion, release of toxins and/or mucus. Can foul beaches and impact on tourism and recreation. Some species may contaminate filter-feeding shellfish and cause fisheries to be closed. Consumption of contaminated shellfish by humans may cause severe illness and death.
Asian Kelp
Undaria pinnatifida
Native to: Northern Asia
Introduced to: Southern Australia, New Zealand, West Coast of USA, Europe and Argentina
Impacts: Grows and spreads rapidly, both vegetatively and through dispersal of spores. Displaces native algae and marine life. Alters habitat, ecosystem and food web. May affect commercial shellfish stocks through space competition and alteration of habitat.
Round Goby
Neogobius melanostomus
Native to: Black, Azov and Caspian Seas
Introduced to: Baltic Sea and North America
Impacts: Highly adaptable and invasive. Increases in numbers and spreads quickly. Competes for food and habitat with native fishes including commercially important species, and preys on their eggs and young. Spawns multiple times per season and survives in poor water quality.
European Green Crab
Carcinus maenas
Native to: European Atlantic Coast
Introduced to: Southern Australia, South Africa, USA and Japan
Impacts: Highly adaptable and invasive. Resistant to predation due to hard shell. Competes with and displaces native crabs and becomes a dominant species in invaded areas. Consumes and depletes wide range of prey species. Alters inter-tidal rocky shore ecosystem.
Further Information:
The species presented here are for illustrative purposes only. Their introduced ranges may be greater than depicted. There are numerous other examples of serious marine bio-invasions around the world.
undp

Wisselen of behandelen

- Ballastwater wisselen
- Alleen wisselen 200 zeemijl van land in water tenminste 200 m diep
- Als dat niet kan, zo ver mogelijk uit de kust, maar tenminste 50 zeemijl van land en tenminste 200 m diep
- Noordzee landen zijn in onderzoek of in de Noordzee meer gebieden als wisselwatergebieden kunnen worden aangewezen
- Bij ballastwater wisseling moet tenminste 95% van het ballastwater worden gewisseld
- Als elke ballastwatertank drie maal wordt in en uit gepompt wordt geacht hieraan te hebben voldaan

Ballastwater behandelen

Bouw schip	Ballastwatercapaciteit m^3	behandelen verplicht
Voor 2009	< 1500	2016
	1500-5000	2014
	> 5000	2016
In of na 2009	< 5000	2009
Van 2009 tot 2012 *)	> 5000	2016
In of na 2012	> 5000	2012

*) Schip uit 2009 hoeft pas 31 dec 2011 te voldoen

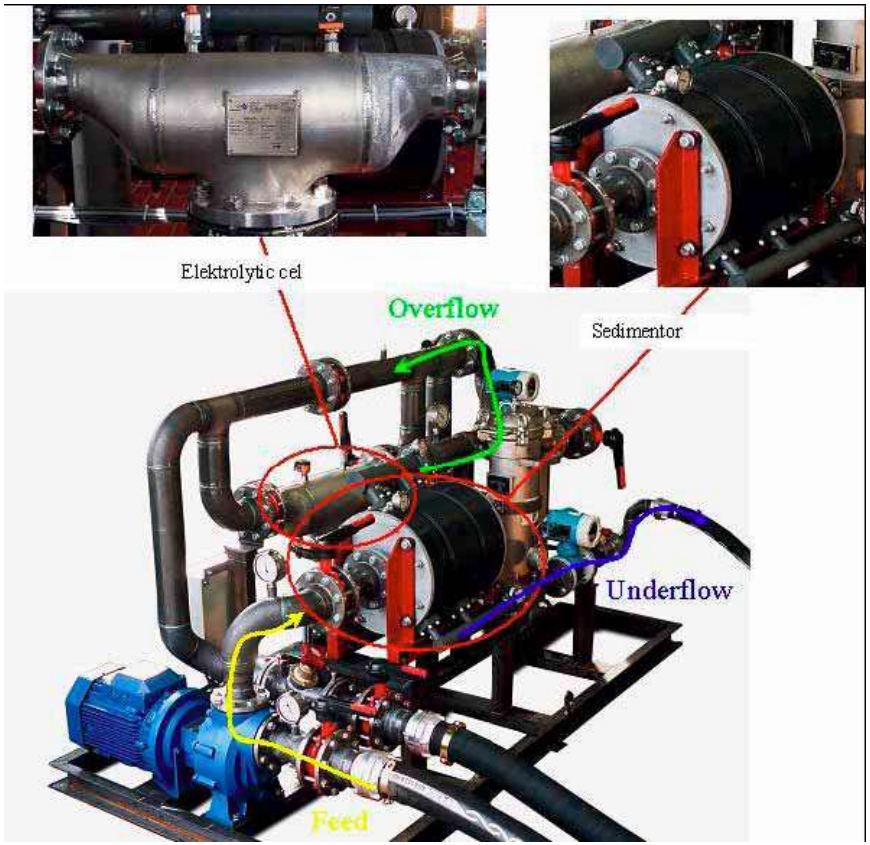
Ballastwater behandelen

- Een schip dient uiterlijk op de datum van de eerste tussentijdse inspectie of herkeuring (welke het eerste is), na de verjaardag van de oplevering van het schip, een ballastwater behandelingssysteem operationeel te hebben

Ballastwater behandelen, voorbeeld

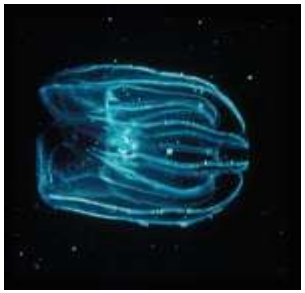
- bouw schip, kiellegging is in 2006
- opleverdatum 1 juni 2008
- ballastwatercapaciteit 3000 m^3
- tabel: schip is gebouwd voor 2009, capaciteit tussen de 1500 en 5000 m^3
- tabel: behandelen verplicht vanaf 2014
- verjaardag opleverdatum is 1 juni 2014
- schip moet uiterlijk na de eerstvolgende tussentijdse inspectie of herkeuring (welke het eerste is) ballastwater behandeling gaan toepassen

Ballastwater behandelingssystemen



- Ballastwater behandeling systemen moeten veilig zijn voor schip en bemanning
- Geloosd ballastwater moet aan normen voor behandeling van ballastwater voldoen
- Systemen die gebruik maken van actieve stoffen/biociden moeten extra worden gekeurd door de IMO (basic en final approval)
- Ballastwater behandeling systemen moeten worden goedgekeurd door land waaraan producent systeem voordraagt (type approval)
- In januari 2012 zijn 19 systemen goedgekeurd (final approval)
- Ruim 20 systemen zijn aangemeld en in procedure

Normen voor de behandeling van ballastwater



- Schepen lozen minder dan
  - 10 organismen groter dan 50 micron per kubieke meter
  - 10 organismen tussen 10 en 50 micron per milliliter
  - Concentraties indicatiemicroben schadelijk voor de gezondheid van de mens (bv cholera)

Ballastwaterbeheerplan en ballastwaterbeheer certificaat

- Alle schepen, ongeacht methode van ballastwaterbeheer, moeten beschikken over goedgekeurd ballastwaterbeheersplan
- In ballastwater beheersplan moeten procedures ballastwater beheer staan, veiligheidsprocedures en aanwijzing officieren die verantwoordelijk zijn voor implementatie plan
- Schepen met een bruto tonnage van 400 ton of meer moeten een ballastwater beheer certificaat hebben
- Dit certificaat wordt afgegeven als bij inspectie blijkt dat het schip voldoet aan eisen in Ballastwaterverdrag
- Na afgifte certificaat wordt een jaarlijkse, tussentijdse en na 5 jaar een volledige herkeuring uitgevoerd

Havenontvangstvoorzieningen

- Verdrag noemt haven ontvangstvoorzieningen voor ballastwater en sedimenten
- Verdrag legt geen verplichting op om deze ontvangstvoorzieningen te hebben
- Zijn die ontvangstvoorzieningen er wel dan moeten ze voldoen aan veiligheidsvoorschriften uit het verdrag

Veelvoorkomende vragen 1

Vraag: valt drinkwater/proceswater/zoetwater/drijfwater/hopper water onder verdrag en moet het behandeld worden?
Antwoord: definitie ballastwater in het verdrag: "water met daarin zwevende deeltjes dat aan boord genomen wordt teneinde de trim, helling, diepgang, stabiliteit van of krachtens op het schip te beheersen en dat schadelijke aquatische organismen en ziektekiemen als bedoeld in het Ballastwaterverdrag kan bevatten. Dus bovengenoemde meestal niet.

Vraag: Ik neem ballastwater in en loos het in dezelfde haven (bijvoorbeeld bij heavy lift operaties), dat is niet schadelijk voor milieu. Moet ik dat ballastwater behandelen?
Antwoord: IVW kan, mits zulks geen gevaar voor milieu geeft, vrijstelling verlenen (artikel 35 WVVS). Dan moet u wel aantonen dat het geen gevaar is voor het milieu, bv dat alle geloosd ballastwater uit de haven zelf afkomstig is, en dat dat ballastwater in schone tanks is opgenomen waarin geen organismen uit andere wateren meer zitten.

Veelvoorkomende vragen 2

Vraag: ik moet door noodgeval ballastwater lozen dat niet is behandeld. Mag dat?
Antwoord: veiligheid gaat voor alles. Verdrag: vereisten zijn niet van toepassing op het innemen of lozen van ballastwater en sedimenten ten behoeve van de waarborging van de veiligheid van een schip in noodsituaties of voor het redden van mensenlevens op zee.

Vraag: moet ik een ballastwater behandelingssysteem op mijn schip hebben?
Antwoord: Nee: als u ballastwater loost moet het voldoen aan de norm van het aantal toegestane organismen. Als u geen ballastwater in zee loost, of u geeft uw ballastwater af aan land, of u laat het door een mobiele behandelingsinstallatie Behandelen, hoeft u geen behandelingsinstallatie te hebben.

KVNR KONINKLIJKE VERENIGING VAN NEDERLANDSE REDERS

Niels van de Minkelis

Staff Member Technical & Environmental Affairs

Royal Association of Netherlands Shipowners

Where do we stand?

The ratification process

Status of the 2004 BWM Convention (as at 16 November 2011)

- Conditions of entry into force: 30 States, 35% of the world's tonnage
- Countries that ratified: 30
- Percentage of world's tonnage: 26.44%

State	Deposit Date	State	Deposit Date
Albania	15 January 2009	Marshall Islands	26 November 2009
Antigua and Barbuda	19 December 2008	Mexico	18 March 2008
Barbados	11 May 2007	Mongolia	28 September 2011
Brazil	14 April 2010	Netherlands	10 May 2010
Canada	8 April 2010	Nigeria	13 October 2005
Cook Islands	2 February 2010	Norway	29 March 2007
Croatia	29 June 2010	Palau	28 September 2011
Egypt	18 May 2007	Republic of Korea	10 December 2009
France	24 September 2008	Saint Kitts and Nevis	30 August 2005
Iran (Islamic Republic of)	6 April 2011	Sierra Leone	21 November 2007
Kenya	14 January 2008	South Africa	15 April 2008
Kiribati	5 February 2007	Spain	14 September 2005
Liberia	18 September 2008	Sweden	24 November 2009
Malaysia	27 September 2010	Syrian Arab Republic	2 September 2005
Maldives	22 June 2005	Tuvalu	2 December 2005

The implementation schedule

Table 2: IMO BWM Convention Implementation Schedule

Revised per Resolution A.1005(25)

Ballast Cpty (m^3)	Build Date	*First Intermediate or Renewal Survey, whichever occurs first, after the anniversary date of delivery in the respective year								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
< 1,500	< 2009	D-1 or D-2								D-2*
	in 2009	Note: D-1; D-2 by 2nd Annual but not beyond 31 Dec. 2011 or EIF, whichever is later								
	> 2009	D-2 (at delivery or EIF, whichever is later)								
≥ 1,500 or ≤ 5,000	< 2009	D-1 or D-2						D-2*		
	in 2009	Note: D-1; D-2 by 2nd Annual but not beyond 31 Dec. 2011 or EIF, whichever is later								
	> 2009	D-2 (at delivery or EIF, whichever is later)								
≥ 5,000	< 2012	D-1 or D-2								D-2*
	≥ 2012	N/A			D-2 (at delivery or EIF, whichever is later)					

Note: EIF = Entry into force

What is the impact for shipowners?

Global market of BWM treatment systems

US$ 50 – 74 billion (purchasing and installing) between 2011 and 2016

Source: ***Preview of Global Ballast Water Treatment Markets,*** D.M. King, P.T Hagan, M. Riggio and D.A. Wright

The number of ships affected

Sub-type (source: Lloyd's Fairplay)	Count	Ballast capacity of <1,500m³	Ballast capacity of 1,500 – 5,000m³	Ballast capacity of > 5,000m³
Barges	574	0	0	574
Bulk Carriers	8,110	0	0	8,110
Containership	4,724	0	0	4,724
Crude Oil Tanker	2,160	0	0	2,160
Chemical Tanker	1,474	0	0	1,474
Chemical/Oil Products Tanker	9,323	0	0	9,323
General Cargo Ship	18,187	0	16,535	1,652
Fishing Vessels	8,001	7,970	30	1
LNG Tanker	327	0	0	327
LPG Tanker	1,194	540	0	654
OSV's	2,000	1,923	0	77
Passenger (Cruise) Ship	515	0	479	36
Passenger- Passenger/Cargo (Ro-Ro)	3,359	3,324	35	0
Passenger Ship	2,942	2,941	1	0
Refrigerated Cargo Ship	2,542	0	2,538	4
Ro-Ro Cargo Ship	1,873	0	1,700	173
Livestock Carrier	101	0	90	11
Vehicle Carrier	784	0	196	588
TOTAL	**68,190**	**16,698**	**21,604**	**29,888**

Costs for shipowners

Average equipment costs
estimated US$ 640,000 – $947,000

Average installation costs
estimated US$18,000 to $197,000

Average annual operational costs
estimated US$9,000 to $18,000

Which challenges have been identified?

1. Operational challenges

Special ship types:

semi-submersible ships

unmanned seagoing barges

Smaller ships:

nearshore workboats

Semi-submersible ships

IMO INTERNATIONAL MARITIME ORGANIZATION E

MARINE ENVIRONMENT PROTECTION COMMITTEE
63rd session
Agenda item 2

MEPC 63/2/13
25 November 2011
Original: ENGLISH

HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Ballast water treatment by internal circulation

Submitted by the Netherlands

SUMMARY

Executive summary:	This document provides a description of the principles of the treatment by internal circulation considered to represent a practical solution for some types of ships, in particular for semi-submersibles
Strategic direction:	7.1
High-level action:	7.1.2
Planned output:	7.1.2.3
Action to be taken:	Paragraph 13
Related documents:	MEPC 61/2/14, MEPC 61/24, MEPC 61/INF.17 and MEPC 62/24

Introduction

1 During its last sessions, the MEPC has reviewed the availability of ballast water treatment technologies to achieve the performance standard contained in regulation D-2 of the Ballast Water Management Convention. MEPC 61 invited Member Governments and observers to propose practical solutions to the challenges identified in relation to some special types of ships, in particular seagoing unmanned barges, semi-submersibles and heavy lift crane vessels and agreed to allocate sufficient time to discuss such proposals during future sessions.

2 MEPC 62 noted the information provided by the Netherlands and the Marshall Islands with regard to the implementation of the BWM Convention in case of some special types of ships and reiterated the invitation to Members and observers to propose practical solutions to the challenges identified at MEPC 61.

3 This document proposes a practical solution for some of these special types of ships based on the treatment of the water after it has been pumped into the tank. Treatment by internal circulation is considered to be an appropriate solution for semi-submersible ships and possibly for other types of ships that require transferring high quantities of ballast water with a high pump ratio. For other types of ships, in particular unmanned barges, a solution is yet to be identified.

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PIRACY

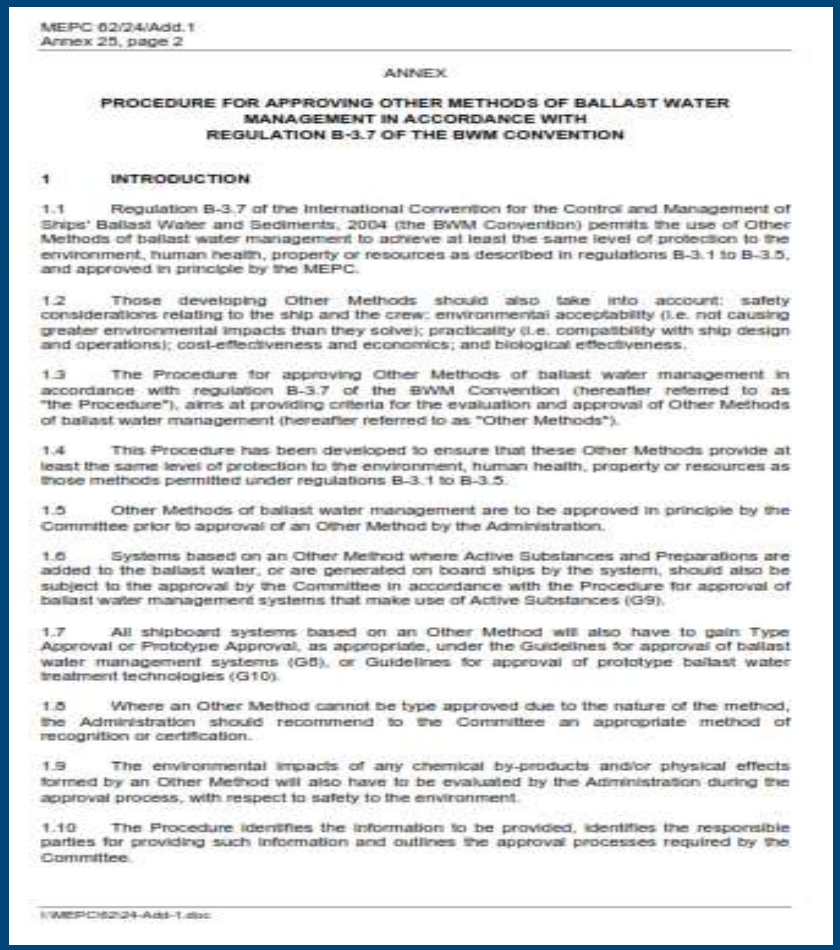
Semi-submersible ships take up and discharge a large quantity of ballastwater in a relatively short period of time.

No system is available for this high flowrate.

Practical solution: treatment by internal circulation

Unmanned seagoing barges

Smaller ships



MEPC 62/24/Add.1
Annex 25, page 2

ANNEX

PROCEDURE FOR APPROVING OTHER METHODS OF BALLAST WATER MANAGEMENT IN ACCORDANCE WITH REGULATION B-3.7 OF THE BWM CONVENTION

1 INTRODUCTION

1.1 Regulation B-3.7 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the BWM Convention) permits the use of Other Methods of ballast water management to achieve at least the same level of protection to the environment, human health, property or resources as described in regulations B-3.1 to B-3.5, and approved in principle by the MEPC.

1.2 Those developing Other Methods should also take into account: safety considerations relating to the ship and the crew; environmental acceptability (i.e. not causing greater environmental impacts than they solve); practicality (i.e. compatibility with ship design and operations); cost-effectiveness and economics; and biological effectiveness.

1.3 The Procedure for approving Other Methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention (hereafter referred to as "the Procedure"), aims at providing criteria for the evaluation and approval of Other Methods of ballast water management (hereafter referred to as "Other Methods").

1.4 This Procedure has been developed to ensure that these Other Methods provide at least the same level of protection to the environment, human health, property or resources as those methods permitted under regulations B-3.1 to B-3.5.

1.5 Other Methods of ballast water management are to be approved in principle by the Committee prior to approval of an Other Method by the Administration.

1.6 Systems based on an Other Method where Active Substances and Preparations are added to the ballast water, or are generated on board ships by the system, should also be subject to the approval by the Committee in accordance with the Procedure for approval of ballast water management systems that make use of Active Substances (G9).

1.7 All shipboard systems based on an Other Method will also have to gain Type Approval or Prototype Approval, as appropriate, under the Guidelines for approval of ballast water management systems (G8), or Guidelines for approval of prototype ballast water treatment technologies (G10).

1.8 Where an Other Method cannot be type approved due to the nature of the method, the Administration should recommend to the Committee an appropriate method of recognition or certification.

1.9 The environmental impacts of any chemical by-products and/or physical effects formed by an Other Method will also have to be evaluated by the Administration during the approval process, with respect to safety to the environment.

1.10 The Procedure identifies the information to be provided, identifies the responsible parties for providing such information and outlines the approval processes required by the Committee.

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b. Procedural challenges

Exemptions

BWMC, Regulation A-4

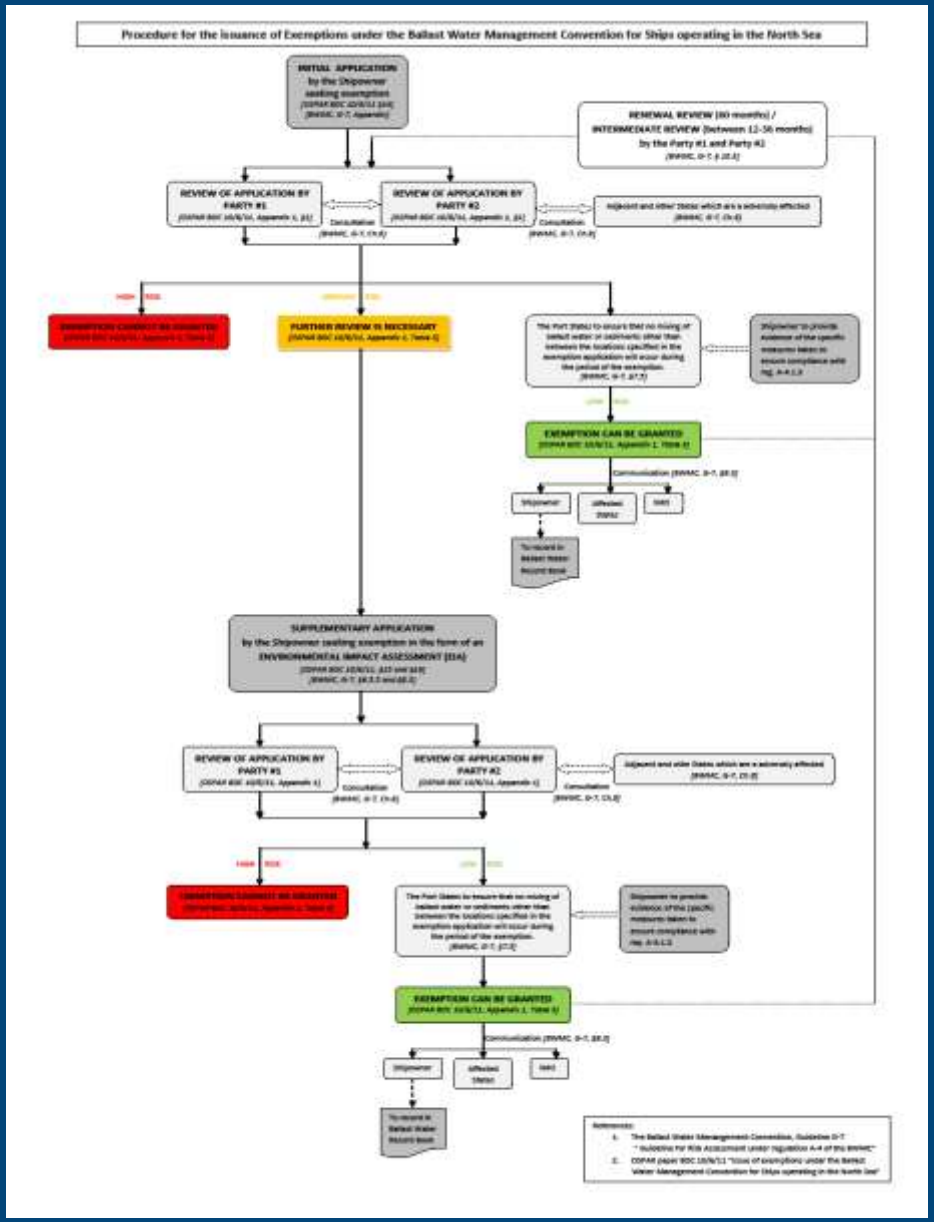
1. A Party or Parties, in waters under their jurisdiction, may grant exemptions to any requirements to apply regulation B-3 or C-1, in addition to those exemptions contained elsewhere in this Convention, but only when they are:

   .1 granted to a ship or ships on a voyage or voyages between specified ports or locations; or to a ship which operates exclusively between specified ports or locations;

   .2 effective for a period of no more than five years subject to intermediate review;

   .3 granted to ships that do not mix ballast water or sediments other than between the ports or locations specified in paragraph 1.1; and

   .4 granted based on the guidelines on risk assessment developed by the Organization.


Procedure for the issuance of Exemptions under the Ballast Water Management Convention for Ships operating in the North Sea
INITIAL APPLICATION by the Shipowner seeking exemption
RENEWAL REVIEW (60 months) / INTERMEDIATE REVIEW (between 12-36 months) by the Party #1 and Party #2
REVIEW OF APPLICATION BY PARTY #1
REVIEW OF APPLICATION BY PARTY #2
Consultation
Consultation
Adjacent and other States which are a adversely affected
FURTHER REVIEW IS NECESSARY
The Port State to ensure that no mixing of ballast water or sediments other than between the locations specified in the exemption application will occur during the period of the exemption.
Shipowner to provide evidence of the specific measures taken to ensure compliance with reg. A-4.1.3
EXEMPTION CAN BE GRANTED
Communication
Shipowner
Affected State
IMO
To record in Ballast Water Record Book
SUPPLEMENTARY APPLICATION by the Shipowner seeking exemption in the form of an ENVIRONMENTAL IMPACT ASSESSMENT (EIA)
REVIEW OF APPLICATION BY PARTY #1
REVIEW OF APPLICATION BY PARTY #2
Consultation
Consultation
Adjacent and other States which are a adversely affected
The Port States to ensure that no mixing of ballast water or sediments other than between the locations specified in the exemption application will occur during the period of the exemption.
Shipowner to provide evidence of the specific measures taken to ensure compliance with reg. A-4.1.3
EXEMPTION CAN BE GRANTED
Communication
Shipowner
Affected States
IMO
To record in Ballast Water Record Book
References:
1. The Ballast Water Management Convention, Guideline D-7 " Guideline for ROA Assessment under regulation A-4 of the BWMC"
2. COPAM paper MSC 10/6/11 "Issue of exemptions under the Ballast Water Management Convention for Ships operating in the North Sea"

Thank you for your attention

Niels van de Minkelis

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ROYAL WAGENBORG

Royal Wagenborg

Ballastwater Seminar Platform Scheepsemissies 26-1-2012 - Rotterdam

Royal Wagenborg

Our company...

- serves clients since 1898
- is 100% privately owned
- provides integrated logistic solutions
- works with state of the art equipment
- employs 3000 people

Our people…

- focus on solutions
- are dedicated and experienced
- have passion for the job
- don’t know the word impossible

Wagenborg Nedlift

- Crane rental (Benelux and Germany)
- Heavy transport and logistic management
- Turnkey heavy transport and lifting projects
- Factory-to-foundation projects with 100% Wagenborg resources
- Engineering and project management





Wagenborg Passenger Services

- Almost 10,000 departures a year
- 1.8 million passengers a year
- 5 ferries sailing to the Dutch isles, Ameland & Schiermonnikoog
- 3 High speed Water taxis operating in the Dutch Northern Coastal waters

Reining

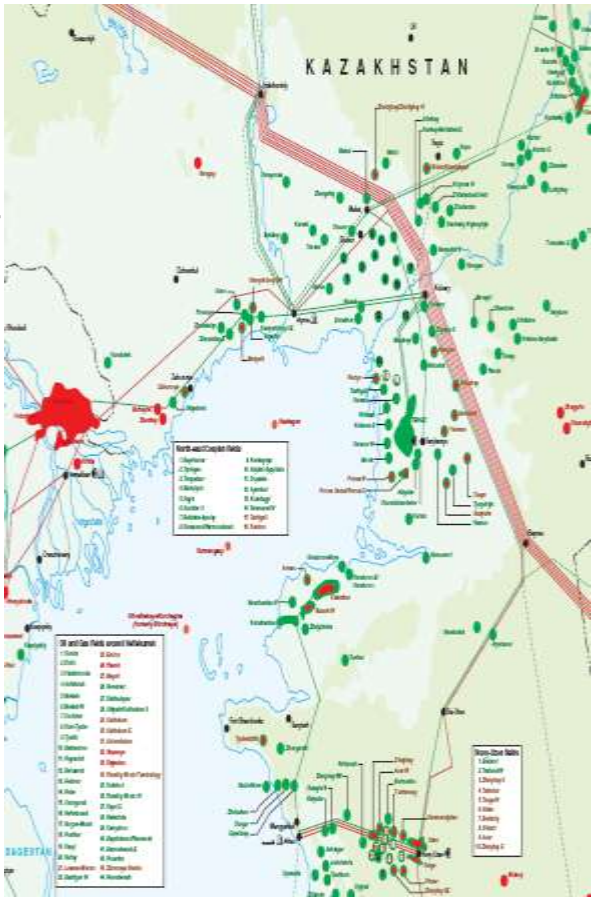
- Integrated solutions: transport, warehousing and distribution
- 320 vehicles
- Warehousing 100,000 m^2
- 4 European branche offices in the Netherlands and in Hungary
- Intermodal solutions
- Real-time information throughout supply chain




Wagenborg Offshore

Area of operations

- Worldwide
- Focus on activities in former CIS and Caspian Sea



Activities in the Oil- & Gas industry

- Operator and owner of vessels, rigging- and hydraulic piling equipment
- Rig move-, Inspection-, Management- and Consultant activities
- Commissioning of offshore structures and assembly of new drilling rigs

Wagenborg Shipping

Area of operations

- Worldwide
- Focus on activities in Europe, Middle East and Americas

Activities in the Multi Purpose Shipping Segment

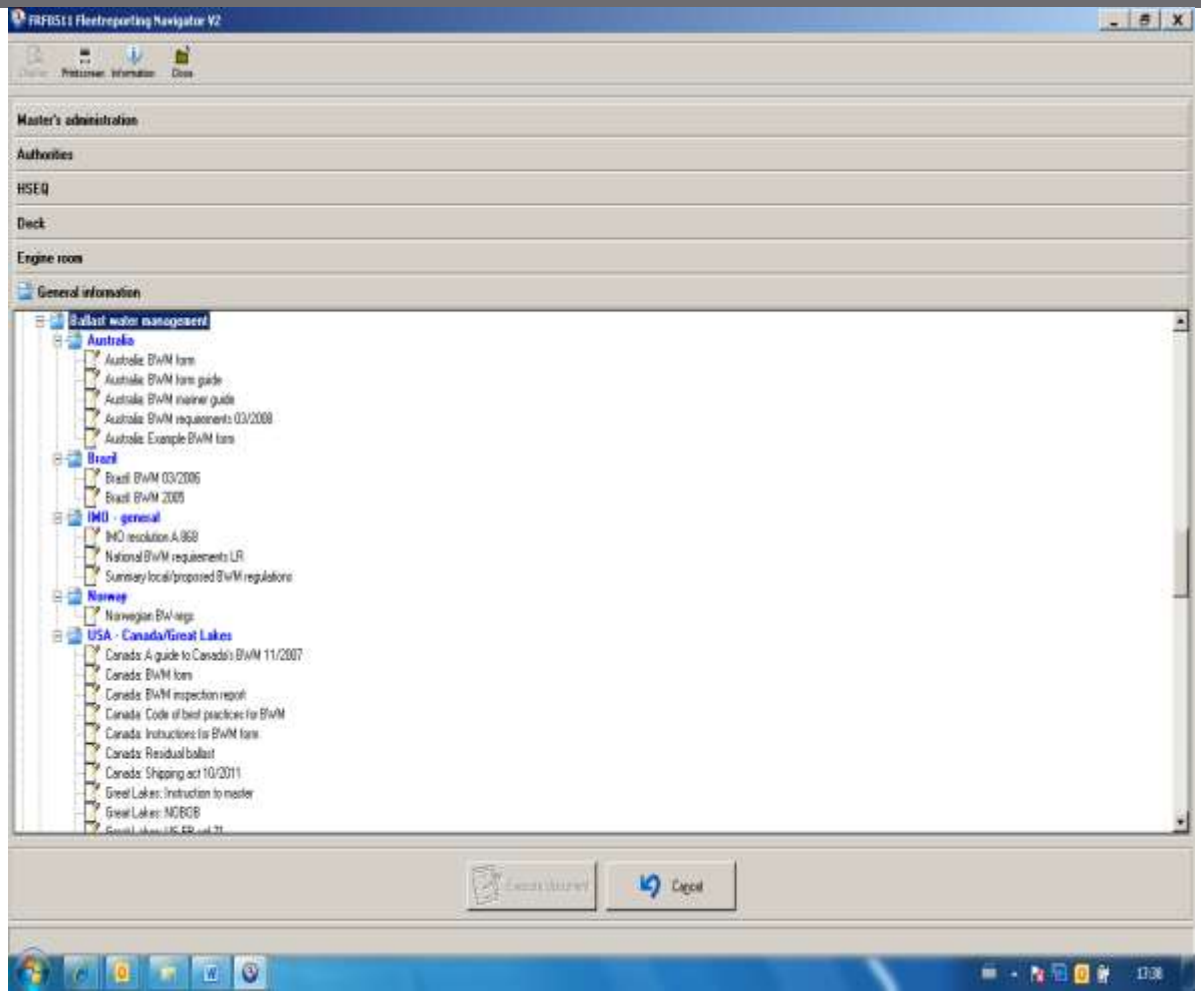
- Operator and owner of vessels
- Commercial and technical operations
- Crewing
- Sale & purchase
- Insurance
- Projects and Newbuilding

Wagenborg Shipping

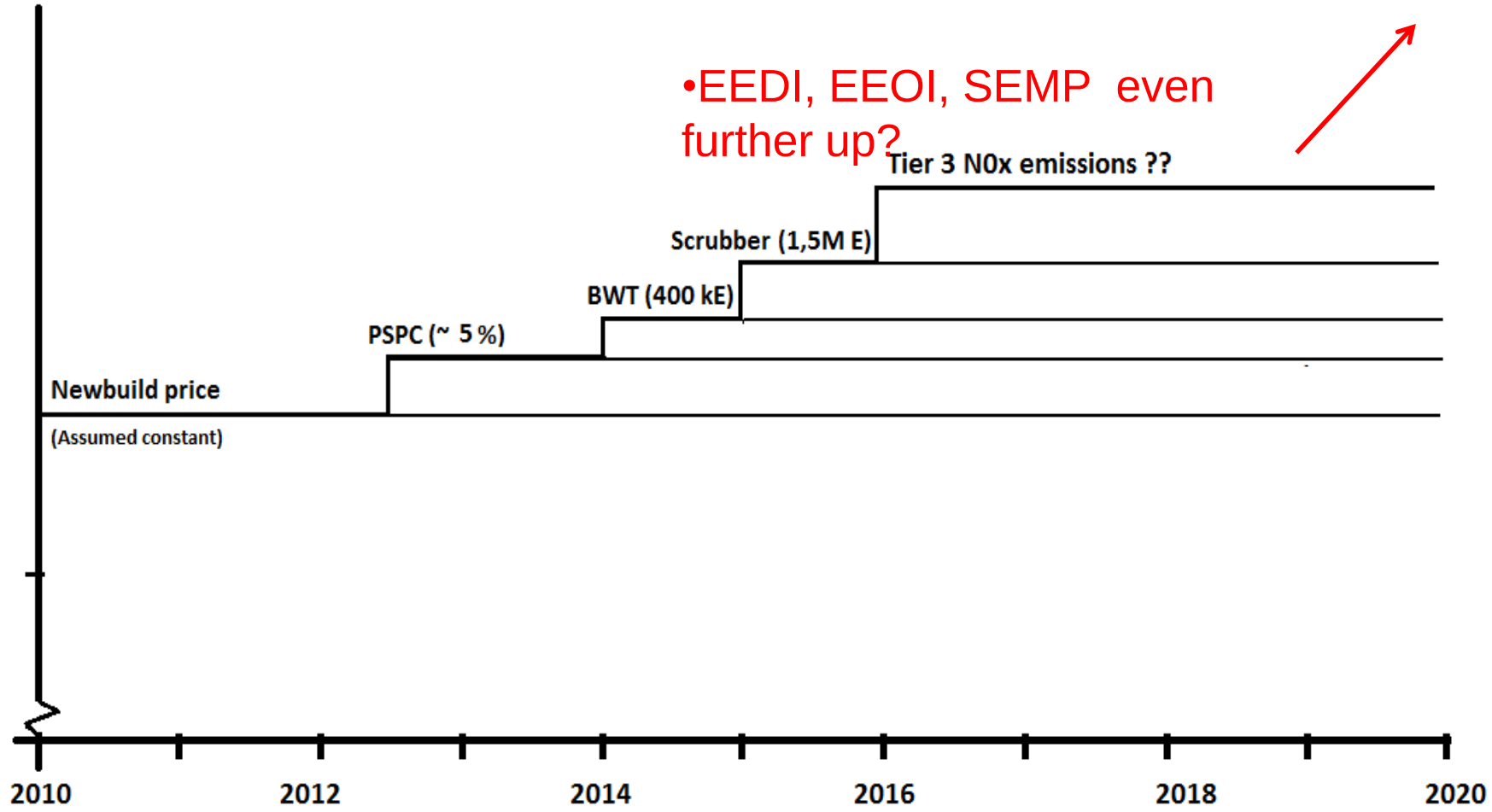
- 180 modern multi-purpose vessels ranging from 2.000 to 22.000 tons, mostly fully ice-classed, geared and gearless
- One of the largest ship owners in Europe by number of vessels
- Youngest fleet in Europe with an average age of 6.2 years due to continuous new building program
- Seamless access to the entire logistic chain through close cooperation with other Wagenborg companies
- More than 150,000 m2 of high quality storage facilities




Ballast water management



Effect of Upcoming Regulations



USA, Calif. Proposed Standards

[August 2009]

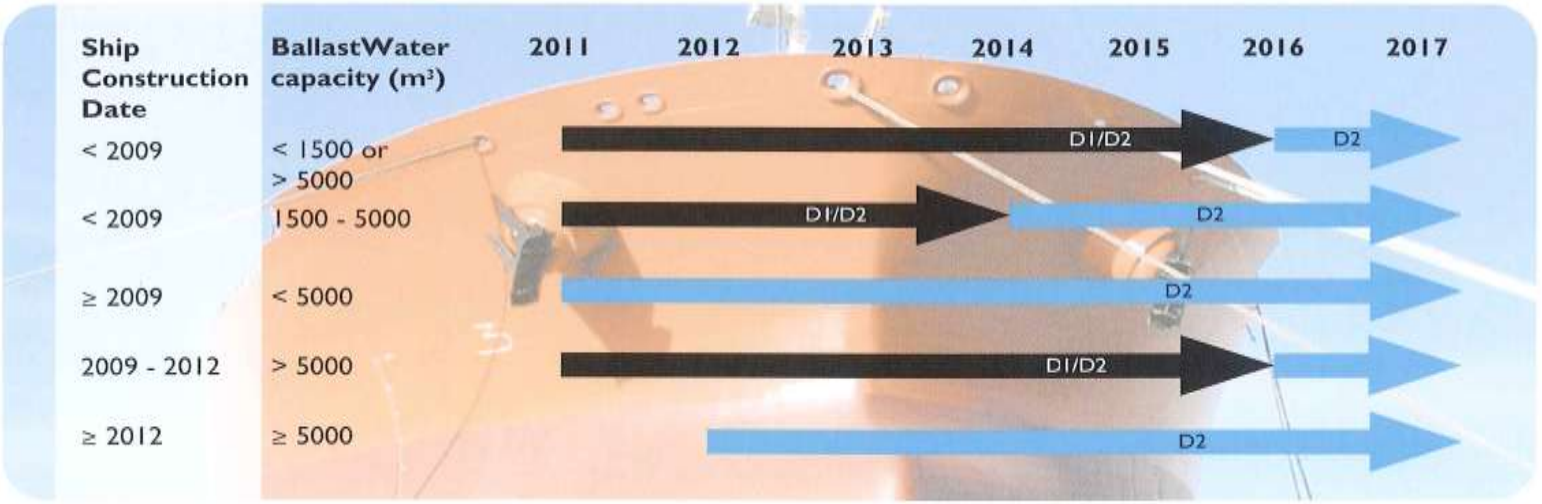
Organism Size	US Proposed Regulation Phase 1 Standard & IMO reg. D-2	US Proposed Regulation Phase 2 Standard	California Law
> 50µm in min dimension	< 10 viable organisms/m^3	< 1 viable organisms/100m^3	No detectable living organisms
< 50µ and >10µ in min. dimension	< 10 viable organisms/ml	< 1 viable organisms/100ml	< 0.01 living organisms per ml
< 10µm in min. dimension	no limit	< 10^3 bacteria/100 ml < 10^4 viruses/100 ml	< 10^3 bacteria/100 ml < 10^4 viruses/100 ml
Escherichia coli	< 250 cfu/100 ml	< 126 cfu/100 ml	< 126 cfu/100 ml
Intestinal enterococci	< 100 cfu/100 ml	< 33 cfu/100 ml	< 33 cfu/100 ml
Toxicogenic Vibrio cholerae	< 1 cfu/100 ml or < 1 cfu/gram wet weight zooplankton samples	< 1 cfu/100 ml	< 1 cfu/100 ml or < 1cfu/gram wet weight zoological samples

BWM Timetable

Shipowner Responsibility

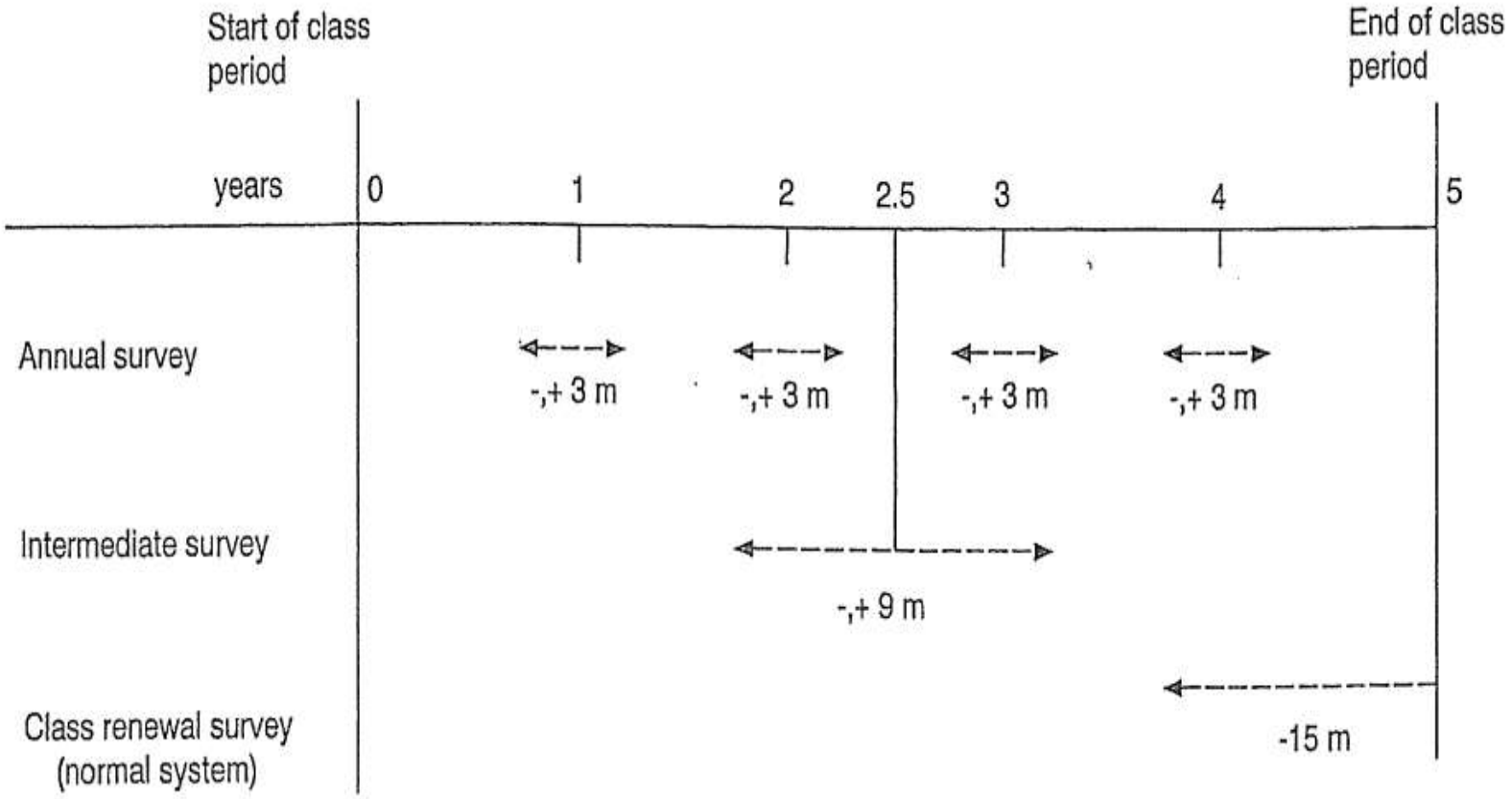
IMO

B-3 Ballast Water Management for ships D1: Exchange D2: Treatment



"The Ballast Water Management Convention will – when entered into force – require all ships, new and existing, to install Ballast Water Treatment (BWT) systems onboard;
- For new ships; from 2012 (ships keel laid after 1 January 2012)
- For existing ships; latest on the first intermediate or renewal survey, whichever comes first, after the anniversary date of delivery of the ship in 2014 or 2016, depending on the date and ballast water capacity of the ship".

Survey schedule, windows

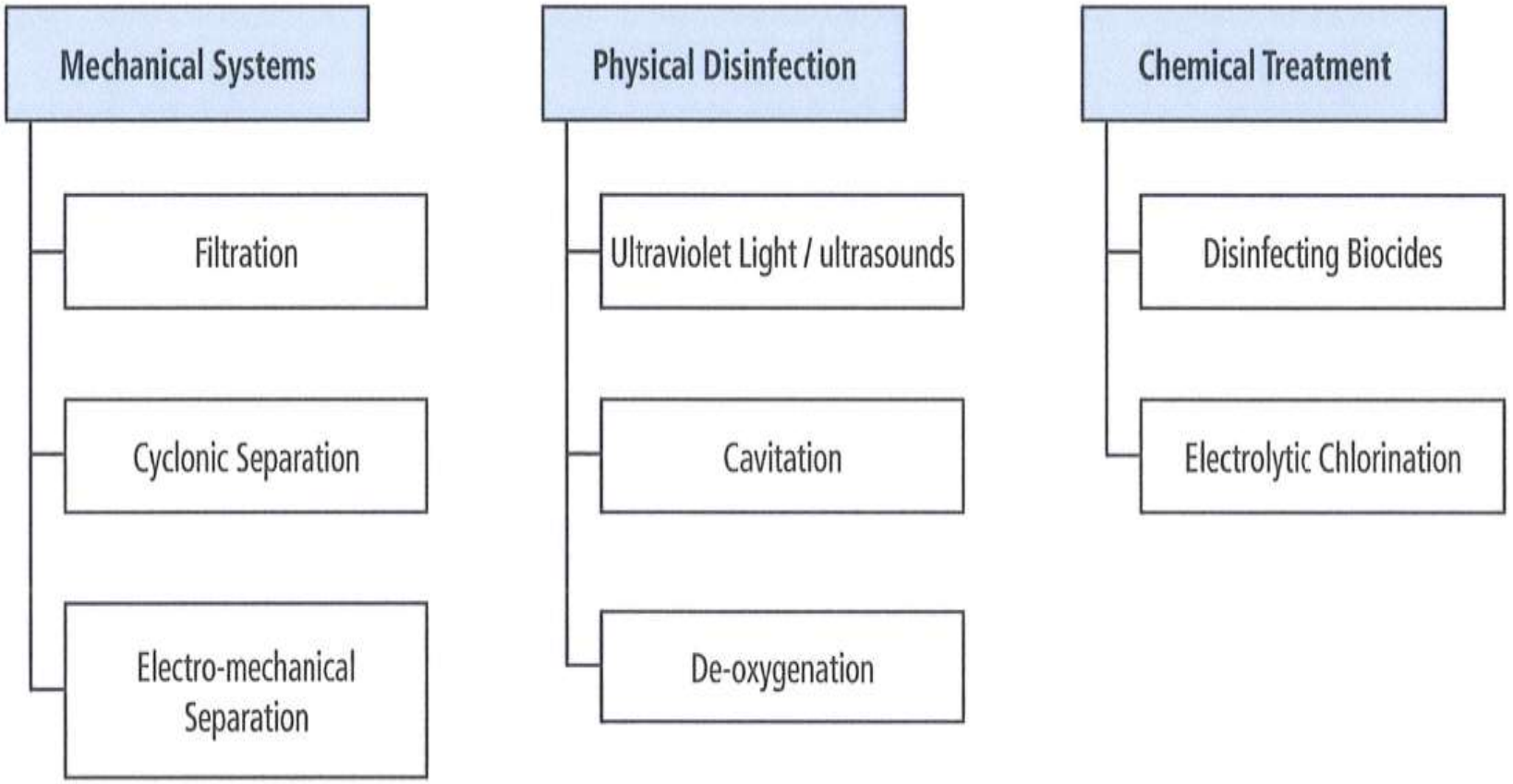


Survey dates Fleet

Yard No.	Name Ship	Shipyard	Keel laying	Compliance in year	Current CoC	Next CoC if applies	Installation window	Intermediate / renewal?	Possible to shift? If yes, next apply date
344	Voorneborg	Bodewes Volharding	30-6-1998	2014	15-11-2014	nvt	15-08-2013 : 15-11-2014	renewal	no (* renewal survey cannot be finished earlier than 15-08-2014)
346	Vaasaborg	Bodewes Volharding	30-6-1998	2014	28-2-2015	nvt	28-11-2013 : 28-02-2015	renewal	no
501	Vancouverborg	Bodewes Volharding	30-6-1998	2014	29-6-2011	29-6-2016	29-03-2013: 29-09-2014	intermediate	yes, if intermediate before 01-01-2014 then 29-03-2015 : 29-06-2016
502	Victoriaborg	Bodewes Volharding	30-6-2000	2014	6-12-2011	6-12-2016	06-09-2013 : 06-03-2015	intermediate	yes, if intermediate before 01-01-2014 then 06-09-2015 : 06-12-2016
505	Virginiaborg	Bodewes Volharding	30-6-1998	2014	19-9-2011	19-9-2016	19-06-2013 : 19-12-2014	intermediate	yes, if intermediate before 01-01-2014 then 19-06-2015 : 19-09-2016
515	Mississippiborg	Bijlsma/FSW	mrt-99	2014	7-11-2014	nvt	07-08-2013 : 07-11-2014	renewal	no (* renewal survey cannot be finished earlier than 07-08-2014)
680	Egbert Wagenborg	Bijlsma/FSW	15-12-1997	2014	10-6-2013	10-6-2018	10-3-2015 : 10-09-2016	intermediate	no
682	Munteborg	Bijlsma/FSW	1-1-1998	2014	15-10-2013	15-10-2018	15-07-2015 : 15-01-2017	intermediate	no

This overview shows part of the fleet, but is indicative for the entire group…….

Treatment Technology Types



Evaluation Checklists, Owner

Ballast system details

- Ballast system arrangement; capacity, tanks,sampling
- Ballast system equipment; capacity, pumps, stripping, control

Vessel and operating profile

- Vessel type
- Ballast water handling practices; how fast required, capacity, minimum time in tanks, sediment
- Ballast water characteristics; fresh/brakish water, temp.,sediment
- Vessel operating profile; special zones, zero discharge
- Characteristics; intake practices (gravity), discharge, internal transfer

Evaluation Checklists, Verndor

Treatment Technology

- Treatment method; Uv, chemical, Ozon, Electrolyse
- Treatment system capacity
- Pressure drops; filtration, amount of backflushing water
- Equipment size; modular, maintenance space
- Materials
- Power requirements; average and maximum
- Impacts on ballast tank coating, pipe corrosion
- Health and safety; chemicals

General Treatment system considerations

- Proven efficiency and approvals
- Vendor qualifications and reputation; worldwide service network
- Maintenance requirements and reliability
- Operation, control, monitoring
- Life cycle costs; Purchase and operation costs, consumables, spares

Installation onboard

ROYAL
WAGENBORG

Royal Wagenborg

Laser scanning and 3D engineering for BWT retrofits

THE INSTALLATION PROCESS

Goltens
Green Technologies

Step 1	• Selection of BWT system
Step 2	• Survey on board / 3D laser scanning
Step 3	• Pre-engineering
Step 4	• Detailed design
Step 5	• Purchasing / pre-fabrication
Step 6	• Installation and commissioning
Step 7	• Service

3D scanning

- Laser scanning
  - Accuracy +/- 2 mm
  - 5 – 10 hours on board
  - Minimal disturbance of ships operation

Reference points

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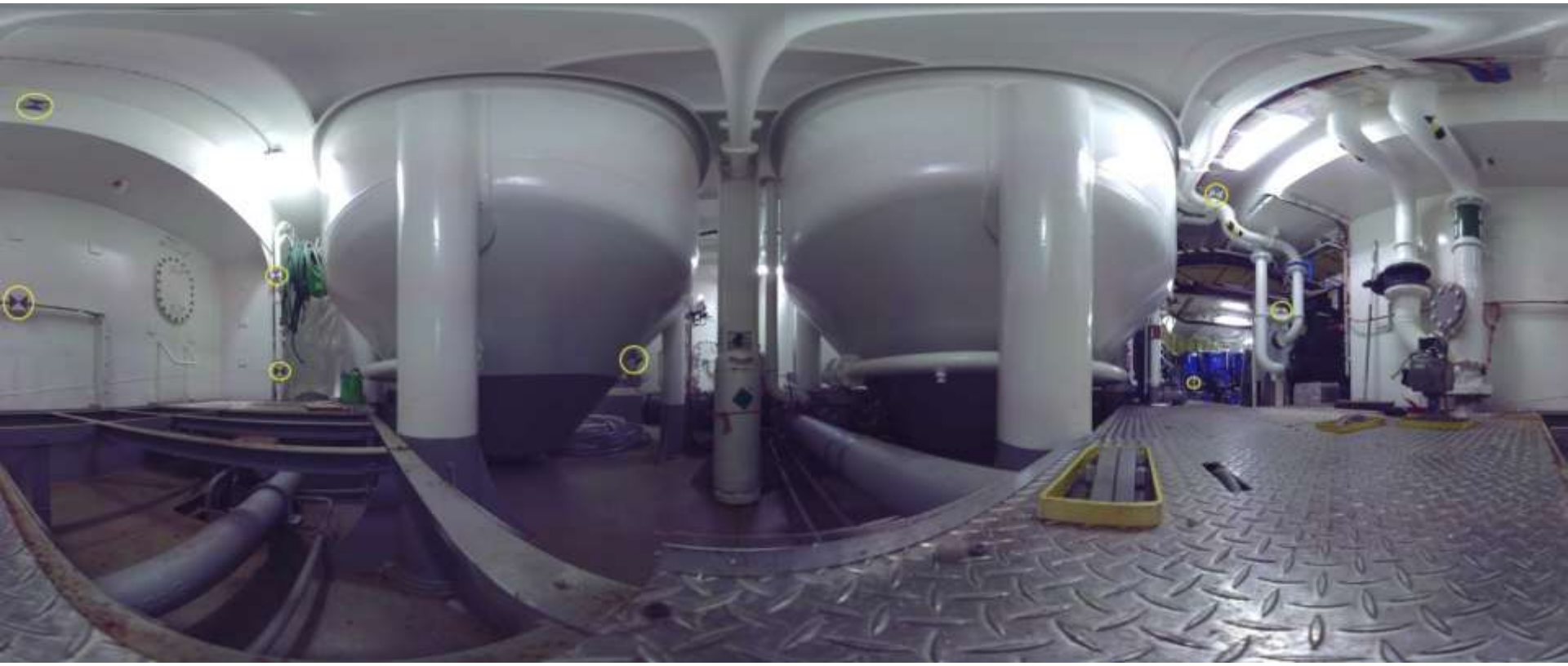
Green Technologies



Laser scanning

Using laser scans

- Results are put directly into a 3D CAD program
- The BWT system can be modelled into it
- Different options can be compared
- Owner can see it before it gets carried out
- Accurate fabrication drawings are made
- Prefabrication of all necessary parts including foundations

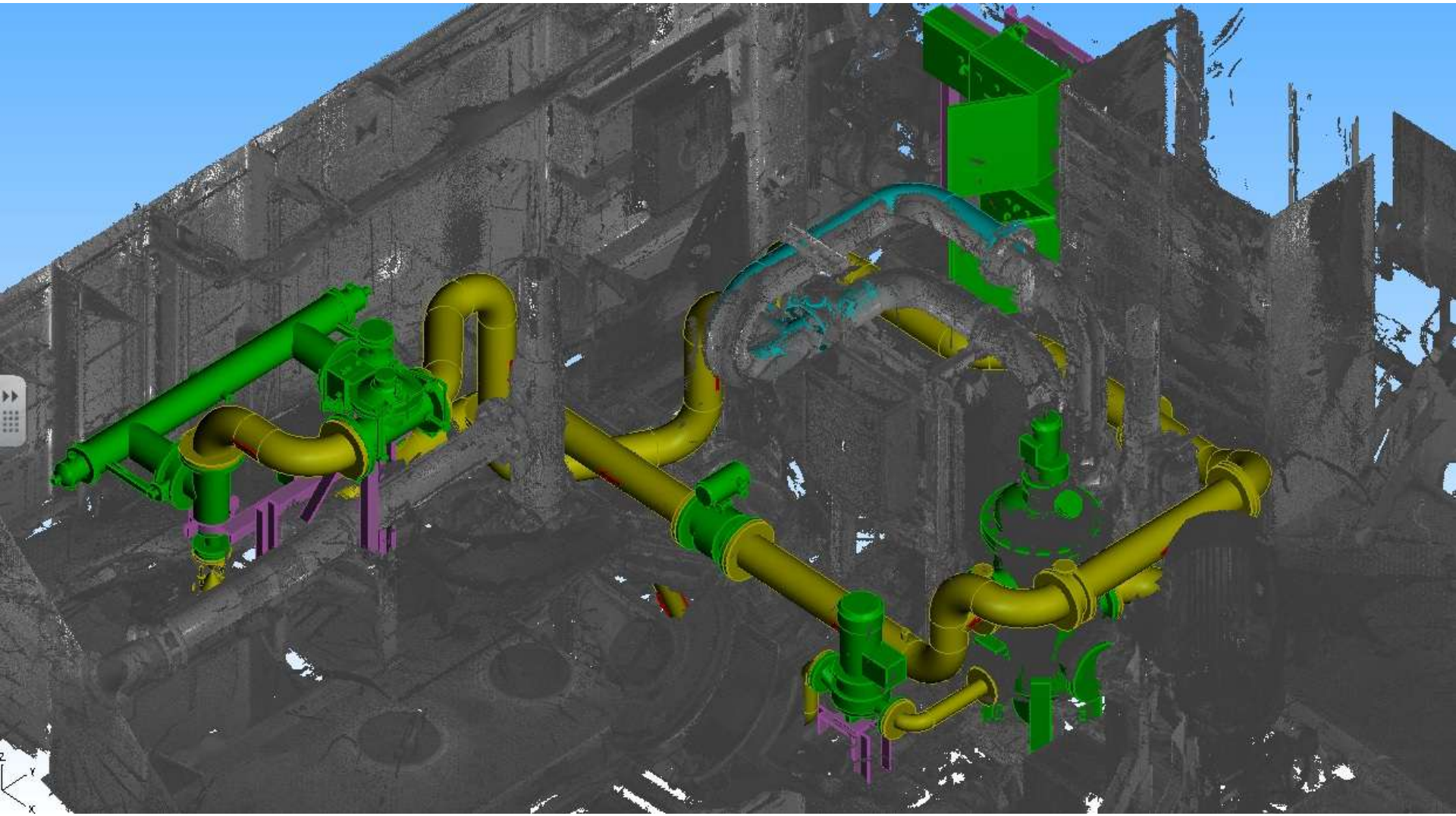
Offshore vessel

- Laser scanning, followed by prefabrication
- Installation during normal operation
- New overboard with divers

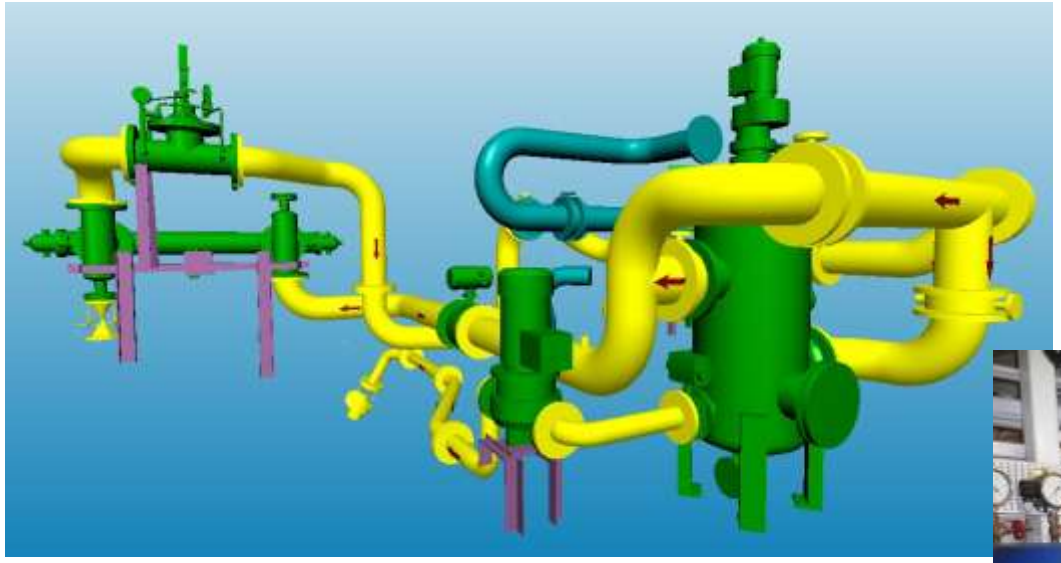
- Situation before and after (in progress)
- System was commissioned in the beginning of December 2011

Highland Eagle

Goltens
Green Technologies



Highland Eagle



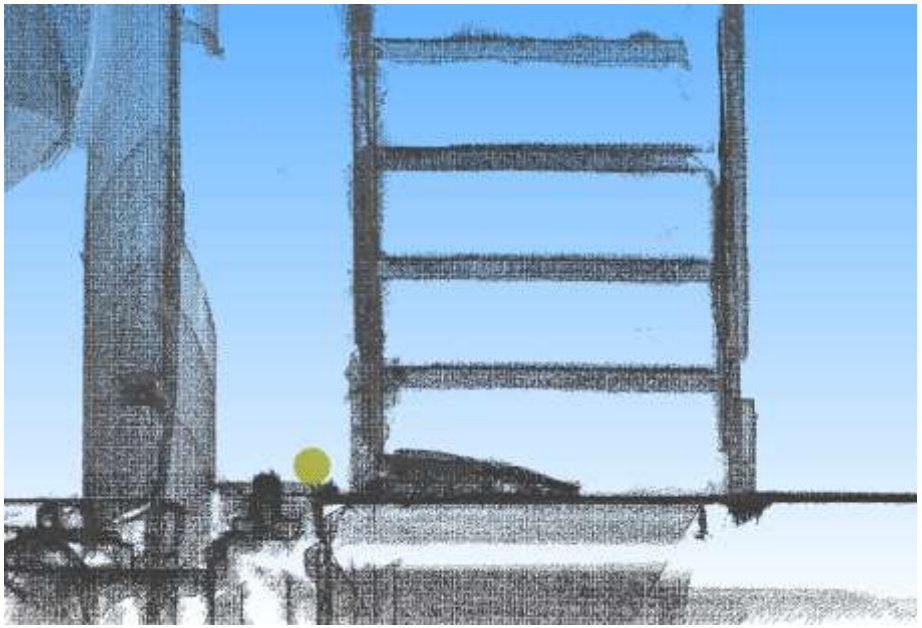
- The accuracy of the laser scanning plus high quality of the piping shortened installation time
- No down time for the vessel

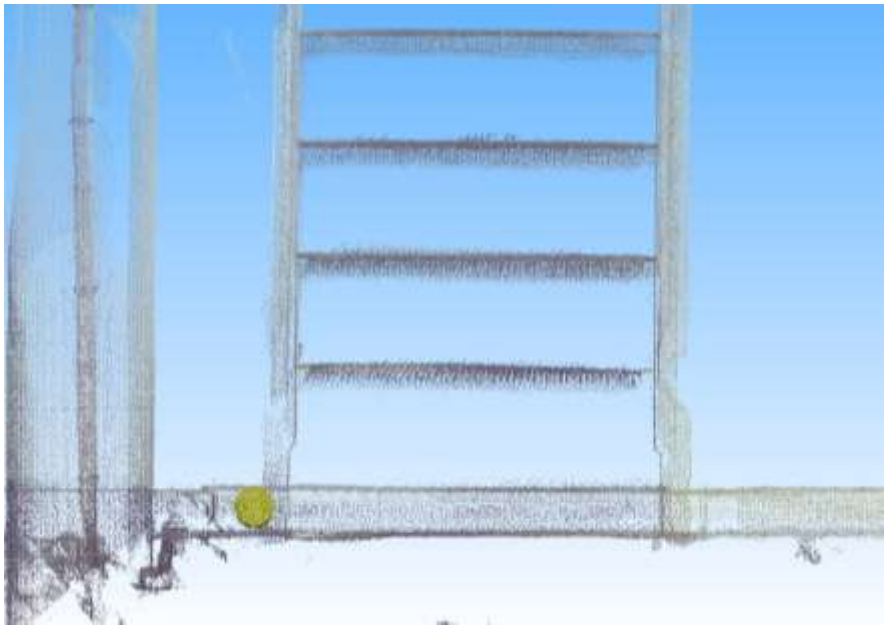
SISTER VESSELS

- Scan each vessel
- Design system once
- Only a collision check on following ships
- Modify where necessary

COLLISION CHECK

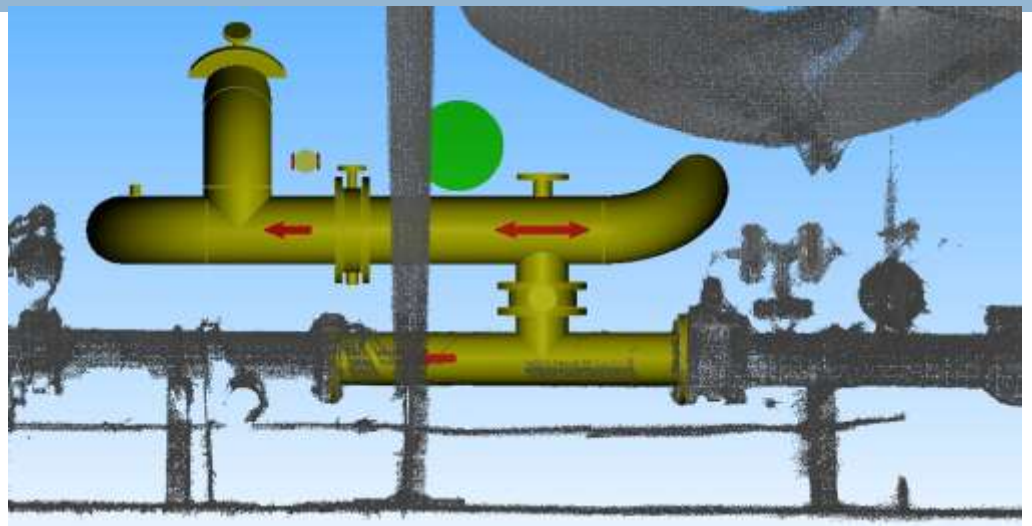
- Sister vessels



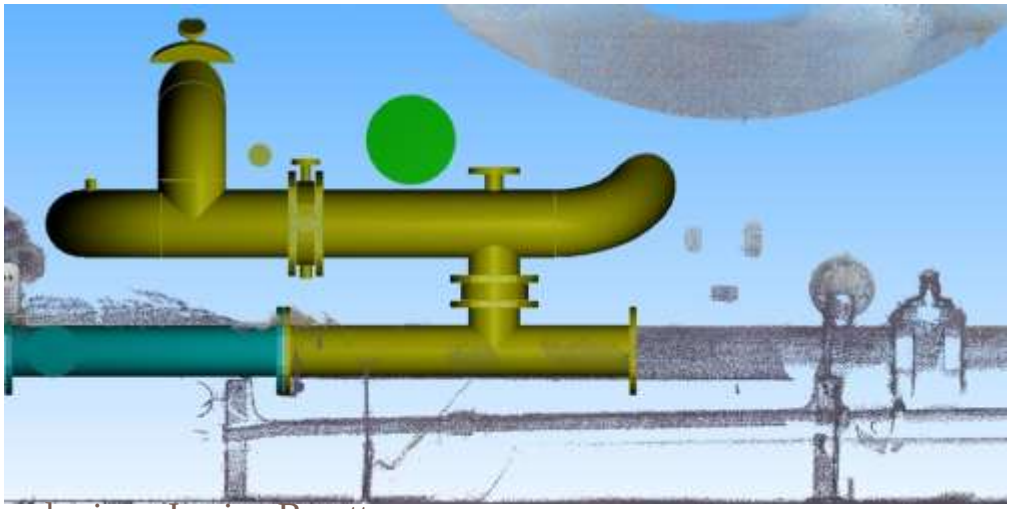


SISTER VESSELS

- VESSEL 1
  - Ok

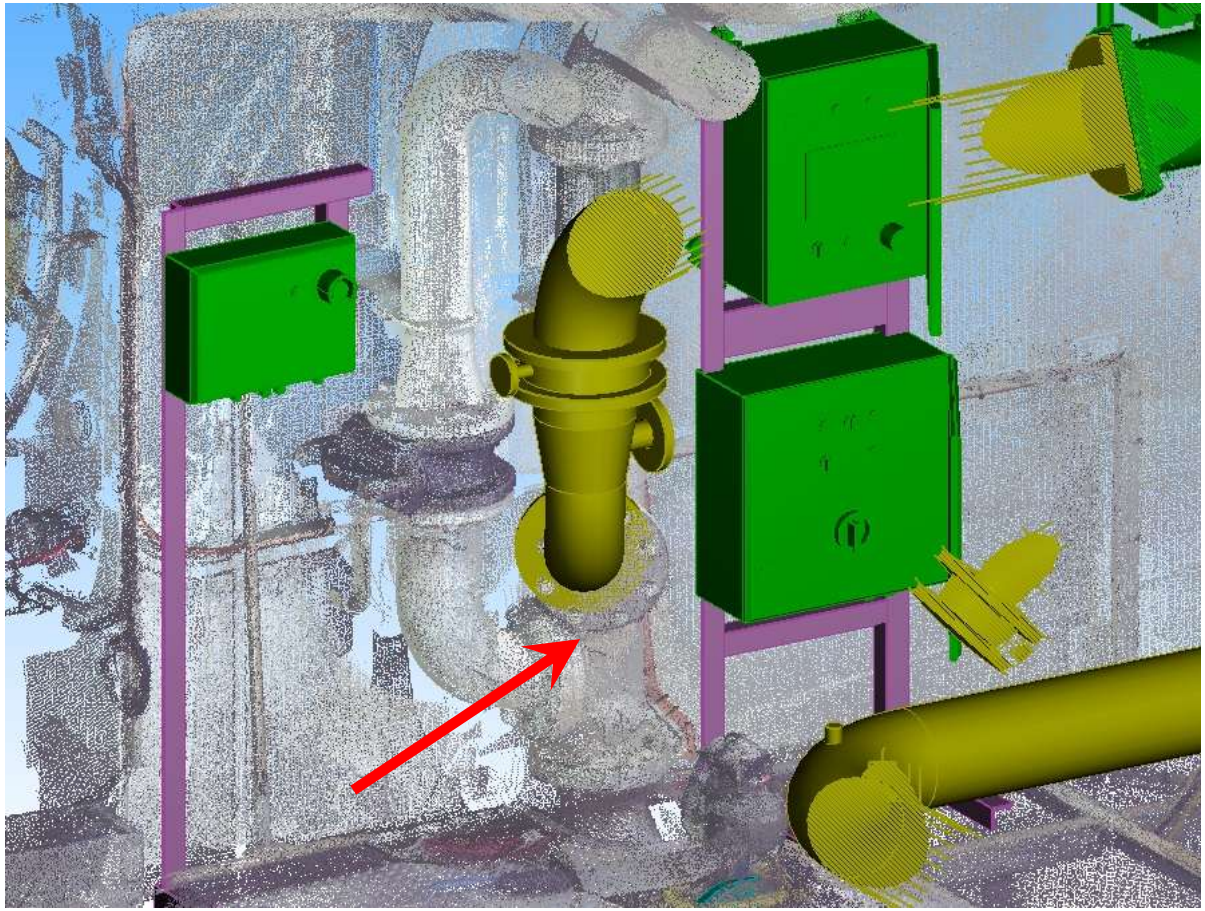


- VESSEL 2
  - Must be modified



SISTER VESSELS

- Collision check:
  - Flange doesn't fit, needs to be modified on vessel nr. 2



SCANNING ON TWO DECKS

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ANIMATION

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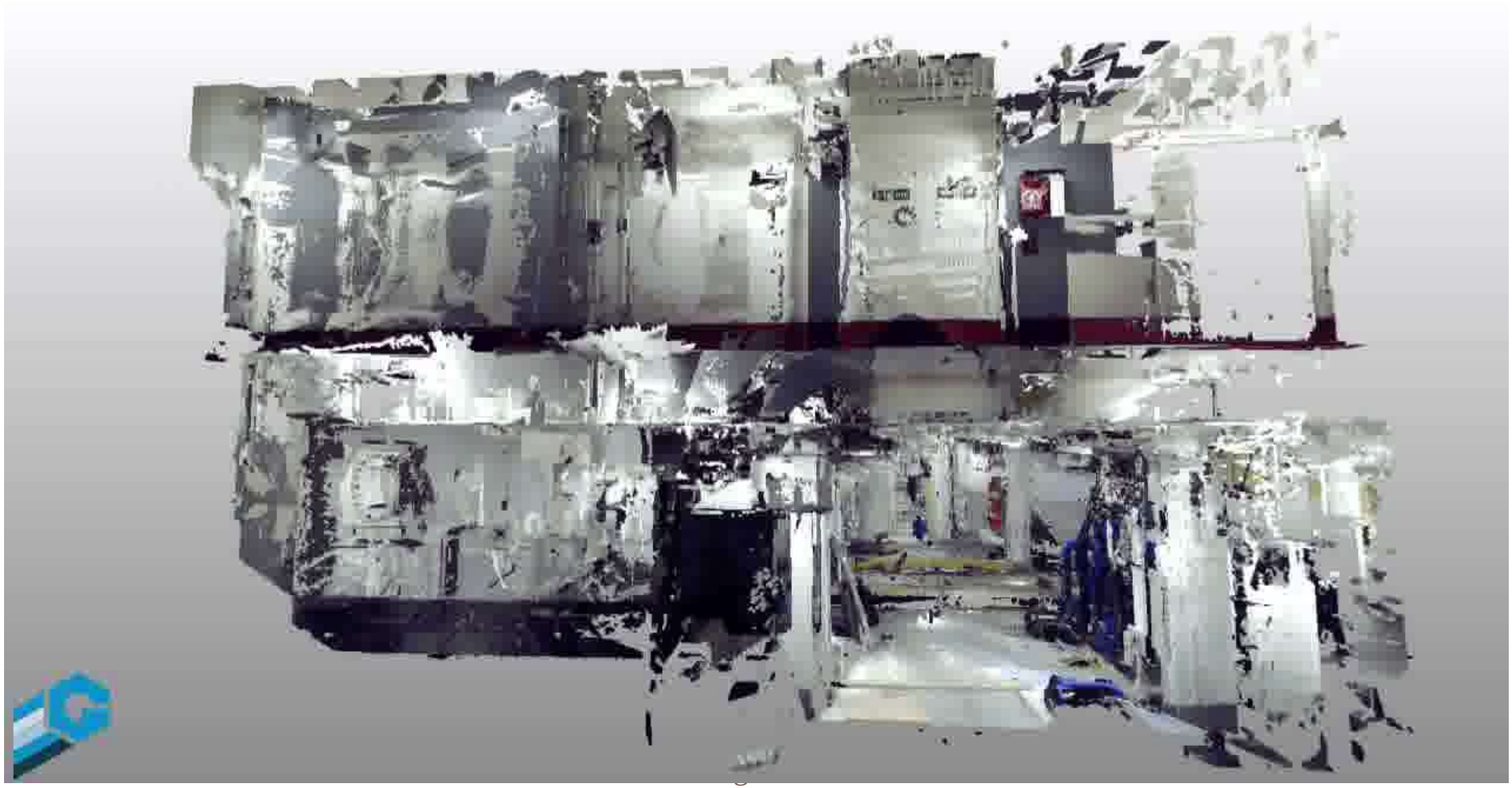
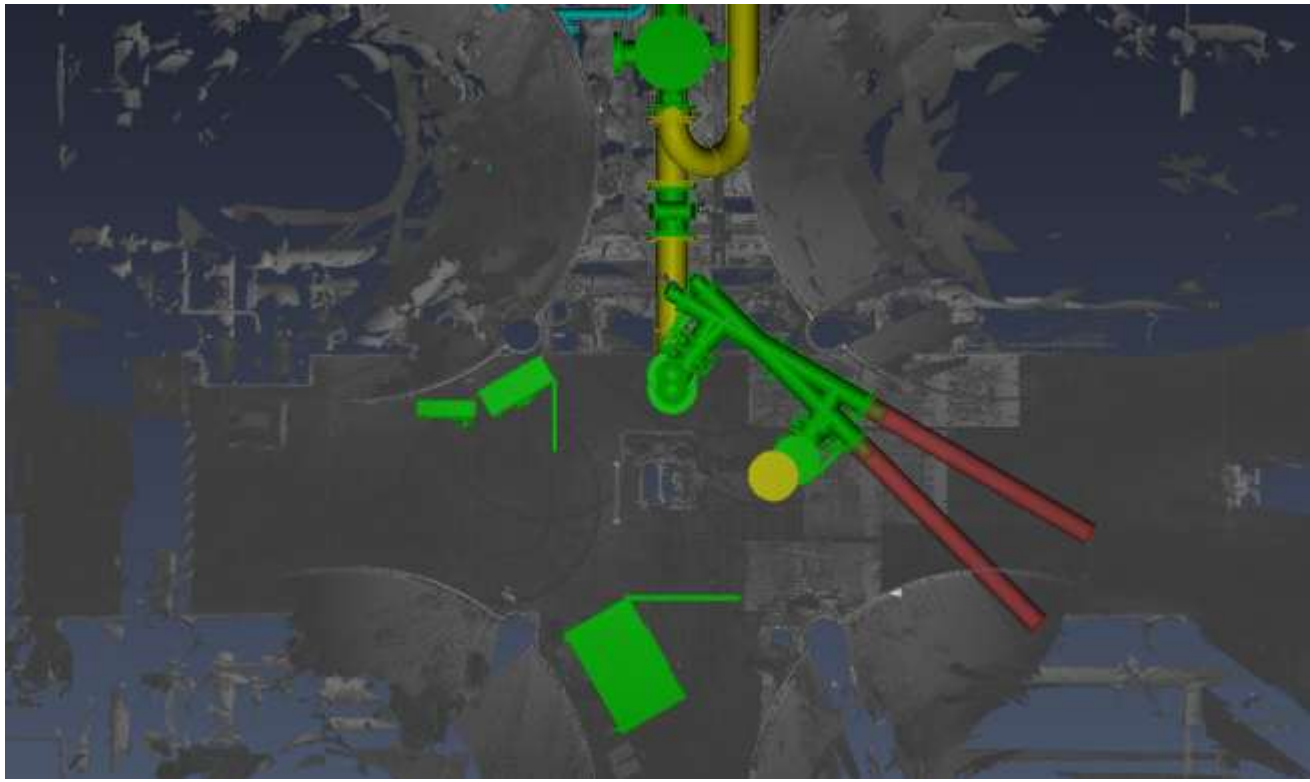


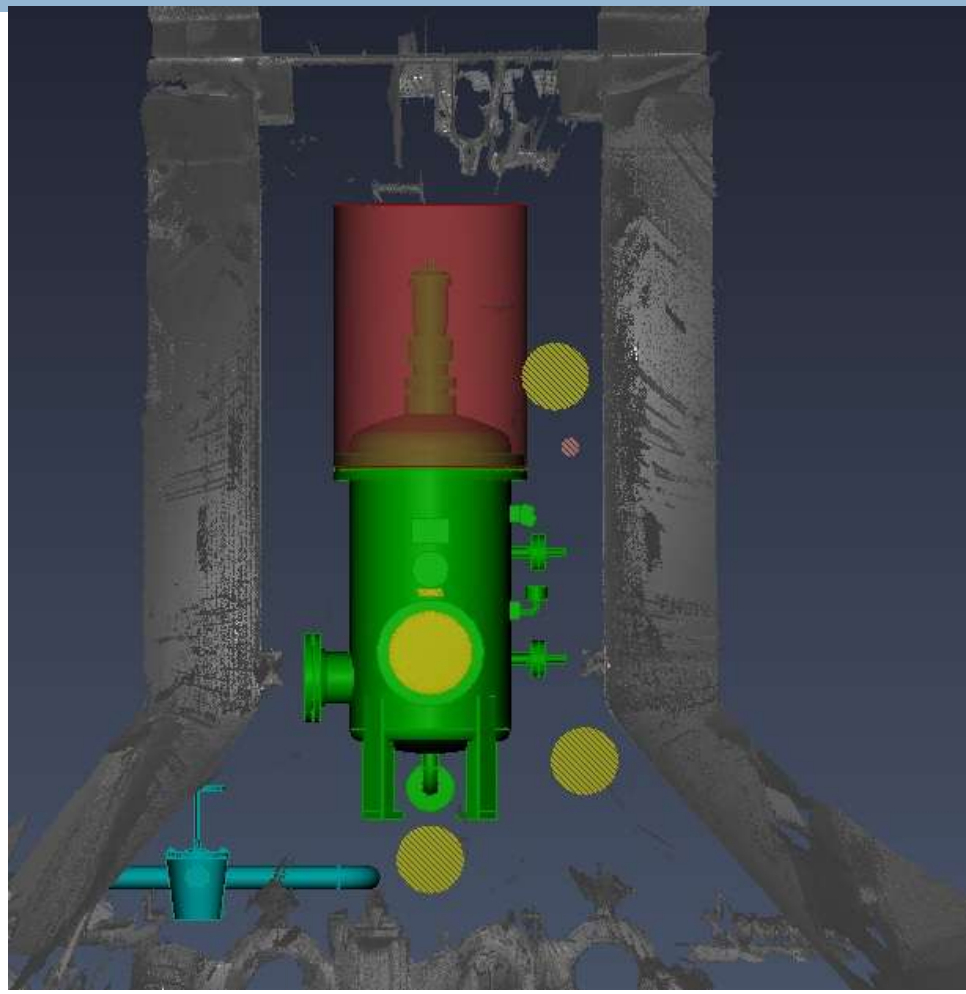
SERVICE SPACE

- Exchange lamps:
  - In the first layout there was not enough space to exchange the UV lamp

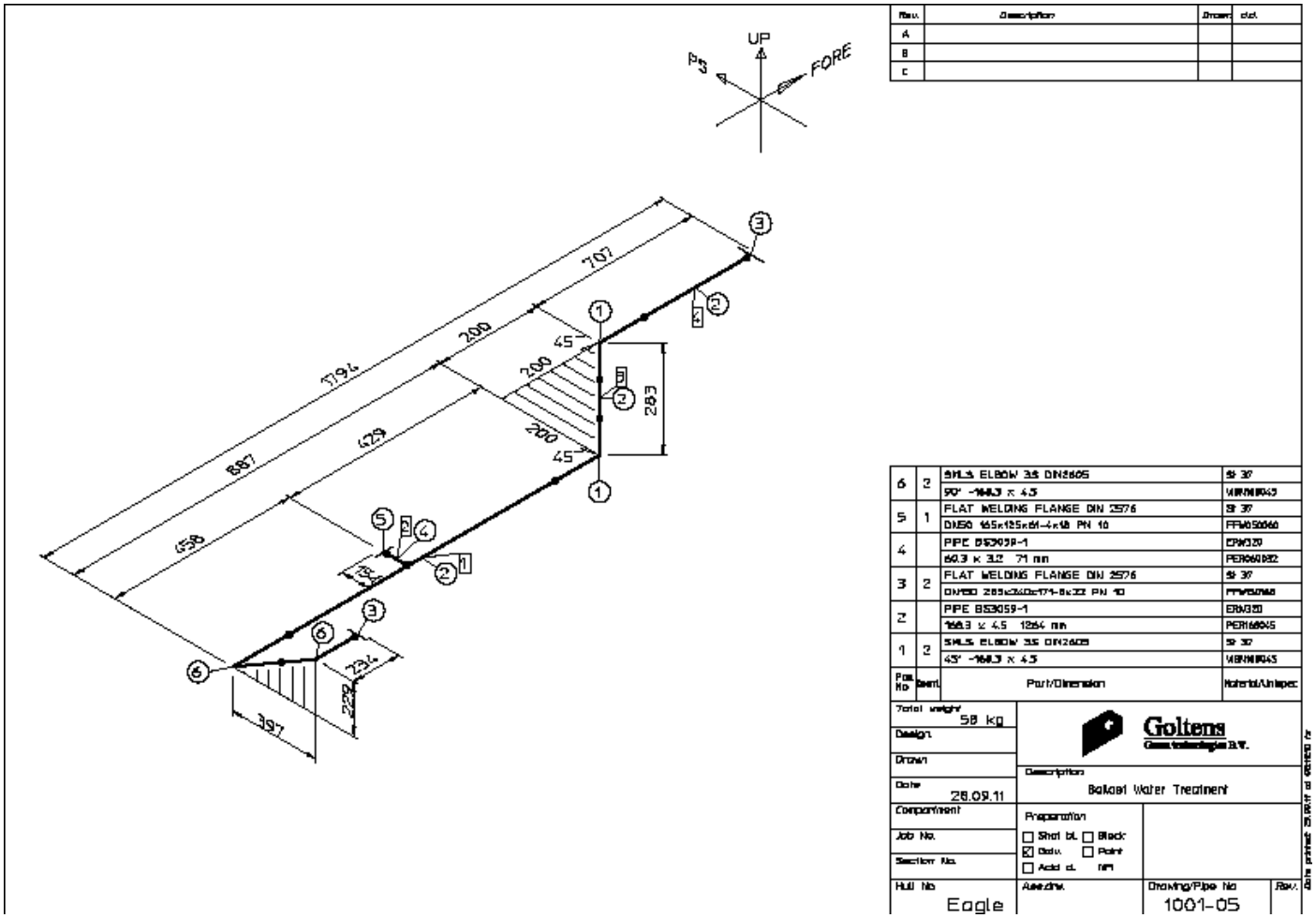


SERVICE SPACE

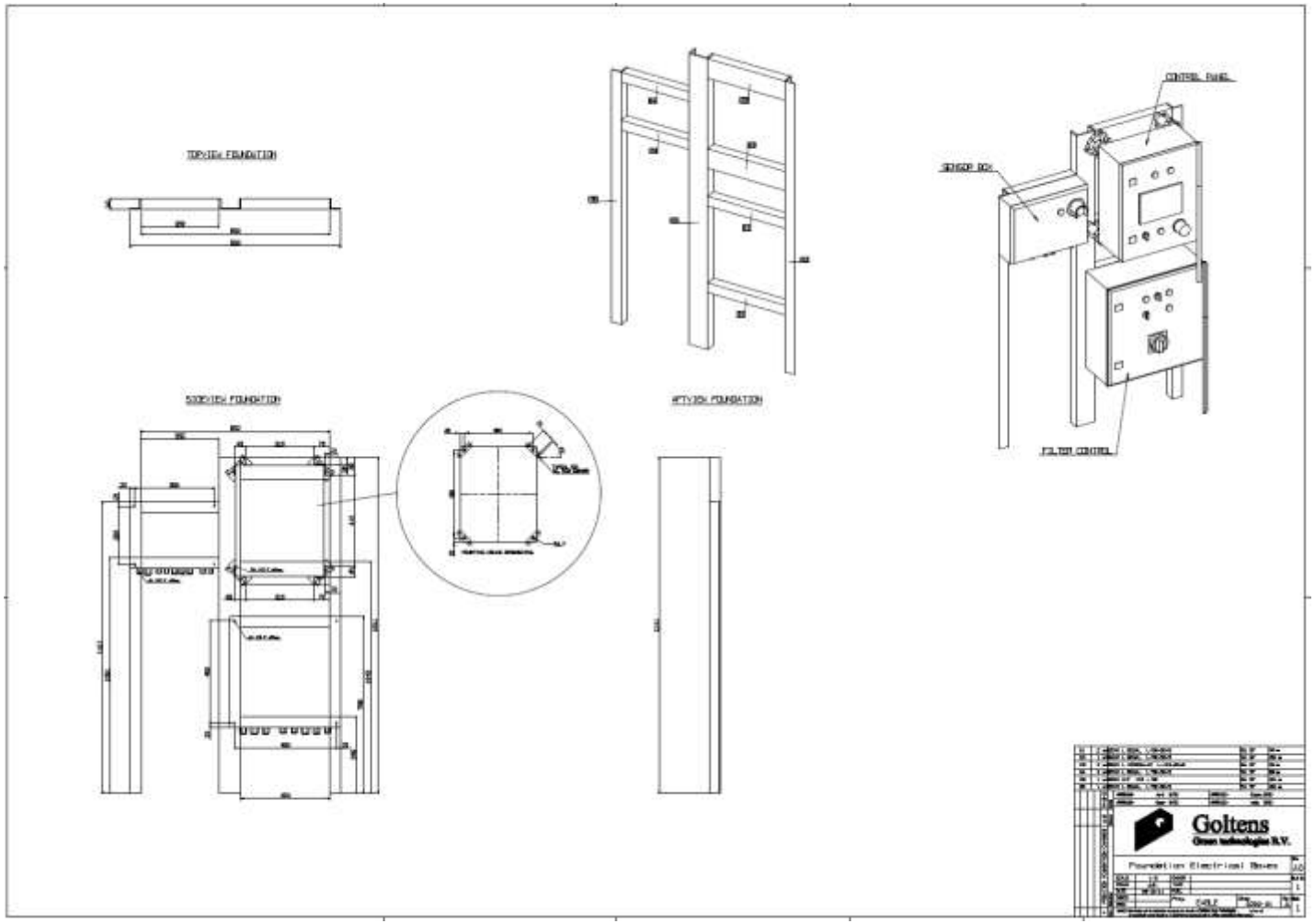
- Service filter:
  - There is enough space to remove the top of the filter and reach the candles inside



PRODUCTION DRAWINGS



FOUNDATIONS



MATERIAL LISTS

Goltens
Green Technologies

Green Technologies B.V.

MATERIAL OF: **Water Ballast system**

MATERIAL LIST

DESCRIPTION	DIMENSION	ANGLE	MATERIAL	QUANTITY (Pieces)	LENGTH in MM	WEIGHT in Kg
CONCENTRIC REDUCER DIN2616-2	219.1x6.3-168.3x4.5		St 37	1		5,40
CONCENTRIC REDUCER DIN2616-2	88.9x3.2-76.1x2.9		St 37	2		1,28
FLAT WELDING FLANGE DIN 2576	DN125 250x210x142-8x18		St 37	2		10,92
FLAT WELDING FLANGE DIN 2576	DN150 285x240x171-8x22		St 37	6		39,42
FLAT WELDING FLANGE DIN 2576	DN200 340x295x222-8x22		St 37	16		148,96
FLAT WELDING FLANGE DIN 2576	DN50 165x125x61-4x18		St 37	6		14,82
FLAT WELDING FLANGE DIN 2576	DN65 185x145x77-4x18		St 37	8		24,00
FLAT WELDING FLANGE DIN 2576	DN80 200x160x90-8x18		St 37	9		34,11
INNER SLEEVE L=100	DN50 - 76.1 x 7.1		St 37	6		7,26
INNER SLEEVE L=100	DN80 - 108.0 x 8.0		St 37	2		3,94
OUTER SLEEVE L=100 L1=20	DN50 - 95.0 x 8.0		St 37	3		5,16
OUTER SLEEVE L=100 L1=20	DN80 - 127.0 x 8.0		St 37	1		2,35
PIPE BS3059-1	139.7 x 4.0		ERW320		665,06	8,91
PIPE BS3059-1	168.3 x 4.5		ERW320		1506,14	27,42
PIPE BS3059-1	60.3 x 3.2		ERW320		7072,88	31,90
PIPE BS3059-1	76.1 x 3.6		ERW320		6003,99	37,51
PIPE BS3059-1	88.9 x 3.6		ERW320		5601,94	42,40
PIPE DIN2458/1626	219.1 x 6.3		St 37		4627,95	153,19
SMLS ELBOW 3S DIN2605	168.3 x 4.5	90	St 37	1		9,00
SMLS ELBOW 3S DIN2605	219.1 x 6.3	90	St 37	10		156,30
SMLS ELBOW 3S DIN2605	219.1 x 6.3	50	St 37	1		9,50
SMLS ELBOW 3S DIN2605	219.1 x 6.3	60	St 37	1		10,00
SMLS ELBOW 3S DIN2605	60.3 x 3.2	90	St 37	6		3,66
SMLS ELBOW 3S DIN2605	60.3 x 3.2	45	St 37	2		0,60
SMLS ELBOW 3S DIN2605	76.1 x 3.6	90	St 37	5		5,50

Prepared on: 19-1-2012

ADVANTAGES SCANNING

- Quick and accurate survey
- Possible to change the design during the process without doing a new survey
- Design once for a series of sister vessels, only collision checks after that
- Optimum preparation and prefabrication
- Minimal installation time
- Clear picture of end result
- Cost-effective
- Maximum control over process, less surprises during installation

Goltens network

Goltens
Green Technologies

green@goltens.com

Ministerie van Infrastructuur en Milieu

Ballast water Sampling

M.C. Vink
ILT/Shipping

27 januari 2012

About

The European Commission has submitted an Report of the Correspondence group on ballast water sampling and analyses to BLG (BLG 16/4)

- Reasons for sampling
- Indicative or/and Complete analysis
- Representative sampling
- Methods of test and analyses

PSC

1. Check certificate, record book and other documentation
2. Check condition of equipment and familiarity of the crew
3. Check records of ballast water monitoring system, including list of alarms
4. When necessary take indicative sample and analyses
5. If clear grounds two options:
    1. Option to rectify without performing detailed sample and analyses before departure or
    2. Perform detailed sample and analyses.

Indicatief

- May be taken during the discharge
- Value is limited
- Clear results are necessary
- Result depends also from the method of analyse used

- Indicative may also from other parameters like oxygen or chloride

- Sufficient to give a ship the option te rectify?

Detailed sampling and analyses

- All over the discharge (Ship may not start de-ballasting before PSC or Lab is on board)
- Many samples and considerable amounts of water
- Take long time
- PSC has to stay on board

What we are stil missing

- Good method to take rapidly a valid representative sample. (Indication)
- In order to taken a sample from the discharge we need a sample point as described in G2. (U shape)
- Good method to have “quick” representative analyses and to check the ballast water is conform D-2 (Detailed)

	Indicative	Complete
Sample		
Volume	Small	Big
Number	Small	Many
Representative	Not neccesary	Neccesary
Method		
Type	Biologisch, Chemisch of Fysisch	Biologisch
Time	Little	Many
Knowledge	Little	High
Detection limit	Low	High
Reliability	<95%	>95%

Methods for PSC and Crew / Quick indication

FDA (Fluorescein diacetate) within 30 min indication. (Hach BW test kit) Relative simple. Filter, ad reagent and compare. No Lab neccesary and easy to be carried out on board.

ATP (Adenosine triphosphate) Quick indication and relative simple. With a prepared stick and sterile equipment

Reliability of these methods is still in discussion. Is it reliable in different salinities or pH levels?

(For example salt or acid to be added, however may influence the species)

Quick indication 2

- Measurement of use of oxygen and CO2 production. Fit to check gross exceedence of D-2

- Check on DNA. (FISH detection) Problems with salinity of water?

- Quantity of chlorophyll whit PAM fluorometry
  - For each analysing event the PAM should be calibrated with distilled water. Samples of a ballast water discharge should be taken using a 10 litre bucket and after mixing [3] subsamples are taken and added to the optical cell for insertion into the PAM Fluorometer. Tests should be done no later than six hours after sampling.

Method for PSC

- First to take an indicative sample and if necessary later a more detailed sample

- For a detailed sample we need qualified personnel and apparatus.
  - Training of PSC officers
  - Sample has to be representative
  - Sample attributes
    - Sieves, pumps, water meter, pipettes etc
    - Transport of samples to a Lab for investigation of microbes

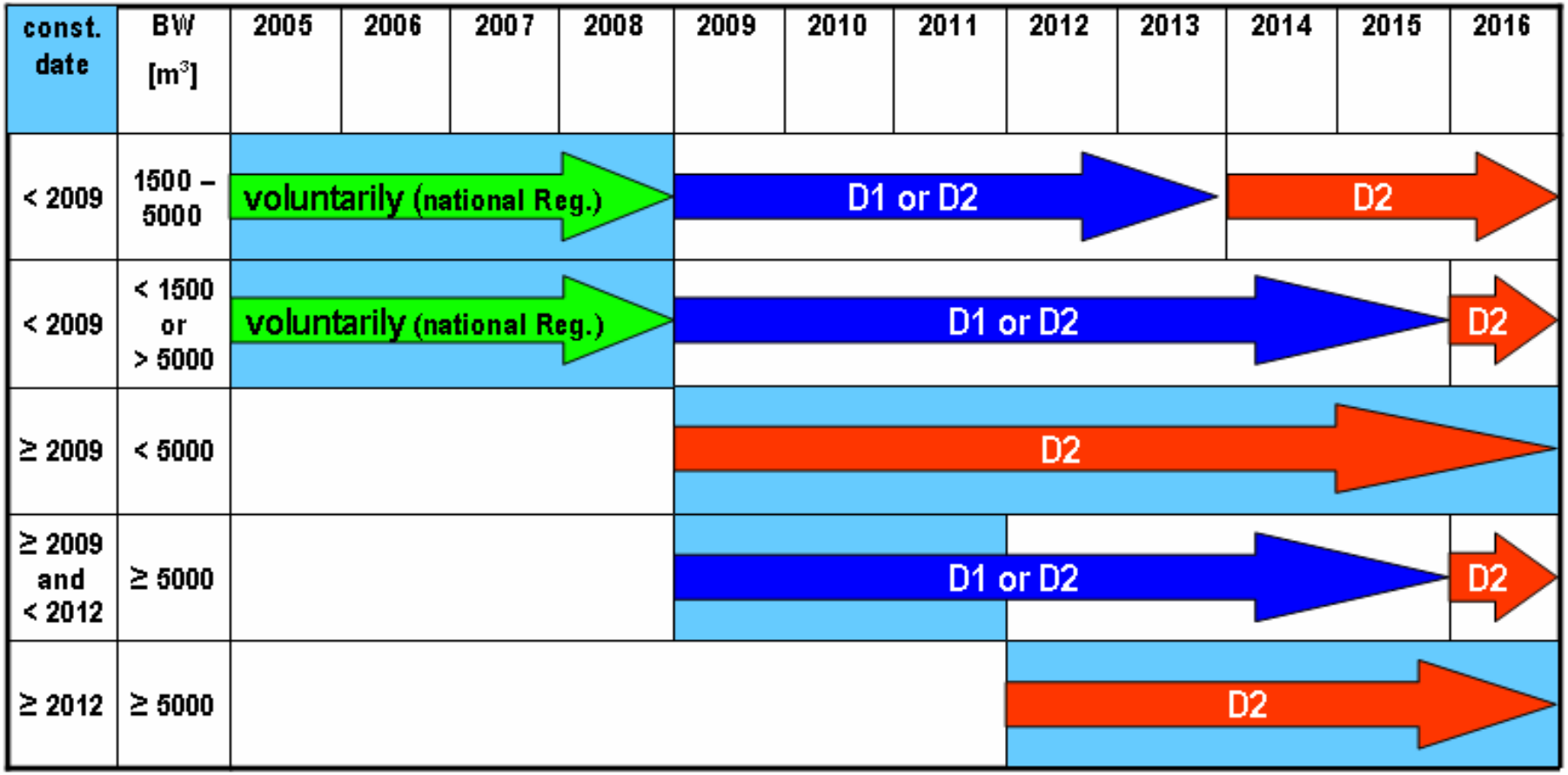
Method for PSC as well as the ship

- **Continues sampling on board.**
  1. Quick scan(FDA of PAM) and if OK end of action.
  2. If not separation of samples into (>50, <50 en > 10 en microbe)
  3. Counting of species, knowledge is necessary.

Organism µm	Methods	Remark
>50	Visual	Only> 1000 µm
>10 en < 50	PAM fluorometry	Only Fytoplankton
> 50 en > 10 en < 50	DNA, ATP, Chlorofyl	Also non living particles not usefull as stand alone indicatie (Salinity and pH)
> 50 en > 10 en < 50	FLOW cytometry	Expensive no portable equipment
Enterococci		Not suitable for indicative analyses

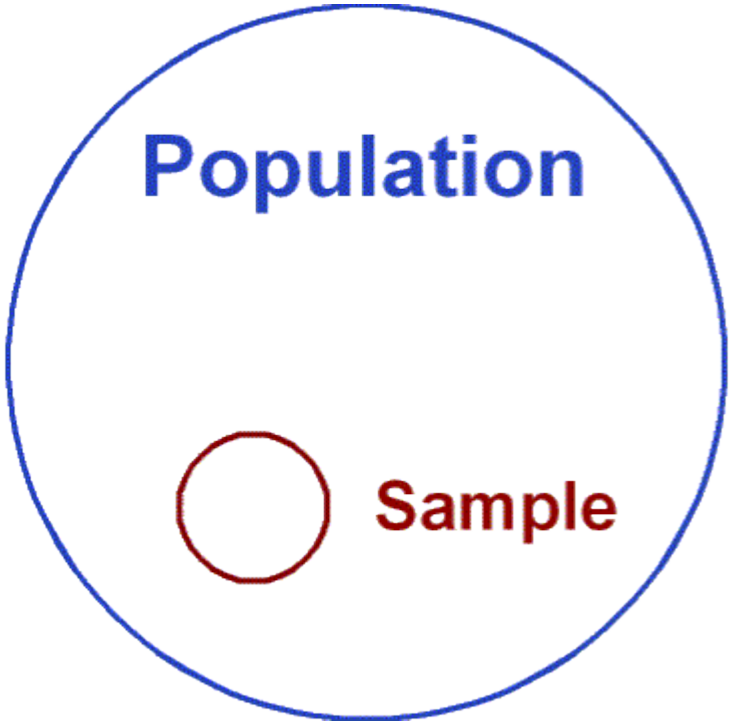
Actions possibilities if non compliance

- Use mobile treatment BWMS
- Delivery of BW to a land based treatment facility
- Arrange for discharge to another ship
- Retain BW on board
- Go back to point of origin to discharge BW
- Repair the BW management system and treat BW on board. (From tank to tank)


const. date
BW [m³]
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
< 2009
1500 – 5000
voluntarily (national Reg.)
D1 or D2
D2
< 2009
< 1500 or > 5000
voluntarily (national Reg.)
D1 or D2
D2
≥ 2009
< 5000
D2
≥ 2009 and < 2012
≥ 5000
D1 or D2
D2
≥ 2012
≥ 5000
D2

Other possibility

- Acceptable for PSC
- Class or the manufacturer check on proper functioning of the equipment sampling included for example once a year!




ALFA
LAVAL

PureBallast

Together we set the standard

Delivery and installation of a BWTS

After the ratification…

- The amount of ships which need to comply with the BWC within one year is growing steadily.

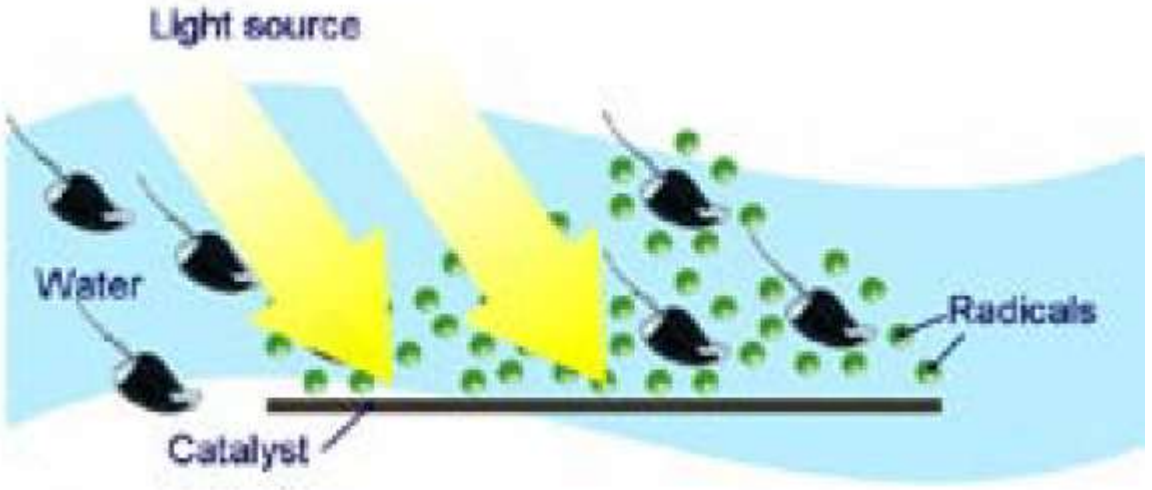
Table 2: IMO BWM Convention Implementation Schedule

Revised per Resolution A.1005(25) & MEPC.188(60)

Ballast Cpty (m^3)	Build Date	*First Intermediate or Renewal Survey, whichever occurs first, after the anniversary date of delivery in the respective year								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
< 1,500	< 2009	D-1 or D-2								D-2*
	in 2009	Note: D-1; D-2 by 2nd Annual but not beyond 31 Dec. 2011 or EIF, whichever is later								
	> 2009	D-2 (at delivery or EIF, whichever is later)								
≥ 1,500 or ≤ 5,000	< 2009	D-1 or D-2						D-2*		
	in 2009	Note: D-1; D-2 by 2nd Annual but not beyond 31 Dec. 2011 or EIF, whichever is later								
	> 2009	D-2 (at delivery or EIF, whichever is later)								
≥ 5,000	< 2012	D-1 or D-2								D-2*
	≥ 2012	N/A			D-2 (at delivery or EIF, whichever is later)					

Note: EIF = Entry into force

PureBallast



Filtration:

- 40 μm

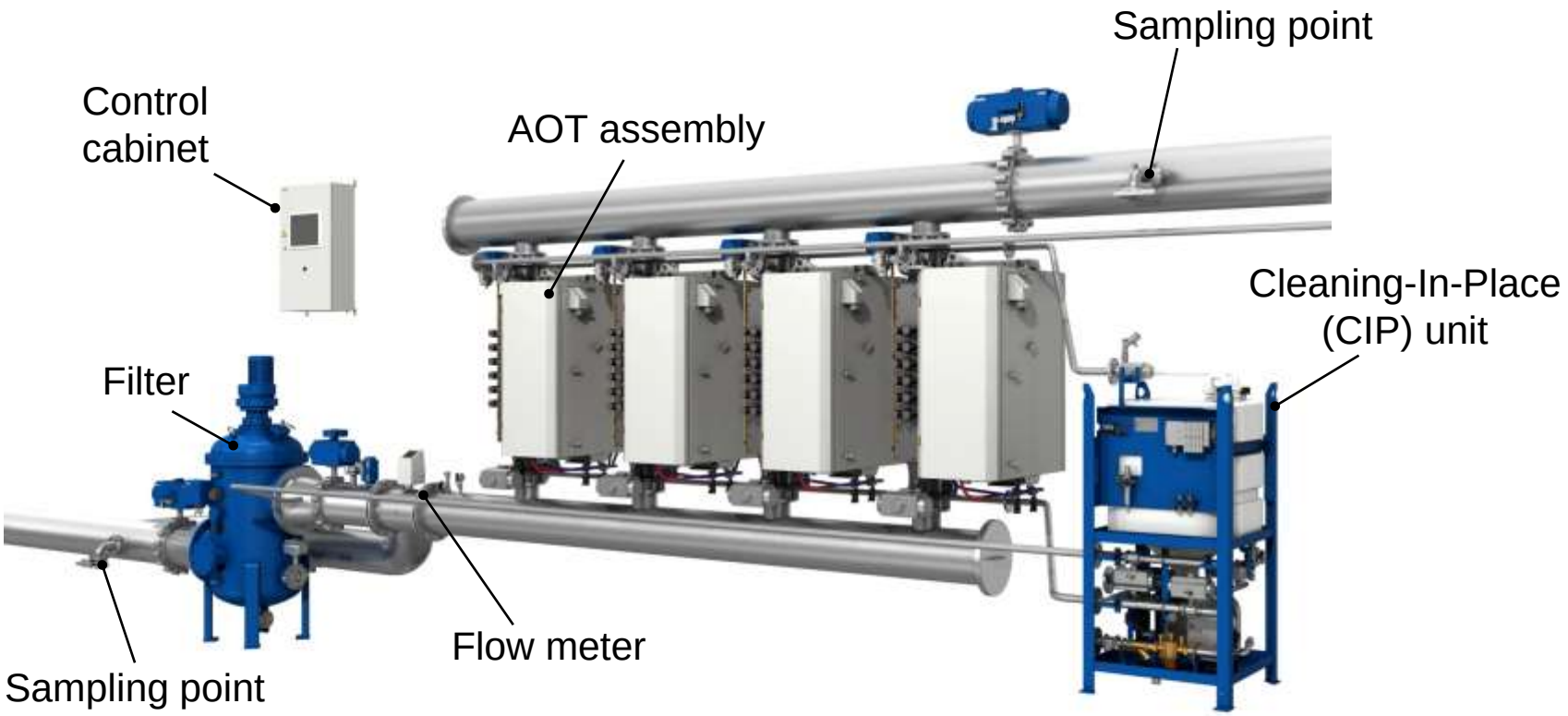
AOT (advanced oxidation technology):

- UV light + TiO_2 -> Free radicals

PureBallast

- Easy to operate
- Self cleaning after each ballast and deballast cyclus
- Ensures 100% performance
- Low life cycle cost

PureBallast 1000



PureBallast

- Safe for crew, vessel and environment
- Chemical free
- Sea-worthy materials
- No holding time in ballast tanks
- Independent of turbidity and salinity

More than a system

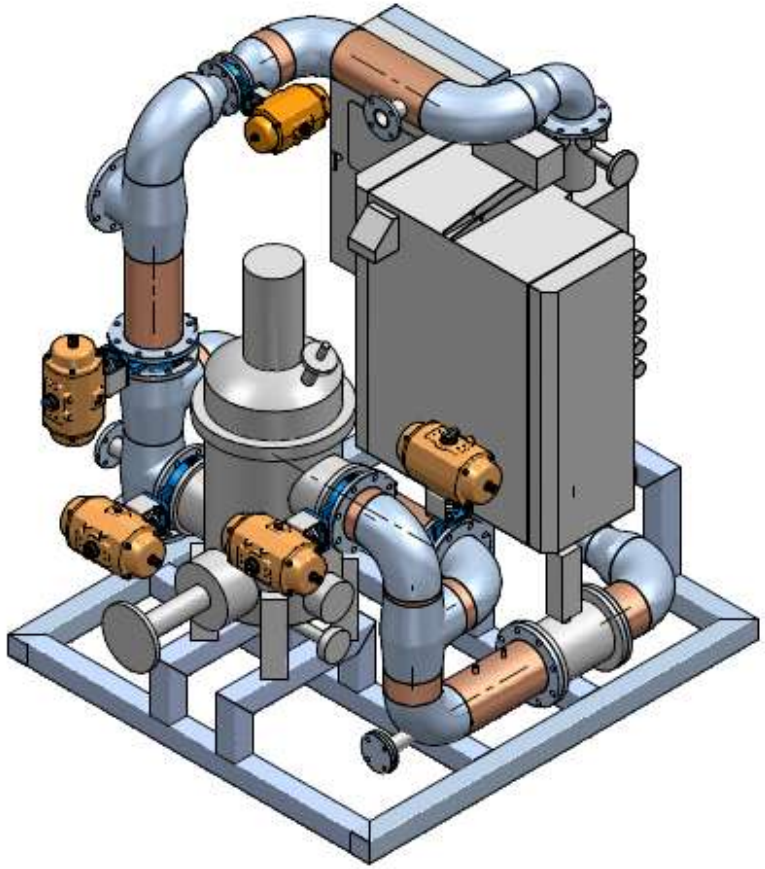
- After delivery the treatment system needs to be installed onboard.
- Partnership with Leemberg Pijpleidingen en Apparatenbouw B.V.

Leemberg Pijpleidingen en Apparatenbouw BV

&

More than a system

- Modules
  Standard - custom build
- Pre-survey
  -Survey report
  -Drawings
  -Installation advice
  -Electrical
- Detailed quote



More than a system

Engineering Survey

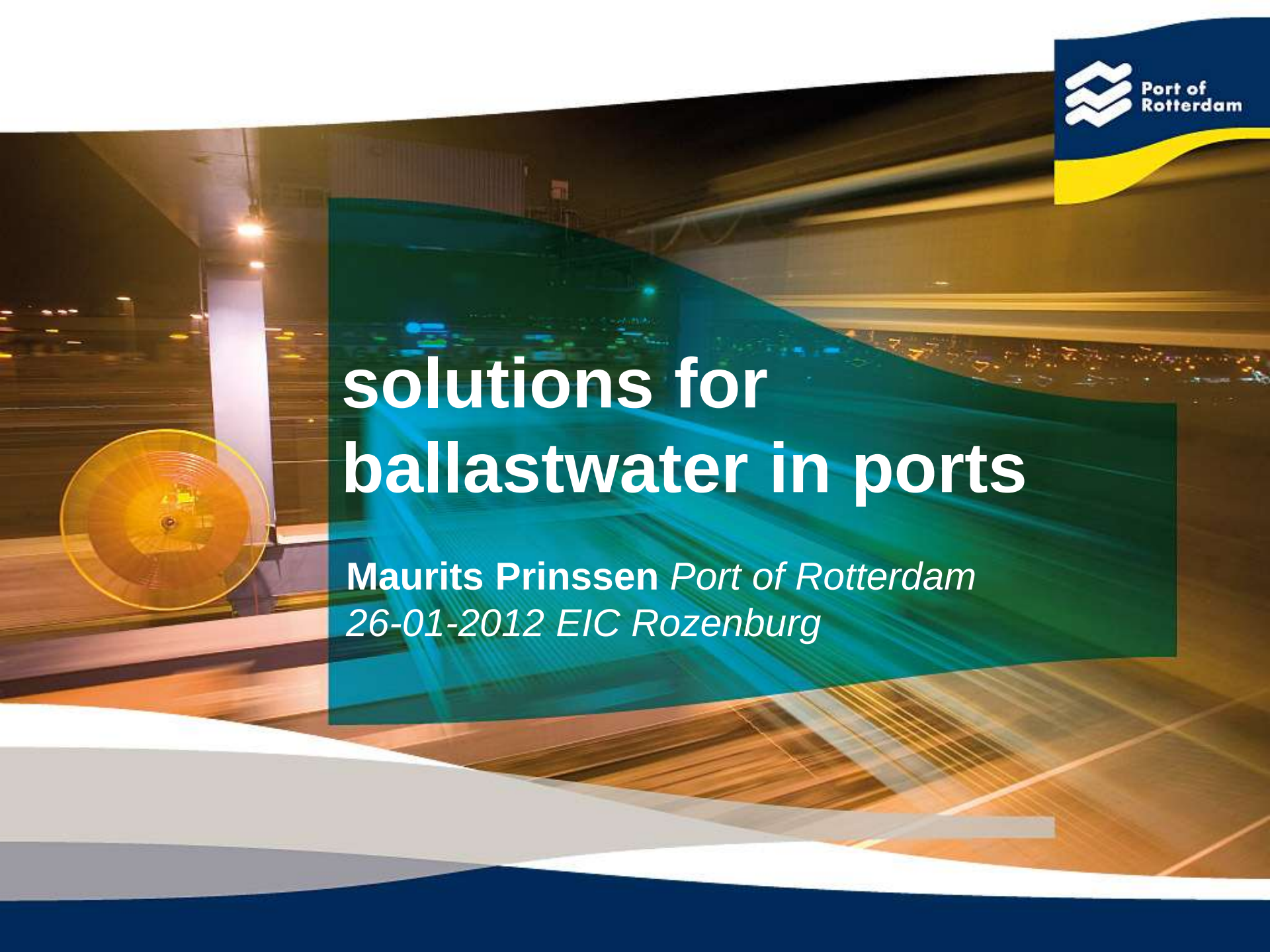
Deliverables:

- Outline drawing
- Class drawings
- Production drawings

Together we set the standard

- Worldwide supplier with dedicated BWT team
- High quality products combined with the experience and knowledge from Leemberg makes a strong team and a perfect fit to provide excellent solutions to their customers.
- Peace of mind, we offer a turn-key solution


ALFA
LAVAL



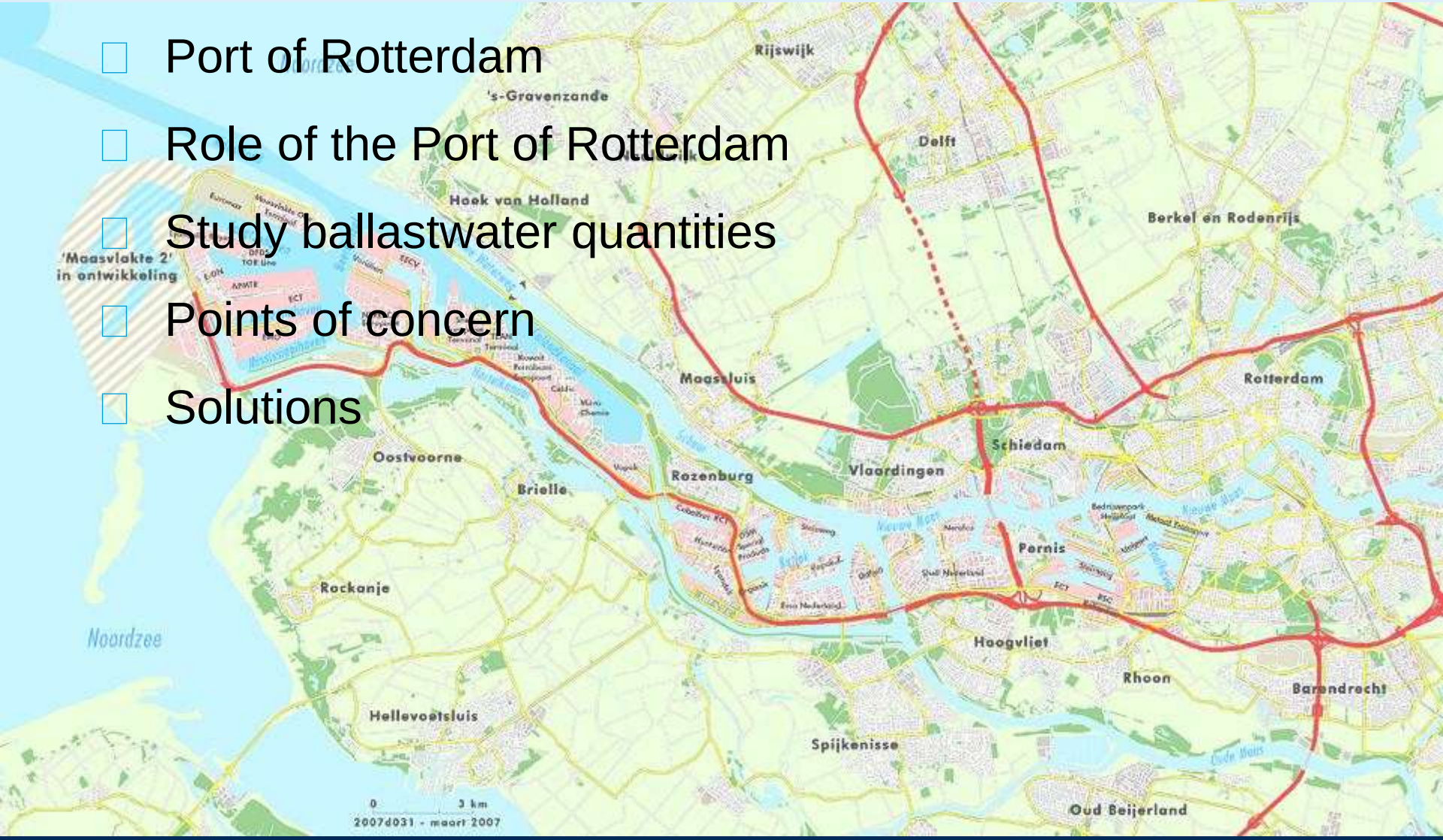
solutions for ballastwater in ports

Maurits Prinssen *Port of Rotterdam*

26-01-2012 EIC Rozenburg

Content

- Port of Rotterdam
- Role of the Port of Rotterdam
- Study ballastwater quantities
- Points of concern
- Solutions



Port of Rotterdam 2011

- approx. 33,700 calling seagoing vessels
- approx. 9,900 calling tankers
- approx. 130,000 calling inland vessels

- 433 million tons (gross weight. +0.8%)
  - 308 million tons supply (+0.8%)
  - 126 million tons distribution (+0.7%)
- 11,900,000 TEU (+6%)

Ballast Water Convention

- not yet ratified
- parties of IMO
  - defined the problem of transport of invasive species
  - one source is ballast water
  - problems occur on board
  - so solution should be on board
- frontrunners some states

Part of the found invasive species

- 1731: shipworm (‘paalworm’) bivalve Teredo navalis
- 1762: ascidians Molgula manhattensis
- 1827: zebra mussel Dreissena polymorpha
- 1910: snail Crepidula fornicata
- 1931: Chinese crab Eriocheir sinensis
- 1945: barnacle Elminius modestus
- 1974: ascidians Styela clava
- 1990: asiatic clam Corbicula fluminea
- 2003: Japanese crab Eriocheir takanoi
- 2003: Asian shore crab Hemigrapsus sanguineus

- Some of them have effect on wooden infrastructure, in-/outlet of cooling systems

Years indicate first recording of species

Role of port (I)

- No big role, only:
  - PRF for sediments?
  - PRF for water?
- BWC guidelines
  - G1: Guidelines for sediments reception facilities
  - G5: Guidelines for ballastwater reception facilities
  - no mandatory RF for ports at this moment
- (small quantities of) sediments can be disposed and treated (incinerated) in Rotterdam
- (large quantities of) ballastwater can not be disposed and treated in Rotterdam

Role of port (II)

- Damage control for port infrastructure
- ERF (Emergency Response Facility) for unwanted ballastwater discharge in port waters?
- Responsibility for the waterquality is 'Rijkswaterstaat', ‘Waterlaw’
- BWC include in Law prevention pollution by shipping
- PSC or FSC is done by Inspection Leefomgeving & Transport (Netherlands Shipping Inspectorate)
  - *Detained vessels in port have several consequences*

Anticipation of port

- prevent detained vessels in the port
  - adopt port entry rules:

    ‘only vessels which comply with BWC are welcome’?
  - challenge for vessels which out of service short after 2016: 2017/2019.

    No investments for those ships for 2-3 years of operation?
  - new market for port services?

    mobile treatment plant (facilitated by port services provider)
- Wait and we will see?

Some actions in the past to understand more of the quantities and origin of bw in Rotterdam

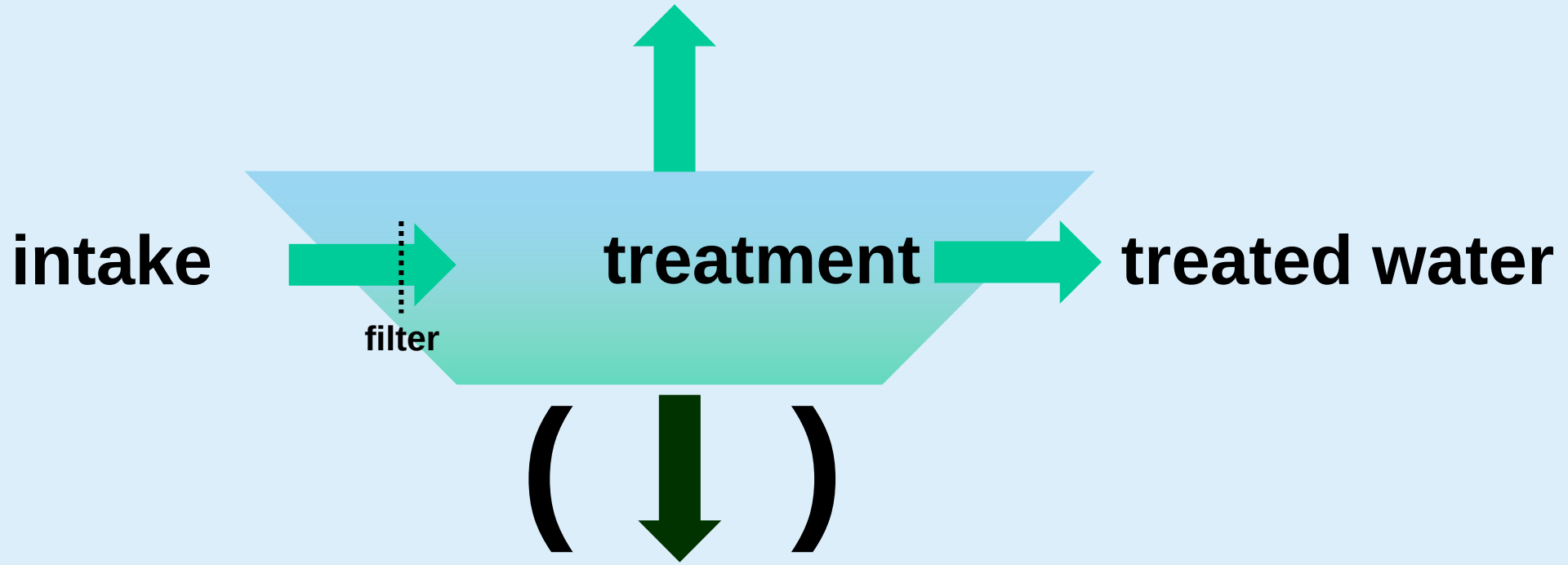
- First questionnaire 1998
- second questionnaire 2004
- latest study in 2008
- INTERREG IV program Together with other (EU) ports
- Discuss with possible providers of Mobile Treatment Facilities

Our view on ballastsediment

- nowadays sediments are removed (for maintenance reasons) by specialized companies
- before installing the BWT, the sediments will have to be removed by cleaning at sea or in dock for existing vessels
- only small amounts of sediments (sand) are produced (enter into the system)
- most BWT produce no new waste streams
- waiting for more experience with the BWT

Ballast treatment concept

Backflush/wash in sea during voyage



( )

waste disposal in port
e.g. flocs or sludge

Case: waste production by ballasttreatment

- Intake 77 million m^3 (in 2008)
- Discharge 35 million m^3 (in 2008)
- Most BWT produce almost no waste/sediments
- If 10% visiting vessels (of e.g. 35,000) installed BWT with 0.005 % waste production
  - Minimum new waste stream is 175 m^3 / year
- If 10% calling vessels installed BWT with 0.1% waste/sediment production:
  - Minimum new waste stream is 3,500 m^3 / year

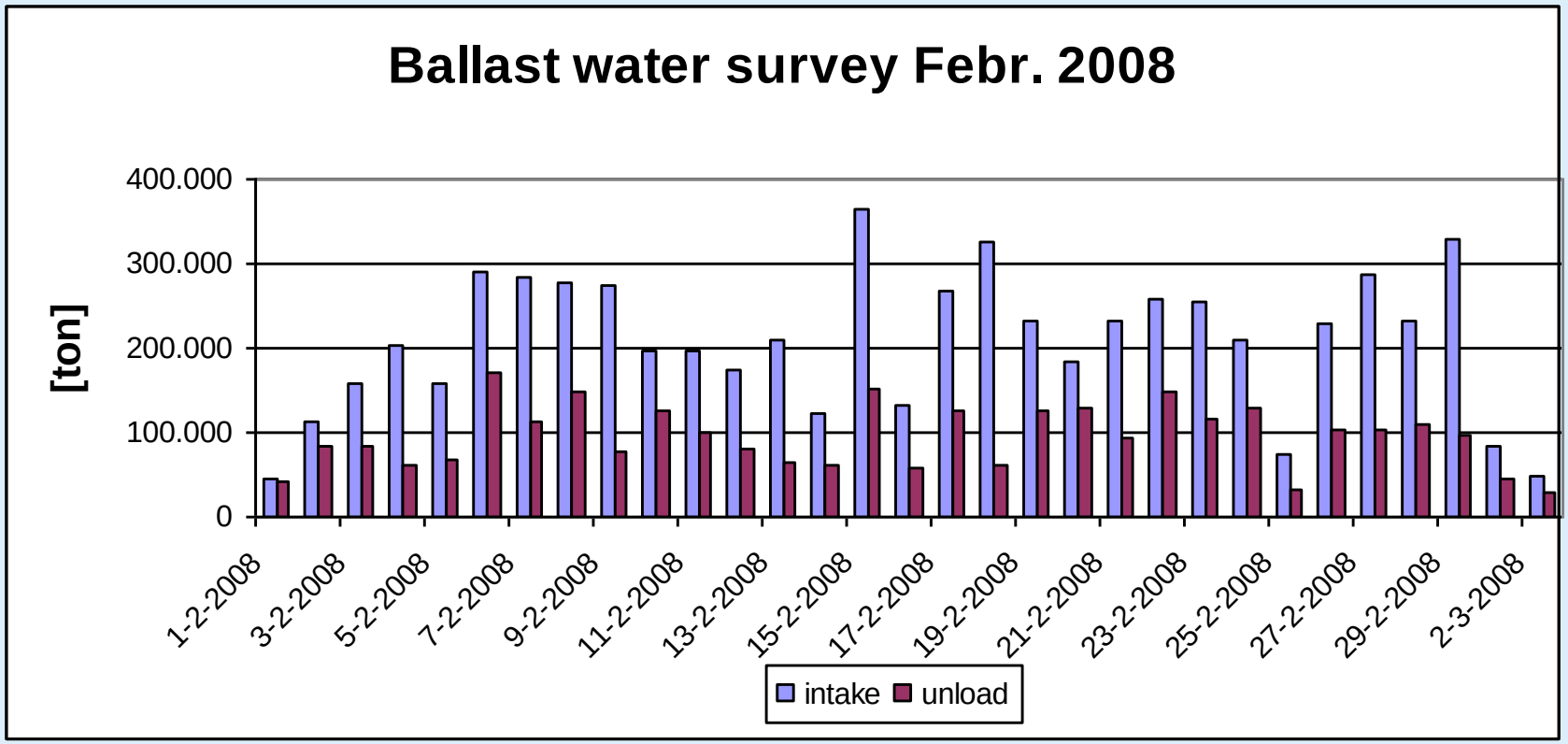
Weighted typical average ballast water intake and discharge

quantities per ship type and size

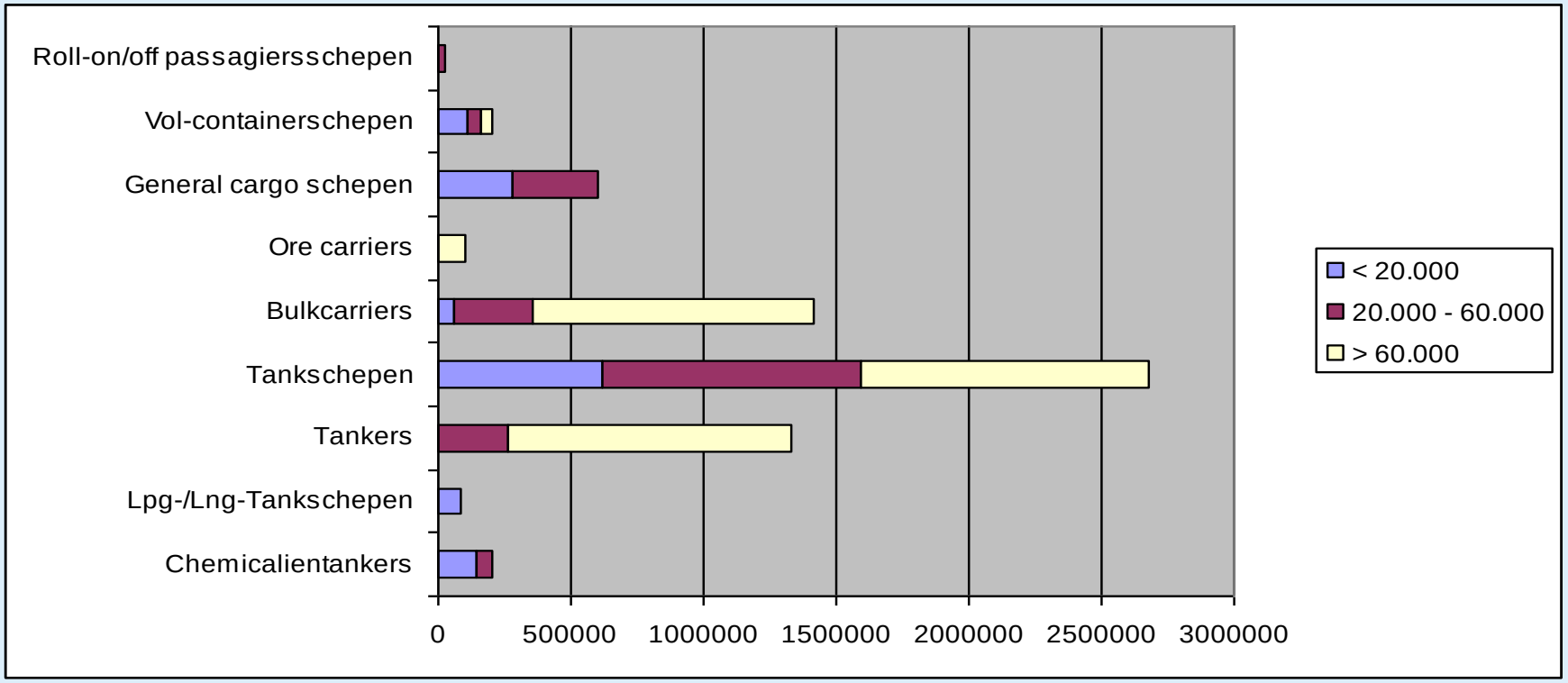
Ship type	Intake (m^3)			Discharge (m^3)		
	≤ 20,000	20,000 – 60,000	> 60,000	≤ 20,000	20,000 – 60,000	> 60,000
Chemical tankers	1,523	2,642	0	1,253	5,167	92,000
LPG / LNG tankers	1,658	-	-	40	-	-
Tankers	1,845	12,080	37.203	854	3,558	11,250
Bulk carriers	3,000	10,170	66.043	-	0	0
Ore carriers	-	-	16.653	-	-	0
Ore-bulk-oil carriers	-	-	-	-	-	-
General cargo ships	426	12,626	0	369	298	0
Containerships	311	442	396	295	330	7,900
Dredging vessels	-	-	-	-	-	-
Off-shore ships	-	-	-	-	-	-
Research vessels	-	-	-	-	-	-
Other ships	-	-	-	-	-	-
(Roll-on/off) passenger ships	0	100	-	400	100	-
Tugs	-	-	-	-	-	-

www.scheepsemissies.nl/images/files/PoR%20Ballastwater%20quantities%20feb%202008%20final%20rev%20aug%202008.PDF

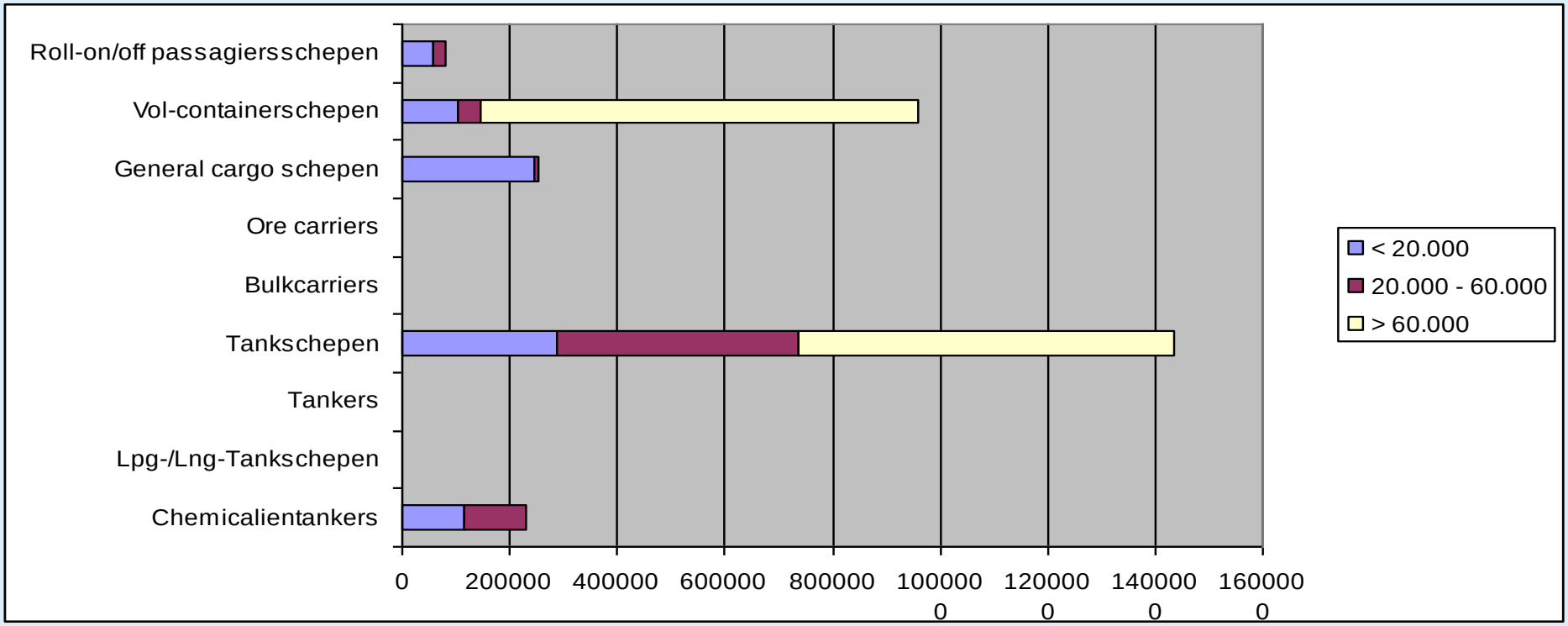
Intake and unload in February 2008



Total intake amounts (m3) calculated for 2008



Total discharge amounts (m3) calculated for 2008



Ballast exchange % volume basin (worst case approach)

Table 3.9 Top 10 harbour basins for ballast water intake, as percentage of harbour basins volume (February 2008)

Harbour basins	Harbour basins volume (m3)	Ballast water intake	
		Quantity (m^3)	Percentage of the harbour basins volume (%)
Donauhaven	181,104	18,450	10.2
Petroleumhaven 5	7,908,989	695,937	8.8
Petroleumhaven 4	4,338,826	288,265	6.6
Kon. Wilhelminahaven	732,225	40,375	5.5
Petroleumhaven 7	18,851,738	901,387	4.8
Mississippihaven	17,042,813	757,552	4.4
Petroleumhaven 6	7,370,133	306,006	4.2
Petroleumhaven 3	8,487,563	348,893	4.1
Torontohaven	734,500	2	
Petroleumhaven 8	9,305,506	29	

Table 3.10 Top 10 harbour basins for ballast water discharge, as percentage of harbour basins volume (February 2008)

Harbour basins	Harbour basins volume (m3)	Ballast water discharge	
		Quantity (m^3)	Percentage of the harbour basins volume (%)
Donauhaven	181,104	8,540	4.7
Amazonehaven	11,920,832	404,551	3.4
Kon. Wilhelminahaven	732,225	22,190	3.0
Petroleumhaven 4	4,338,826	111,126	2.6
Petroleumhaven 5	7,908,989	200,484	2.5
Petroleumhaven 3	8,487,563	200,692	2.7
Torontohaven	734,500	15,836	2.2
Vulcaanhaven	1,941,832	36,976	1.9
Petroleumhaven 7	18,851,738	325,044	1.7
Prinses Beatrixhaven	3,320,280	52,826	1.6

Quantities in Antwerp and Rotterdam

	Port of Antwerp 2008	Port of Rotterdam 2008
Discharge	24 mio m3 p.y. 0,76 m3 p.s.	35 mio m3 p.y. 1,1 m3 p.s.
intake	89 mio m3 p.y. 2,8 m3 p.s.	77 mio m3 p.y. 2,4 m3 p.s.

Points of concern (I)

- **Malfunctions:**
  - Turn Around Time (TAT)
    - Terminal capacity
    - Logistics
    - Port dues
    - -> all result in extra costs shipowner
- **Port Reception Facilities**
  - Frequency
  - Quantities
  - Capacity
  - Quality sediment and water
  - Treatment onshore(burning sediment and mobile BWTplant?)

Points of concern (II)

- Stores, delivery and handling of chemicals
  - bulk (ADN?) by barge or truck
  - Solid packing (ADN?) by barge or truck
- Effect to airquality if BWT are used in port area/North Sea
- For good calculation of bw quantity a good calculation of the weight of the cargo is needed
- PoR wants notification (location/Time of Discharge) for:
  - Malfunction BWT
  - mandatory discharge bw
- Prevent undue delay

Solutions in the port

- Wait for ratification proces BWC IMO
- Discharge ballastsediments in RF
- Follow discussion on mobile BWT systems


as many others we try to prepared for the BWC,
but we don't have all the answers yet
we will learn and discuss with others in the coming
years to comply with the general goal of the BWC