

Seminar
'Ballastwater: regelgeving en behandeling'

Woensdag 22 juni 2016





Programma

13.00 uur	Ontvangst	
13.30 uur	Openingswoord en introductie	Edo Donkers Dagvoorzitter
13.40 uur	Wat moet een reder weten over de verschillende mondiale / regionale / nationale ballastwaterregelgeving?	Niels van de Minkelis Stafmedewerker, KVNR
14.10 uur	Wat moet/mag een reder doen om aan de verschillende ballastwaterregelgeving te voldoen?	Niels van de Minkelis Stafmedewerker, KVNR
14.40 uur	Hoe zal er gehandhaafd en geïnspecteerd worden?	Kees Hak, Inspecteur, Inspectie Leefomgeving en Transport
15.10 uur	Pauze	
15.30 uur	Tien jaar ballastwater testpraktijk: de keuze aan behandelingssystemen hoe aan alle normen te voldoen?	Marcel Veldhuis, Senior Scientist, Marine Eco Analytics (MEA-nl)
16.00 uur	Ballast Water Treatment Retrofit: A shipyard perspective	Stef Loffeld, Manager Retrofits, Damen Green Solutions
16.30 uur	Vragen en discussie	Onder leiding van dagvoorzitter
17.15 uur	Netwerkgelegenheid	
18.00 uur	Einde bijeenkomst	



Jullie dagvoorzitter: Edo Donkers

Time machine: 1972



+The Year's Highlights+
WHO on invasive species: spread of cholera in South-American ports by... ships?



1998-2016



Marine Environmental Awareness Course

BLOCK 1 Introduction, sustainable shipping and the marine environment

- Introduction – lecture
- Personal opinions – workshop
- Marine environment – lecture
- Regional marine area – background article

BLOCK 2 Environmental challenges I

- Discharges to the sea – lectures
 - Chemicals
 - Oil (+ 1 movie)
 - Sewage
 - Solid waste (+ 3 movies)
- Reputation of shipping – workshop

BLOCK 3 Environmental challenges II

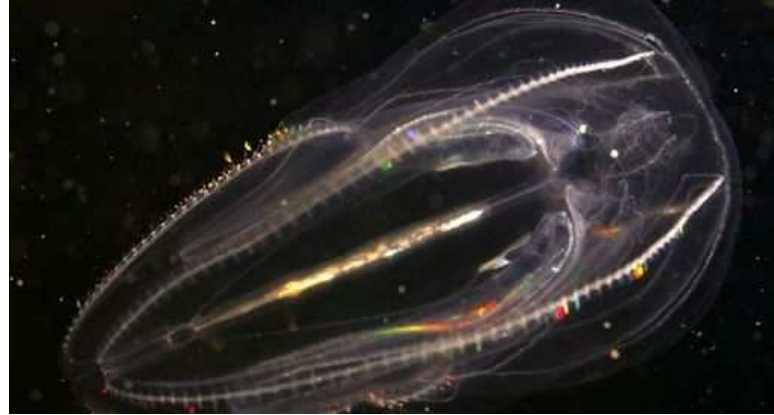
- Emissions to air – lectures
 - Overview
 - Greenhouse gases
 - Ozone depleting substances
 - Other emissions to air (focus on SO_x, NO_x, PM)
- Introduction of invasive species including ballast water – lecture
- Other impacts on the marine environment – lectures
 - Noise
 - Antifouling paint
 - Ship recycling

BLOCK 4 Pollution prevention, personal involvement

- Pollution prevention measures – workshop
- Personal involvement – workshop

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Invasive Species: *zijn we nog op tijd?*





Hellenic Center of Marine Research

Number of Aliens in European Seas

Total 851
Dec.2005

Streftaris et al., 2005

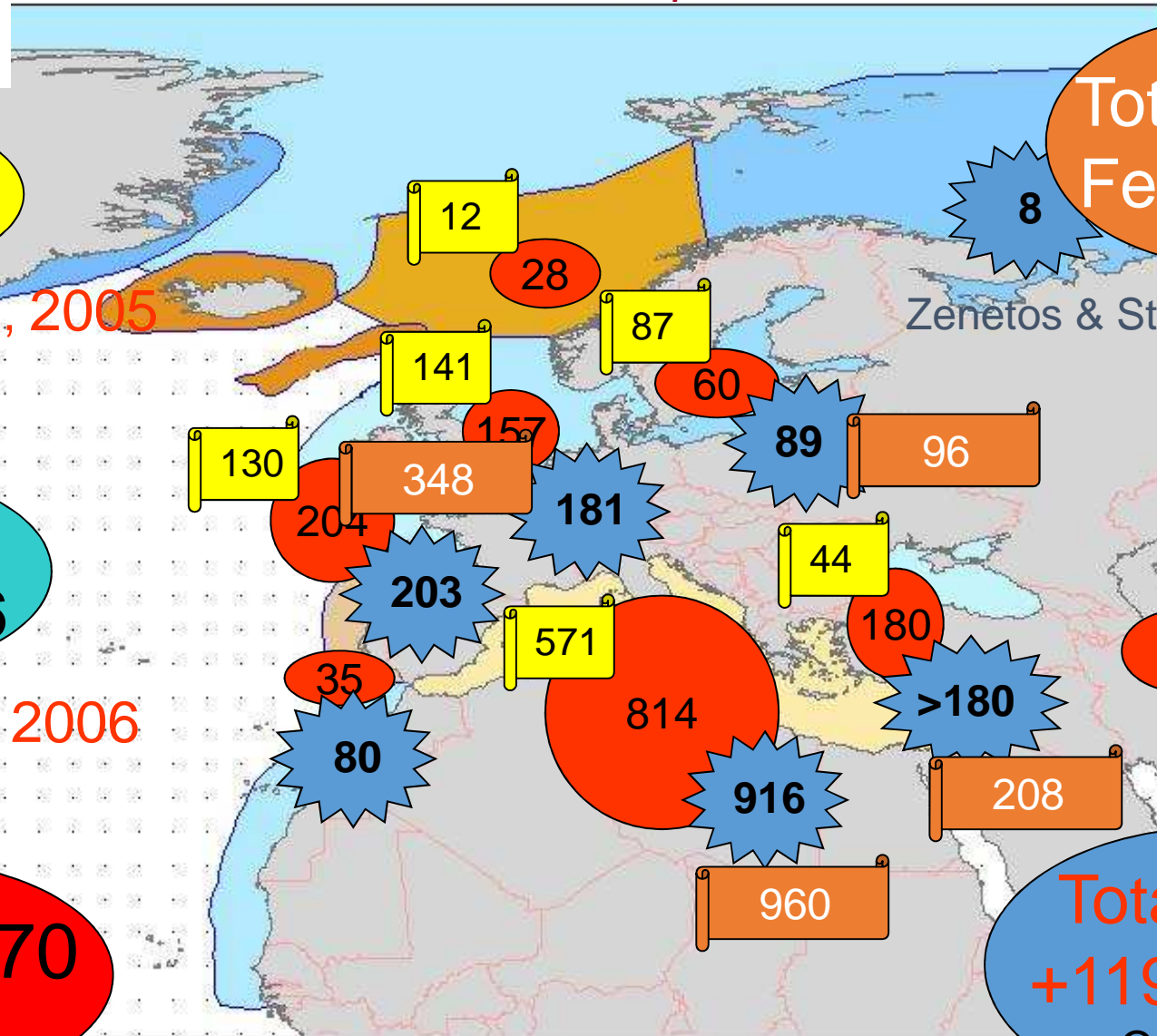
Total 963
Dec.2006

Zenetos et al., 2006

Total 1270
Dec.2007

Zenetos & Streftaris, 2008

Marine Awareness Course
- Eletsos, Piraeus, 14
15/3/2011



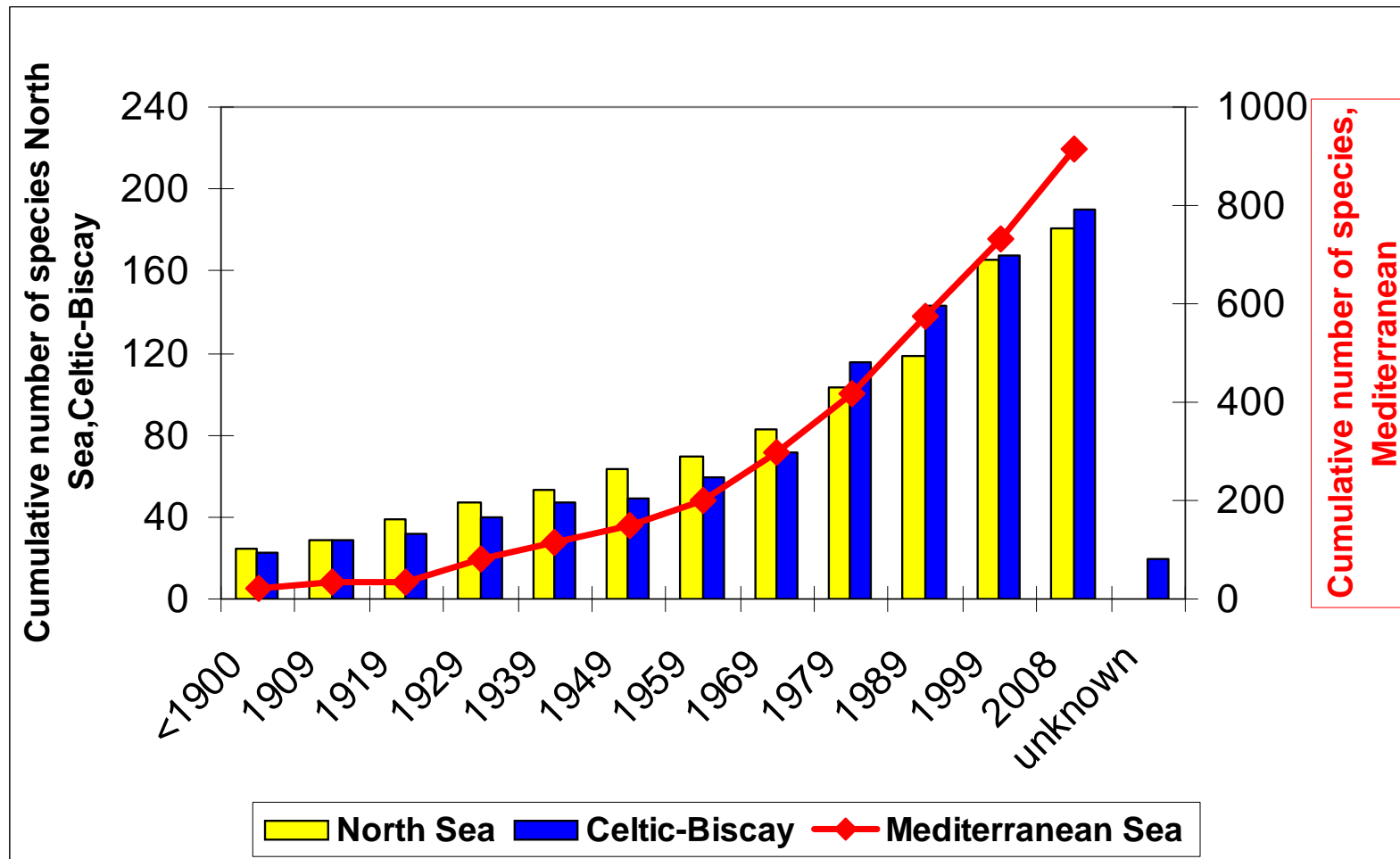
Total 1391
Feb. 2010

Zenetos & Streftaris, 2010

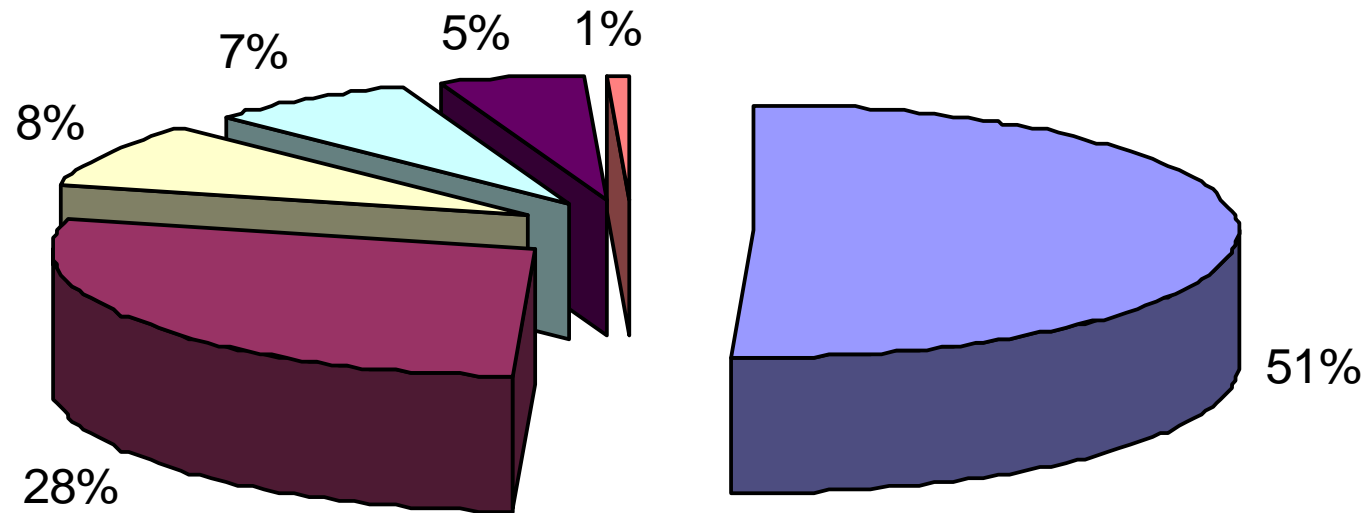
Total 1373
+119 FR/BR
Oct. 2008

Zenetos et al., 2008

Aliens in European Seas: trends



Mode of introduction of alien species



■ suez ■ shipping ■ aquaculture ■ gibraltar ■ questionable ■ other



GiMarIS, A. Gittenberger 2009



INTRODUCTIE KVNR

COLLECTIEVE EN INDIVIDUELE VERTEGENWOORDIGING VAN

- MEER DAN 400 NEDERLANDSE REDERS EN SCHEEPSBEHEERDERS
- 100 GEASSOCIEERDE LEDEN
- 1100 SCHEPEN DIE DE NEDERLANDSE VLAG VOEREN
- 30.000 WERKNEMERS WAARVAN 5.500 AAN BOORD





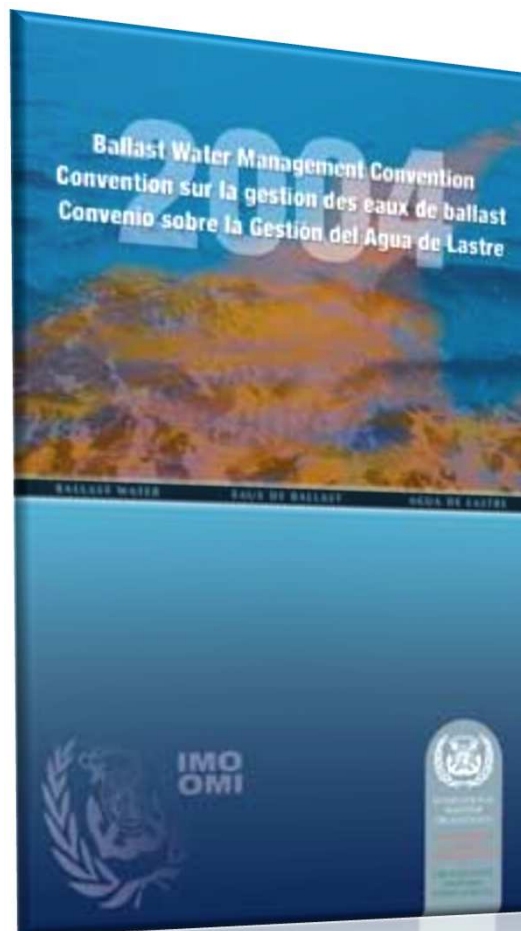
**WAT MOET EEN REDER WETEN
OVER DE VERSCHILLENDE
MONDIALE / REGIONALE / NATIONALE
BALLASTWATERREGELGEVING?**

**WAT MOET/MAG EEN REDER DOEN OM AAN DEZE
REGELGEVING TE VOLDOEN?**

MONDIALE BALLASTWATERREGELGEVING



Internationaal Verdrag voor de controle en het beheer van ballastwater en sedimenten van schepen



14 richtsnoeren (guidelines) voor de uniforme implementatie van het ballastwaterverdrag

Resolution	Title	Status
MEPC.152(55)	Guidelines for sediment reception facilities (G1)	
MEPC.173(58)	Guidelines for ballast water sampling (G2)	
MEPC.123(53)	Guidelines for ballast water management equivalent compliance (G3)	
MEPC.127(53)	Guidelines for ballast water management and development of ballast water management plans (G4)	
MEPC.153(55)	Guidelines for ballast water reception facilities (G5)	
MEPC.124(53)	Guidelines for ballast water exchange (G6)	
MEPC.162(56)	Guidelines for risk assessment under regulation A-4 of the BWM convention (G7)	
MEPC.174(58)	Guidelines for approval of ballast water management systems (G8)	Revokes MEPC.125(53)
MEPC.169(57)	Procedure for approval of ballast water management systems that make use of active substances (G9)	Revokes MEPC.126(53)
MEPC.140(54)	Guidelines for approval and oversight of prototype ballast water treatment technology programmes (G10)	
MEPC.149(55)	Guidelines for ballast water exchange design and construction standards (G11)	
MEPC.209(63)	2012 Guidelines on design and construction to facilitate sediment control on ships (G12)	Revokes MEPC.150(55)
MEPC.161(56)	Guidelines for additional measures regarding ballast water management including emergency situations (G13)	
MEPC.151(55)	Guidelines on designation of areas for ballast water exchange (G14)	

Inwerkingtreding

“Twaalf maanden na de datum waarop ten minste dertig staten, waarvan de koopvaardijvloeden tezamen ten minste vijfendertig procent vormen van de bruto-tonnage van de wereldkoopvaardijvloot, het verdrag hebben ondertekend zonder voorbehoud ten aanzien van bekrachtiging, aanvaarding of goedkeuring of in overeenstemming met artikel 17 de vereiste akte van bekrachtiging, aanvaarding, goedkeuring of toetreding hebben neergelegd.”

Stand van zaken (13 juni 2016):

- 51 landen
 - 34,87 %
- Finland oktober 2016?

Implementatieschema voorschrift D-2 (norm voor behandeling van ballastwater)

conform voorschrift B-3 in combinatie met IMO-resolutie A.1088(28)

Voor-schrift	Ballastwatercapaciteit	Datum bouw**	Nalevingsdatum
B-3.1.1	Meer dan 1,500 m ³ , maar minder dan 5,000 m ³	Voor 2009	Eerstvolgende herkeuring voor IOPP-certificaat* na de datum van inwerkingtreding van het verdrag
B-3.1.2	Minder dan 1,500 m ³ of meer dan 5,000 m ³	Voor 2009	
B-3.3	Minder dan 5,000 m ³	In of na 2009, maar voor de datum van inwerkingtreding van het verdrag	
B-3.4	5,000 m ³ of meer	In of na 2009, maar voor 2012	
B-3.5	5,000 m ³ of meer	In of na 2012, maar voor de datum van inwerkingtreding van het verdrag	
	Iedere capaciteit	Op of na de datum van inwerkingtreding van het verdrag	Tijdens oplevering schip

* IOPP is het Internationaal certificaat ter voorkoming van verontreiniging door olie

** "gebouwd", met betrekking tot een schip een stadium in de bouw waarin:

- .1 de kiel wordt gelegd; of
- .2 de bouw specifiek voor een bepaald schip aanvangt; of
- .3 is aangevangen met de montage van dat schip, dat ten minste 50 ton of 1 procent van de geschatte massa van alle bouwmateriaal omvat, naar gelang van welke van beide het minst is; of
- .4 het schip een belangrijke verbouwing*** ondergaat.

*** "belangrijke verbouwing", de verbouwing van een schip:

- .1 waarbij de ballastwatercapaciteit met 15 procent of meer wordt gewijzigd, of
 - .2 waarbij het scheepstype verandert, of
 - .3 waarbij, naar het oordeel van de administratie, beoogd wordt de levensduur met ten minste tien jaar te verlengen, of
 - .4 die leidt tot veranderingen in het ballastwatersysteem anders dan vervanging van onderdelen met soortgelijke onderdelen.
- Verbouwing van een schip teneinde te voldoen aan de bepalingen van voorschrift D-1 wordt voor de toepassing van deze Bijlage niet aangemerkt als een belangrijke verbouwing.

Na inwerkingtreding en tot datum waarop aan D2-standaard voldaan moet worden (normaliter behandeling van ballastwater) → wisselen van ballastwater

Voorschrift D-1. Norm voor de wisseling van ballastwater

- 1. Schepen die ballastwater wisselen dienen zulks te doen met een efficiëntie van ten minste 95% aan volumetrische wisseling van ballastwater.*
- 2. Schepen die ballastwater wisselen door in- en uitpompen, waarbij het volume van **elke ballastwatertank driemaal in en uit wordt gepompt** worden geacht te voldoen aan de norm omschreven in punt 1. Minder dan driemaal het volume in- en uitpompen kan worden aanvaard, mits aangetoond kan worden dat voldaan wordt aan ten minste 95 percent van de volumetrische wisseling.*

Vereisten voor schepen

Het verdrag schrijft voor dat elk schip met een bruto-tonnage van 400 ton of meer:

- 1) een *ballastwaterbeheersplan* aan boord dient te hebben en te implementeren. Een dergelijk plan dient te worden goedgekeurd door de vlaggenstaatadministratie (voorschrift B-1).



Een ballastwaterbeheersplan bevat ten minste:

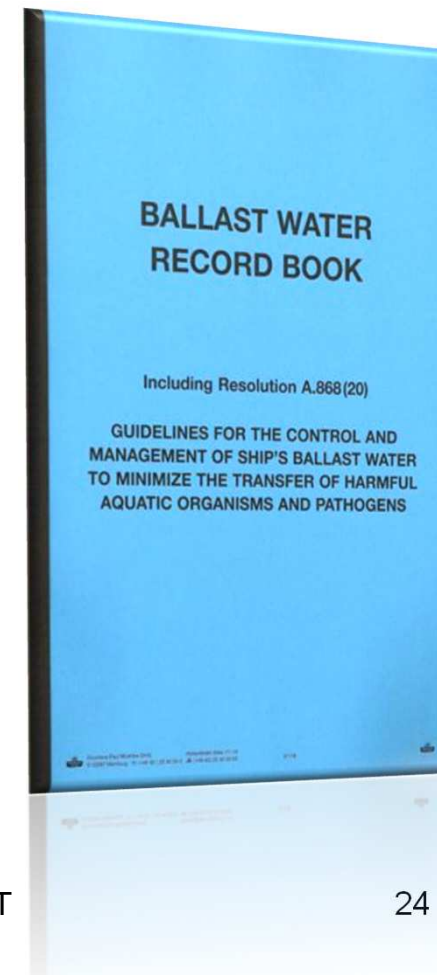
- a) gedetailleerde veiligheidsprocedures voor schip en bemanning bevat ter zake van ballastwaterbeheer zoals vereist door dit Verdrag;
- b) voorziet in een gedetailleerde beschrijving van de te treffen maatregelen om het ballastwaterbeheersplan te implementeren alsmede aanvullende praktijken voor ballastwaterbeheer zoals vervat in dit Verdrag;
- c) details dient te vermelden van de procedures voor het verwijderen van sedimenten:
 - .1 op zee; en
 - .2 aan de wal;

- d) de procedures bevat voor de afstemming van ballastwaterbeheer aan boord inzake het lozen op zee, met de autoriteiten van de Staat in de wateren waarvan de lozing zal plaatsvinden;
- e) de officier aan boord aanwijst die verantwoordelijk is voor het waarborgen dat het plan naar behoren wordt geïmplementeerd;
- f) de rapportagevereisten bevat voor de schepen voorzien in dit Verdrag; en
- g) opgesteld is in de werktaal van het schip. Ingeval de gebruikte taal een andere is dan de Engelse, de Franse of de Spaanse taal dient een vertaling in één van deze talen te zijn opgenomen.

Vereisten voor schepen

Het verdrag schrijft voor dat elk schip met een bruto-tonnage van 400 ton of meer:

- 2) een ballastwaterjournaal dient bij te houden (voorschrift B-2).



- 3) uitgerust te dient te zijn met een internationaal ballastwaterbeheercertificaat. Dit certificaat is onderhevig aan een eerste inspectie bij afgifte, een herkeuring na maximaal 5 jaar en een tussentijdse inspectie. Het is de bedoeling dat deze inspecties opgenomen zullen worden in het geharmoniseerde systeem van inspecties en certificering (HSSC).

- 4) het ballastwater aan boord dient te beheren/behandelen (voorschrift B-3), te wisselen (voorschrift B-4) en het sediment dient te verwijderen en af te voeren (voorschrift B-5).

Ballastwaterbeheersystemen

Voorschrift D-3 van het verdrag vereist dat ballastwaterbeheersystemen die worden gebruikt om te voldoen aan dit verdrag goedgekeurd dienen te worden door een administratie, rekening houdend met de [IMO-richtlijnen \(G8\)](#).

Voor goedkeuring → testen systeem aan land en aan boord dat aan de norm voor de behandeling van ballastwater (voorschrift D-2) voldaan wordt.

Succesvol goedkeuringstraject → typegoedkeuringcertificaat van land dat partij is van het verdrag.

Ballastwaterbeheersystemen

Ballastwaterbeheersystemen waarbij tevens gebruik wordt gemaakt van actieve substanties dienen tevens op grond van een door de [IMO-procedure \(G9\)](#) door de IMO te worden goedgekeurd (basisgoedkeuring en definitieve goedkeuring).

Ballastwaterbeheersystemen

1 x jaar IMO [overzichtlijst](#) van de systemen waarvoor een typegoedkeuringcertificaat, een definitieve goedkeuring en een basisgoedkeuring is verleend.

April 2016:

- 65 systemen met een typegoedkeuringscertificaat. Deze systemen zijn volledig gecertificeerd en gereed om aan boord geïnstalleerd te worden.
- Van de systemen die gebruik maken van actieve substanties zijn er 55 die een basisgoedkeuring en 40 die een definitieve goedkeuring van de IMO hebben ontvangen.

<http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Documents/Table%20of%20BA%20FA%20TA%20updated%20June%202016.pdf>

Ontheffingen

Eén of meerdere partijen (landen) van het verdrag mogen in haar of hun wateren ontheffing verlenen (voorschrift A-4) van de vereisten voor de toepassing van het eerder genoemde voorschrift B-3 of van voorschrift C-1 (aanvullende maatregelen) van het verdrag.

Dit geldt voor schepen op reis tussen aangegeven havens of locaties of uitsluitend varend tussen aangegeven havens of locaties. Een ontheffing geldt voor maximaal 5 jaar onder voorbehoud van een tussentijdse herziening. Daartoe dient eerst een risicoanalyse gemaakt te worden conform een [IMO-richtlijn \(G7\)](#)

Joint HELCOM/OSPAR Guidelines on the granting of exemptions



[Joint Ballast Water Risk Assessment Website](#)


Uitzonderingen

Eén of meerdere partijen (landen) van het verdrag mogen in haar of hun wateren uitzondering verlenen (voorschrift A-3)

Dit geldt onder andere

- 1) Innemen of lozen ballastwater en sedimenten worden t.b.v. de veiligheid van het schip in noodsituaties of voor het redden van mensenlevens op zee.
- 2) Bij onbedoelde lozing of inname van ballastwater en sedimenten als gevolg van beschadiging van een schip of zijn uitrusting.
- 3) Inname en lozen ballastwater en sedimenten op *dezelfde locatie*, mits er geen vermenging met onbeheerd ballastwater uit andere gebieden.

'Same Risk Area'-concept



INTERNATIONAL MARITIME ORGANIZATION

E

MARINE ENVIRONMENT PROTECTION COMMITTEE
69th session
Agenda item 4

MEPC 69/4/11
12 February 2016
Original: ENGLISH

HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Introduction of the same risk area concept in relation to the Ballast Water Management Convention and its guidelines

Submitted by Denmark and INTERFERRY

SUMMARY

Executive summary: This document builds on previous deliberations at the MEPC and the PPR Sub-Committee on the same risk area concept; refining the mechanism for a similar area-based risk approach based on regulation A-4 of the BWM Convention; outlining the parameters for a risk assessment, in order to justify a decision between two or more coastal States to delineate a "same risk area". A comprehensive study is also presented in document MEPC 69/INF.25.

Strategic direction: 7

High-level action: 7.2.2

Output: 7.2.2.4

Action to be taken: Paragraph 28


Related documents: MEPC 47/2; MEPC 48/2; MEPC 49/INF.6; MEPC 67/2/12; MEPC 67/INF.23; MEPC 68/12/2; MEPC 68/INF.25; PPR 2/5/3 and PPR 2/21

Introduction

1 The same risk area concept (SRA) is a conceptual approach to encourage Member States to make use of provisions that are already catered for, but not explicitly addressed, in the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the Convention).

2 The co-sponsors assess that an exemption granted under an SRA approach does not require any changes to the Convention, nor to the Guidelines (G7). The exemption will cover the same type of vessels, it will have the same duration, it will not accept vessels mixing water or sediments from outside of SRA and it is based on the Organization's prescribed risk assessment methodology.

[https://edocs.imo.org/Final Documents/English/MEPC 69-4-11 \(E\).docx](https://edocs.imo.org/Final Documents/English/MEPC 69-4-11 (E).docx)



INTERHAUZ
Same Risk Area Concept

MEPC 69/INF.25
Annex, page 1


ANNEX

10 February | **2016**

For:
INTERFERRY; Danish Nature Agency

Document type:
FINAL REPORT

Same Risk Area Concept -
Procedure and Scientific
Basis



[https://edocs.imo.org/Final Documents/English/MEPC 69-INF.25 \(E\).docx](https://edocs.imo.org/Final Documents/English/MEPC 69-INF.25 (E).docx)

'Same Risk Area'-concept

NAME: _____ DATE: _____
PROJECT: _____
10 February 2016
FOR: _____
INTEREST: Danish Nature Agency
DOCUMENT TYPE: Final Report
Same Risk Area Concept -
Procedure and Scientific
Basis



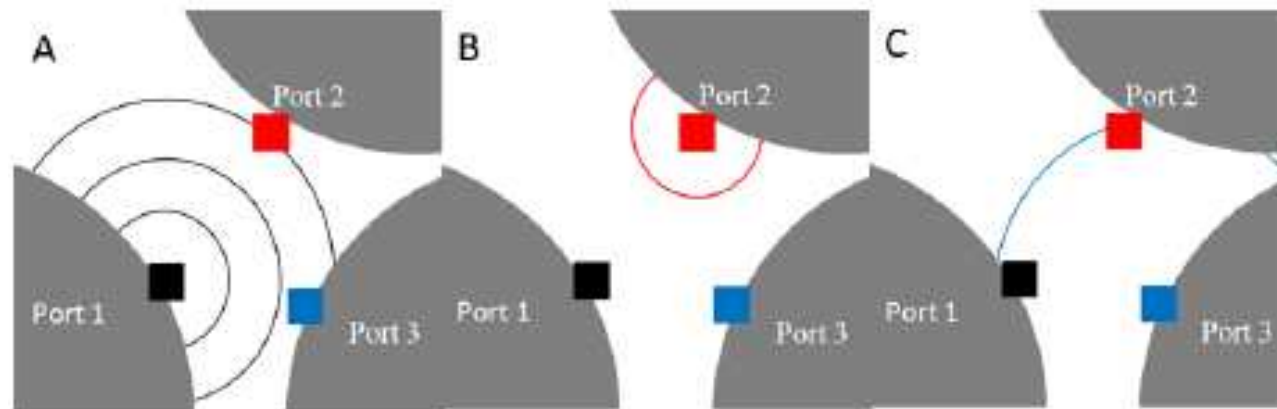
“The key component of SRA is

*the assessment of the natural dispersal of target species
by way of hydrography or other natural mechanisms,*

*which would be expected to occur within a limited area in one
biogeographical region,*

*and comparing this to the potential transfer of target species
with ballast water.”*

'Same Risk Area'-concept



A: Data exists on a target species in Port 1. The species has a medium dispersal capability. Analysis of species dispersal reveals that the species after a few generations (black circles) will reach Port 2 and Port 3 through natural dispersal. All three ports may be perceived as belonging to the same SRA

B: Data exists on a target species in Port 2. The species has no pelagic larval stage and slow dispersal. Analysis of species' dispersal and/or historic distribution data show that the species is incapable of spreading (red circle) to Port 1 or Port 3 within the timeframe considered. Port 2 is not perceived as belonging to an SRA

C: Data exists on a target species in Port 3. The species has a large dispersal capability. Analysis of species dispersal reveals that the species after one generation (blue circle) will reach Port 1 and Port 2 through natural dispersal and all three ports will belong to a SRA for this species.

10 February 2016
 For: Danish Nature Agency
 Document type: Final Report
 Same Risk Area Concept - Procedure and Scientific Basis



REGIONALE BALLASTWATERREGELGEVING



Voorschrift B-4. Wisseling van ballastwater

1. Schepen die ballastwater wisselen teneinde te voldoen aan de normen in voorschrift D-1, dienen:
 - .1 het ballastwater waar mogelijk te wisselen ten minste op 200 zeemijl van het dichtstbijzijnde land en in water met een diepte van ten minste 200 meter, rekening houdend met de door de Organisatie opgestelde richtlijnen;
 - .2 in gevallen waarin het schip geen ballastwater kan wisselen in overeenstemming met punt 1.1, dient dit te geschieden met inachtneming van de richtlijnen beschreven in punt 1.1 en zo ver mogelijk verwijderd van het dichtstbijzijnde land, en in alle gevallen ten minste 50 zeemijl van het dichtstbijzijnde land en in water met een diepte van ten minste 200 meter.
2. In zeegebieden op een afstand van het dichtstbijzijnde land of met een diepte die niet overeenkomen met de parameters omschreven in de punten 1.1 of 1.2, kan de havenstaat in overleg met aangrenzende of andere Staten, naar gelang hetgeen van toepassing is, gebieden aanwijzen waar een schip ballastwater kan wisselen met inachtneming van de richtlijnen omschreven in punt 1.1.

Voorschrift B-4. Wisseling van ballastwater

3. Van schepen zal niet verlangd worden dat zij afwijken van de beoogde reis of deze vertragen teneinde te voldoen aan een specifiek vereiste van punt 1.
4. Van schepen die ballastwater wisselen wordt niet verlangd dat zij voldoen aan punt 1 of 2, naar gelang hetgeen van toepassing is, indien de kapitein redelijkerwijs oordeelt dat een dergelijke wisseling de veiligheid of stabiliteit van het schip, zijn bemanning of passagiers in gevaar zou brengen ten gevolge van ongunstige weersomstandigheden, het ontwerp van of krachten op het schip, uitval van uitrusting of andere uitzonderlijke omstandigheden.
5. Indien een schip ballastwater dient te wisselen en zulks nalaat in strijd met dit voorschrift, worden de redenen vermeld in het ballastwaterjournaal.

NOORDZEE

Voldoet niet aan voorwaarden
(waterdiepte + afstand kust)
voor ballastwaterwisseling.

Tóch wisselgebieden
aangewezen door de
Noordzeelanden (OSPAR)

Wisseling (D-1) verplicht tot
datum waarop behandeld
moet worden (D-2).

OOSTZEE

Voldoet niet aan voorwaarden
(waterdiepte + afstand kust)
voor ballastwaterwisseling

Géén wisselgebieden
aangewezen door
Oostzeelanden (HELCOM)

Géén wisseling (D-1) verplicht
tot datum waarop behandeld
moet worden (D-2)



MEPC 68:

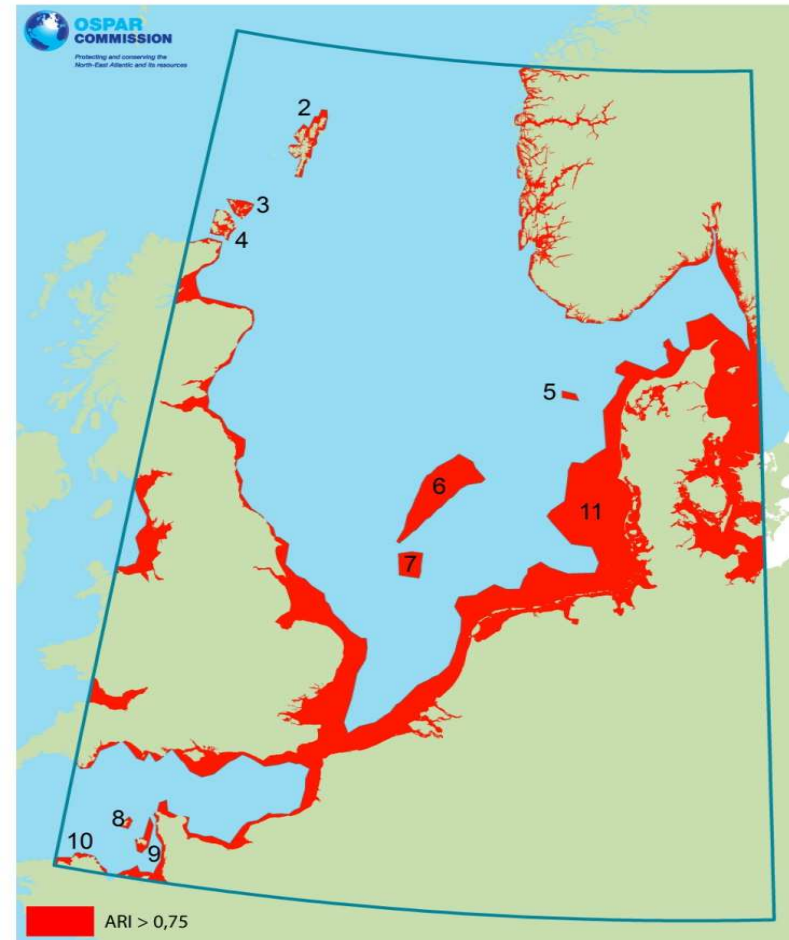
“The Committee concurred with the understanding that the intentions of resolution A.1088(28) apply also to ships operating in sea areas where ballast water exchange in accordance with regulations B-4.1 and D-1 of the BWM Convention is not possible.”

Noordzee

Aangewezen ballastwaterwisselgebieden

Hoe zal .3 van voorschrift B-4 worden geïnterpreteerd door de handhavers?

“Van schepen zal niet verlangd worden dat zij afwijken van de beoogde reis of deze vertragen teneinde te voldoen aan een specifiek vereiste van punt 1.”



NATIONALE BALLASTWATERREGELGEVING



VERENIGDE STATEN VAN AMERIKA



USCG BALLASTWATERREGELGEVING



FEDERAL REGISTER

Vol. 77
No. 57

Friday,
March 23, 2012

Part V

Department of Homeland Security

Coast Guard

33 CFR Part 151

46 CFR Part 162

Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters; Final Rule

22 JUNI 2016

PLATFORM SCHONE SCHEEPVAART

SUBCHAPTER O—POLLUTION

PART 151—VESSELS CARRYING OIL, NOXIOUS LIQUID SUBSTANCES, GARBAGE, MUNICIPAL OR COMMERCIAL WASTE, AND BALLAST WATER

Subpart A—Implementation of MARPOL 73/78 and the Protocol on Environmental Protection to the Antarctic Treaty as it Pertains to Pollution from Ships

GENERAL

- 151.01 Purpose.
- 151.03 Applicability.
- 151.04 Penalties for violation.
- 151.05 Definitions.
- 151.06 Special areas.
- 151.07 Delegations.
- 151.08 Denial of entry.

OIL POLLUTION

- 151.09 Applicability.
- 151.10 Control of discharge of oil.
- 151.11 Exceptions for emergencies.
- 151.13 Special areas for Annex I of MARPOL 73/78.
- 151.15 Reporting requirements.
- 151.17 Surveys.
- 151.19 International Oil Pollution Prevention (IOPP) Certificates.
- 151.21 Ships of countries not party to MARPOL 73/78.
- 151.22 Inspection for compliance and enforcement.
- 151.25 Oil Record Book.
- 151.26 Shipboard oil pollution emergency plans.
- 151.27 Plan submission and approval.
- 151.28 Plan review and revision.
- 151.29 Foreign ships.

NOXIOUS LIQUID SUBSTANCE POLLUTION

- 151.30 Applicability.
- 151.31 Where to find requirements applying to oceangoing ships carrying Category A, B, C, and D NLS.
- 151.32 Special areas for the purpose of Annex II.
- 151.33 Certificates needed to carry Category C Oil-like NLS.
- 151.35 Certificates needed to carry Category D NLS and Category D Oil-like NLS.
- 151.37 Obtaining an Attachment for NLSs to the IOPP Certificate and obtaining an NLS Certificate.
- 151.39 Operating requirements: Category D NLS.

- 151.41 Operating requirements for oceangoing ships with IOPP Certificates: Category C and D Oil-like NLSs.
- 151.43 Control of discharge of NLS residues.
- 151.45 Reporting spills of NLS: Category A, B, C, and D.
- 151.47 Category D NLSs other than oil-like Category D NLSs that may be carried under this part.
- 151.49 Category C and D Oil-like NLSs allowed for carriage.

GARBAGE POLLUTION AND SEWAGE

- 151.51 Applicability.
- 151.53 Special areas for Annex V of MARPOL 73/78.
- 151.55 Recordkeeping requirements.
- 151.57 Waste management plans.
- 151.59 Placards.
- 151.61 Inspection for compliance and enforcement.
- 151.63 Shipboard control of garbage.
- 151.65 Reporting requirements.
- 151.66 Operating requirements: Discharge of garbage in the navigable waters prohibited.
- 151.67 Operating requirements: Discharge of plastic prohibited.
- 151.69 Operating requirements: Discharge of garbage outside special areas.
- 151.71 Operating requirements: Discharge of garbage within special areas.
- 151.73 Operating requirements: Discharge of garbage from fixed or floating platforms.
- 151.75 Grinders or comminutors.
- 151.77 Exceptions for emergencies.
- 151.79 Operating requirements: Discharge of sewage within Antarctica.

APPENDIX A TO §151.51 THROUGH §151.77—SUMMARY OF GARBAGE DISCHARGE RESTRICTIONS

Subpart B—Transportation of Municipal and Commercial Waste

- 151.1000 Purpose.
- 151.1003 Applicability.
- 151.1006 Definitions.
- 151.1009 Transportation of municipal or commercial waste.
- 151.1012 Applying for a conditional permit.
- 151.1015 Issuing or denying the issuance of a conditional permit.
- 151.1018 Withdrawal of a conditional permit.
- 151.1021 Appeals.
- 151.1024 Display of number.

Subpart C—Ballast Water Management for Control of Nonindigenous Species in the Great Lakes and Hudson River

- 151.1500 Purpose.
- 151.1502 Applicability.

151.1502 Determination of hydrocarbon oil index—Part 2: Method Using solvent extraction and Gas Chromatography (incorporated by reference, see §162.050-4).
[USCG-2004-1889, 74 FR 2380, Jan. 16, 2009]

Subpart 162.060—Ballast Water Management Systems

AUTHORITY: 16 U.S.C. 1711; Department of Homeland Security Delegation No. 0178.1.
SOURCE: USCG-2001-1948, 77 FR 17211, Mar. 23, 2012, unless otherwise noted.

§ 162.060-1 Purpose and scope.

This subpart contains procedures and requirements for approval of complete ballast water management systems to be installed onboard vessels for the purpose of complying with the ballast water discharge standard of 33 CFR part 151, subparts C and D.

§ 162.060-3 Definitions.

As used in this subpart—
Acute substance means a chemical or an organism, including a virus or a fungus, that has a general or specific ac-

side; § 162.060-3

Administration means the government of the nation/State under whose authority a vessel is operating.

Ballast water means any water and suspended matter taken onboard a vessel to control or maintain trim, draught, stability, or stresses of the vessel, regardless of how it is carried.

Ballast water management system (BWMS) means any system which processes ballast water to kill, render harmless, or remove organisms. The BWMS includes all ballast water treatment equipment and all associated control and monitoring equipment.

Ballast water system means the tanks, piping, valves, pumps, sea chests, and any other associated equipment that the vessel uses for the purposes of ballasting.

Ballast water treatment equipment means that part of the BWMS that mechanically, physically, chemically, or biologically processes ballast water, either singularly or in combination, to kill, render harmless, or remove organisms within ballast water and sediments.

Challenge water means water just prior to treatment. In land-based tests, source water may be augmented to achieve required challenge water conditions.

Control and monitoring equipment means that part of the BWMS required to operate, control, and assess the effective operation of the ballast water treatment equipment.

Hazardous location means areas where fire or explosion hazards may exist due to the presence of flammable gases/vapors, flammable liquids, combustible dust, or ignitable fibers, as determined in accordance with the standards of construction applicable to the vessel on which the BWMS is to be installed.

Hazardous materials means hazardous materials as defined in 49 CFR 171.8; hazardous substances designated under 49 CFR part 118.4; reportable quantities as defined under 40 CFR 117.1; materials that meet the criteria for hazard classes and divisions in 49 CFR part 173; materials under 46 CFR 153.40 determined by the Coast Guard to be hazardous when transported in bulk; flammable liquids defined in 49 CFR 50.10-

42

IMPLEMENTATIE

Implementatieschema voor de ballastwaterlozingnorm voor schepen die een USCG-goedgekeurd ballastwaterbeheersysteem gebruiken in Amerikaanse wateren

	Ballastwatercapaciteit	Datum bouw	Nalevingsdatum
Nieuw schip	Alle	Op of na 1 december 2013	Tijdens oplevering schip
Bestaand schip	Minder dan 1,500 m ³	Voor 1 december 2013	1 ^e geplande droogdokinspectie na 1 januari 2016
	Meer dan 1,500 m ³ , maar minder dan 5,000 m ³	Voor 1 december 2013	1 ^e geplande droogdokinspectie na 1 januari 2014
	Meer dan 5,000 m ³	Voor 1 december 2013	1 ^e geplande droogdokinspectie na 1 januari 2016

Tabel 151.1512(b) / Tabel 151.2035(b)

UV-SYSTEMEN

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

Commanding Officer
United States Coast Guard
Marine Safety Center

US Coast Guard Stop 7430
2703 Martin Luther King Jr. Ave. SE
Washington D.C., 20593-7430
Staff Symbol: MSC
Phone: (202) 795-6729

U.S. Department of Homeland Security
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Staff Symbol: MSC
Phone: (202) 795-6729
Email: msc@uscg.mil

Alfa Laval Tumba AB
Attn: [REDACTED]
Hans Stahles väg 7
SE-147 80 Tumba, Sweden

DESMI Ocean Guard A/S
Attn: [REDACTED]
Lufthavnsvej 12
DK-9400 Norresundby
Denmark

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

Commanding Officer
United States Coast Guard
Marine Safety Center

Trojan Marinex
Attn: [REDACTED]
3020 Gore Road
London, Canada N5V 4T7

16710/P018787/jmk
Serial: E1-1504669
December 14, 2015

Subj: REQUEST FOR APPROVAL OF (MPN) METHOD TO DETERMINE LAVAL PUREBALLAST BALLAST WATER TREATMENT TECHNOLOGIES

Ref: (a) Your letter w/ attachments dated February 23, 2015
(b) U.S. Environmental Protection Agency (EPA) Generic Protocol for the Verification of Ballast Water Treatment Technologies, version 5.1, dated September 2010.
(c) Application for USCG Type Approval of Laval PureBallast Ballast Water Treatment System

Subj: REQUEST FOR APPROVAL OF THE USE OF THE MOST PROBABLE NUMBER (MPN) METHOD TO DETERMINE BIOLOGICAL EFFICACY OF THE TROJAN MARINEX™ BALLAST WATER MANAGEMENT SYSTEM (BWMS)

Ref: (a) Your letter w/enclosures dated February 23, 2015
(b) U.S. Environmental Protection Agency (EPA) Generic Protocol for the Verification of Ballast Water Treatment Technologies, version 5.1, dated September 2010.
(c) Application for USCG Type Approval of Trojan Marinex™ Ballast Water Treatment System

Hyde Marine Inc.
Attn: [REDACTED]
2000 McClaren Wood Drive
Coraopolis, PA 15108

Subj: REQUEST FOR APPROVAL OF THE USE OF THE MOST PROBABLE NUMBER (MPN) METHOD TO DETERMINE BIOLOGICAL EFFICACY OF THE TROJAN MARINEX™ BALLAST WATER MANAGEMENT SYSTEM (BWMS)

Ref: (a) Your letter dated February 5, 2015, (to include supplemental submissions)
(b) U.S. Environmental Protection Agency (EPA) Generic Protocol for the Verification of Ballast Water Treatment Technologies, version 5.1, dated September 2010.
(c) Application for USCG Type Approval of by Trojan Marinex, dated March 4, 2015

Dear [REDACTED]:

In reference (a), you requested approval of the Most Probable Number (MPN) method, per 46 Code of Federal Regulations (CFR) 162.060-10(b)(1), as an equivalent alternative to the method for determining the number of living organisms in the 10-50 µm size class specified in reference (b).¹ After consultation with the Coast Guard Headquarters Office of Operating and Environmental Standards and careful evaluation of your request, I do not consider the MPN method to be equivalent to the methods specified in reference (b). Since the efficacy of the Trojan Marinex™ Ballast Water Treatment System was evaluated using the MPN method, reference (c) is not approved.

Dear [REDACTED]:

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Ref: (a) Your letter w/enclosures dated February 23, 2015
(b) U.S. Environmental Protection Agency (EPA) Generic Protocol for the Verification of Ballast Water Treatment Technologies, version 5.1, dated September 2010.
(c) Application for USCG Type Approval of Trojan Marinex™ Ballast Water Treatment System

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Our review concluded that the MPN test method is not equivalent to the performance standard required by the regulations. The regulations specifically require ballast water treatment systems to be evaluated based on their ability to kill certain organisms. Since the proposed MPN method assesses the viability of an organism to colonize after treatment, it measures to a different standard than that required by the regulations.

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In the Preamble to the Final Rule which implemented the Ballast Water Discharge Standard and the procedures for BWMS type approval, the distinction between live/dead and viable/unviable was evaluated, explicitly discussed and the decision was made to use live/dead as the standard for evaluating the performance of BWMS (see 77 FR 17254 at 17266). Since the MPN method does not measure performance to this standard, it is not an equivalent alternative to the methods specified in reference (b).¹

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¹ Coast Guard regulations at 46 CFR 162.060-5(d)(1) incorporate this protocol by reference.

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UITSTEL

<p>U.S. Department of Homeland Security United States Coast Guard</p> 	<p>Commandant United States Coast Guard</p>	<p>Stop 7509 2703 Martin Luther King Jr. Ave. S.E. Washington, DC 20593-7509 Staff Symbol: CG-OES Phone: 202-372-1433 Fax: 202-372-6382 Email: environmental_standards@uscg.mil</p>
<p>KELLY.SCOTT J.1158795902</p>	<p>16711 CG-OES Policy Letter No. 13-01, Revision 2 16 November 2015</p>	
<p>From: S. J. KELLY, CAPT COMDT (CG-OES)</p>		
<p>To: Distribution</p>		
<p>Subj: EXTENSION OF IMPLEMENTATION SCHEDULE FOR APPROVED BALLAST WATER MANAGEMENT METHODS, Revision 2</p>		
<p>Ref: (a) Title 33 Code of Federal Regulations (CFR) Part 151 Sections 1513 & 2036 (b) Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters (Federal Register/Volume 77, No. 57/March 23, 2012/page 17254)</p>		
<p>1. PURPOSE. This policy letter provides revised guidance to vessel owners and operators seeking to extend compliance dates for implementing approved Ballast Water Management (BWM) methods. Reference (a) contains provisions for the Coast Guard to grant an extension to a vessel's original compliance date under the implementation schedule in 33 CFR 151.1512 and 151.2035. Every extension request and supplemental extension request must document that, despite all efforts, compliance with the requirement under 33 CFR 151.1510 or 33 CFR 151.2025 by the date stipulated in the implementation schedule, or the end date specified in the current extension granted by the Coast Guard, is not possible for the subject vessel.¹</p>		
<p>2. ACTION. Area, District, and Sector Commanders and Captains of the Port should ensure that the provisions of this policy are brought to the attention of the appropriate individuals in the maritime industry. Internet release is authorized.</p>		
<p>3. DIRECTIVES AFFECTED. CG-OES Policy Letter No. 13-01, Rev. 1 dated Sept 10, 2015 is superseded.</p>		
<p>4. BACKGROUND. Reference (b) became effective on June 21, 2012, and established a quantitative ballast water discharge standard (BWDS) and approved BWM methods for many of the non-recreational vessels equipped with ballast tanks that operate in waters of the U.S. Exemptions from applicability of the regulations finalized by Reference (b) are detailed in 33 CFR 151.1502 (Subpart C – Great Lakes and Hudson River) and 33 CFR 151.2015 (Subpart D – Waters of the United States). The original compliance dates for implementation of approved BWM methods vary based on a vessel's ballast water capacity and construction date. The implementation schedule for compliance with approved BWM methods for Subpart C is</p>		
<p>¹ Some vessels that are not covered by the applicability requirements of Reference (b) may still be subject to the ballast water management requirements of the U.S. EPA Vessel General Permit (VGP) issued under Section 402 of the Clean Water Act. Please note statement in Section 6 of this policy letter regarding EPA's policy on Coast Guard extension letters. A discussion of the VGP is beyond the scope of this policy letter. The EPA's 2013 VGP can be found on the Internet at http://water.epa.gov/polwaste/npdes/vessels/Vessel-General-Permit.cfm</p>		

EPA BALLASTWATERREGELGEVING

VESSEL GENERAL PERMIT FOR DISCHARGES INCIDENTAL TO THE NORMAL OPERATION OF VESSELS (VGP)

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act (CWA), as amended (33 USC 1251 et seq.), any owner or operator of a vessel being operated in a capacity as a means of transportation who:


- Is eligible for permit coverage under Part 1.2; and
- If required by Part 1.5.1, submits a complete and accurate Notice of Intent (NOI) or completes a Permit Authorization and Record of Inspection (PARI) form and retains it onboard the vessel

Is authorized to discharge in accordance with the requirements of this permit.

General effluent limits for all eligible vessels are given in Part 2. Further vessel class or type specific requirements are given in Part 5 for select vessels and apply in addition to any general effluent limits in Part 2. Specific requirements that apply in individual states and Indian Country Lands are found in Part 6. Definitions of permit-specific terms used in this permit are provided in Appendix A.

This permit becomes effective on December 19, 2013.

This permit and the authorization to discharge expire at midnight December 19, 2018.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 27 2013

ASSISTANT ADMINISTRATOR
FOR ENFORCEMENT AND
COMPLIANCE ASSURANCE

MEMORANDUM

SUBJECT: Enforcement Response Policy for EPA's 2013 Vessel General Permit: Ballast Water Discharges and U.S. Coast Guard Extensions under 33 C.F.R. Part 151

FROM: Cynthia Giles
Assistant Administrator *Cynthia Giles*

TO: Regional Vessel General Permit Enforcement and Program Directors

Section 2.2.3.5 of EPA's 2013 Vessel General Permit ("2013 VGP")¹ specifies certain numeric ballast water discharge limits for vessels covered by the 2013 VGP. The discharge of ballast water is also subject to U.S. Coast Guard regulations² under the National Aquatic Nuisance Prevention and Control Act / National Invasive Species Act. Unlike the 2013 VGP, Coast Guard regulations specify certain technologies be applied on vessels for treatment of ballast water prior to discharge. As part of the regular coordination between EPA and the Coast Guard as co-regulators of ballast water discharges, the provisions of the 2013 VGP and Coast Guard requirements for ballast water were intended to work in tandem.

However, Coast Guard type approved ballast water management systems pursuant to 33 C.F.R. § 151 subparts C and D are not yet available and consequently, pursuant to 33 C.F.R. § 151.2036, the Coast Guard has indicated that, on a case-by-case basis, it may determine "that despite all efforts to meet the ballast water discharge standard requirements," it is necessary to issue a temporary extension of the schedule to implement the required technology on a particular vessel. In addition, Section 1.9.1 of EPA's 2013 VGP contemplated the possibility that such extensions might be granted: "[W]here the U.S. Coast Guard has granted . . . an extension request pursuant to 33 CFR 151.2036, that information will be considered by EPA."

Accordingly, this memorandum articulates how EPA will consider the grant of an extension by the Coast Guard when a vessel has not complied with the numeric ballast water

¹ Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (effective date December 19, 2013), available at http://www.epa.gov/npdes/pubs/vgp_permit2013.pdf.
² See 33 C.F.R. Part 151.

	USCG BW FINAL RULE	EPA VGP 2013
EXTENSION	✓	?
ALTERNATE MANAGEMENT SYSTEM (AMS)	?	✓
TYPE APPROVAL	NOG NIET	AMS VOLSTAAT

13-1745(L)
NRDC v. EPA

UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

August Term 2014

(Argued: January 30, 2015 Decided: October 5, 2015
Amended: December 18, 2015)

Docket Nos. 13-1745(L), 13-2393(CON), 13-2757(CON)

NATURAL RESOURCES DEFENSE COUNCIL, NORTHWEST ENVIRONMENTAL
ADVOCATES, CENTER FOR BIOLOGICAL DIVERSITY, and
NATIONAL WILDLIFE FEDERATION,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent,

LAKE CARRIERS' ASSOCIATION and CANADIAN SHIPOWNERS ASSOCIATION,

Intervenors.

ON PETITION FOR REVIEW FROM THE
ENVIRONMENTAL PROTECTION AGENCY

LEVEND VERSUS LEVENSVATBAAR

ARGENTINIË – PLATARIVIER

Sinds 1998

Eis:

- a) Ballast water exchange (BWE): to be conducted in open-sea following the IMO approved methods, i.e. total ballasting and deballasting, flow-through, or over-flow or sequential exchange. Note: salinity levels following BWE must not be below 30mg/cm³.
- b) Treatment system/ballast discharge standard: Alternative methods are allowed under strict guidance and approval from either the IMO or the administration, details of which are found in Section 8 and Annex 1 of the ORDENANZA N^o 7-98.
- c) A Ballast Water Management Plan + record/log of all ballast water exchange and operations

BRAZILIË – ALLE HAVENS

Sinds 2006

Eis:

- a) Sequential method, flow-through method and dilution method, where at least 3 times the tank's volume should be pumped. Ballast water exchange should be carried out with an efficiency of at least 95% volumetric exchange. The exchange must take place in an area no less than 200 nautical miles from the coast and in a water depth of 200 metres or more. If this is not possible exchange may take place at least 50 nautical miles from the coast and in a water depth of at least 200 metres.
- b) Approved Ballast Water Management Plan
- c) Ballast Water Reporting Form, 24 uur voor aankomst

AUSTRALIË – ALLE HAVENS

Sinds 1992

Eis:

- a) Ballast water exchange methods in deep ocean areas:
 - Sequential exchange (to ensure no more than 50% of high-risk ballast water)
 - Flow through method or dilution exchange method with 300% of a tank's capacity pumped through
 - Compliance regime in agreement with Department of Agriculture
 - Other in-tank treatment agreed with Department of Agriculture
- b) Ballast Water Management Plan
- c) Quarantine Pre-Arrival Report, 12-96 voor aankomst

NIEUW ZEELAND – ALLE HAVENS

Sinds 1998

Eis:

- a) Ballast water exchange at mid ocean position preferably 200 nautical miles from land. Accepted techniques are either emptying and refilling ballast tanks/holds with an efficiency of 95% volumetric exchange or pumping through the tanks a water volume equal to at least three times the tank capacity. Tanks should be pumped no more than two at a time and, if two tanks are pumped together, they should be a symmetrical pair of tanks to ensure the safety of the vessel. Alternative methods:
- Use of fresh water in ballast tanks (<2.5ppt NaCl)
 - Use of approved on-shore treatment facility
 - Use of approved in-tank treatment

CANADA – ALLE HAVENS

Sinds 2011

Eis:

- a) Ballast Water Exchange (BWE): A ballast water exchange must achieve at least 95% volumetric exchange and a ballast water salinity of at least 30 parts per thousand, if the exchange is conducted in an area not less than 50 nautical miles from shore. In the case of a vessel that exchanges ballast water through flow-through exchange, pumping through three times the volume of each ballast tank is considered to meet the requirements.
- b) Treatment system/ballast discharge standard (same as that contained in the IMO Convention – Regulation D-2).
- c) Ballast Water Management Plan
- d) Ballast Water Reporting Form

NOORWEGEN – ALLE HAVENS

Sinds 2010

Eis:

- a) Ballast water exchange: ballast is to be exchanged in waters at least 200 metres deep and 200 nautical miles from the nearest land. If this is not possible, ballast may be exchanged in waters 200 metres deep and not less than 50 nautical miles from land. Ships are not required to deviate from their intended voyage to meet this requirement, however, ballast water may not be discharged into ports and internal waters. At least 95% of the volume in all ballast tanks to be used for port calls shall be exchanged. Pumping through three times the volume of each ballast water tank shall be considered equal to this requirement.

NOORWEGEN – ALLE HAVENS

Alternatief:

- Treat with an IMO approved system.
 - Deliver to a reception facility.
- b) Ballast Water Management Plan
- c) Ballast water record book or record ballasting operations in the deck log book.



Ministry of Infrastructure and the
Environment



Ballast water Management, enforcement and sampling

June 2016

23 June 2016



Contents

- Introduction
- BWMC: basic requirements
- Standards, type approval, exceptions, exemptions
- Available systems
- PSC
- Sampling





Introduction

- ~ 3000-4000 million tons of untreated ballast water are discharged every year in ports
- Many species, including bacteria, microbes, small invertebrates, eggs, cysts and larvae are carried in BW
- May survive and reproduce in the host environment, becoming invasive, and multiplying into pest proportions
- Ecological, socio-economic, human health problems, often irreversible





BWMC basic requirements

- Ballast water management plan
- BW Record Book
- Survey and certification
- Ballast water exchange until 2015
- On-board treatment





Exceptions / Exemptions

- Exceptions: Emergency situations, safety of ship and crew, discharge in same location as uptake,
- Exemptions:
 - Ships on voyage or operating exclusively between specific ports
 - For up to 5 years, subject to intermediate review
 - Based on G7, Guidelines for Risk Assessment
 - To be communicated to IMO
 - To be recorded in the BW Record Book



Type approval

- Treatment systems not using active substances approved in accordance with G8
- At the moment National Approval, MED when the convention is adopted
- Treatment systems using active substances must be tested and approved by IMO in accordance with Procedures in G9
- Type approval can take more than a year – land-based and shipboard testing

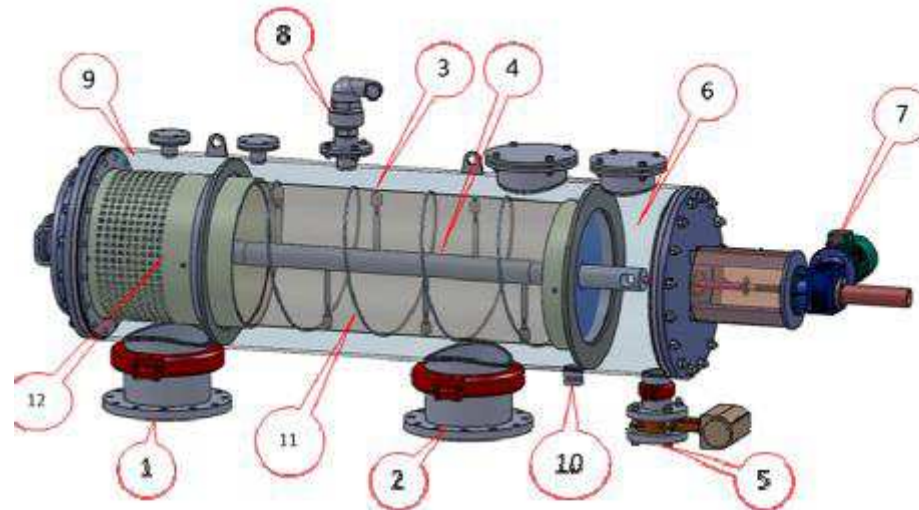


Available systems

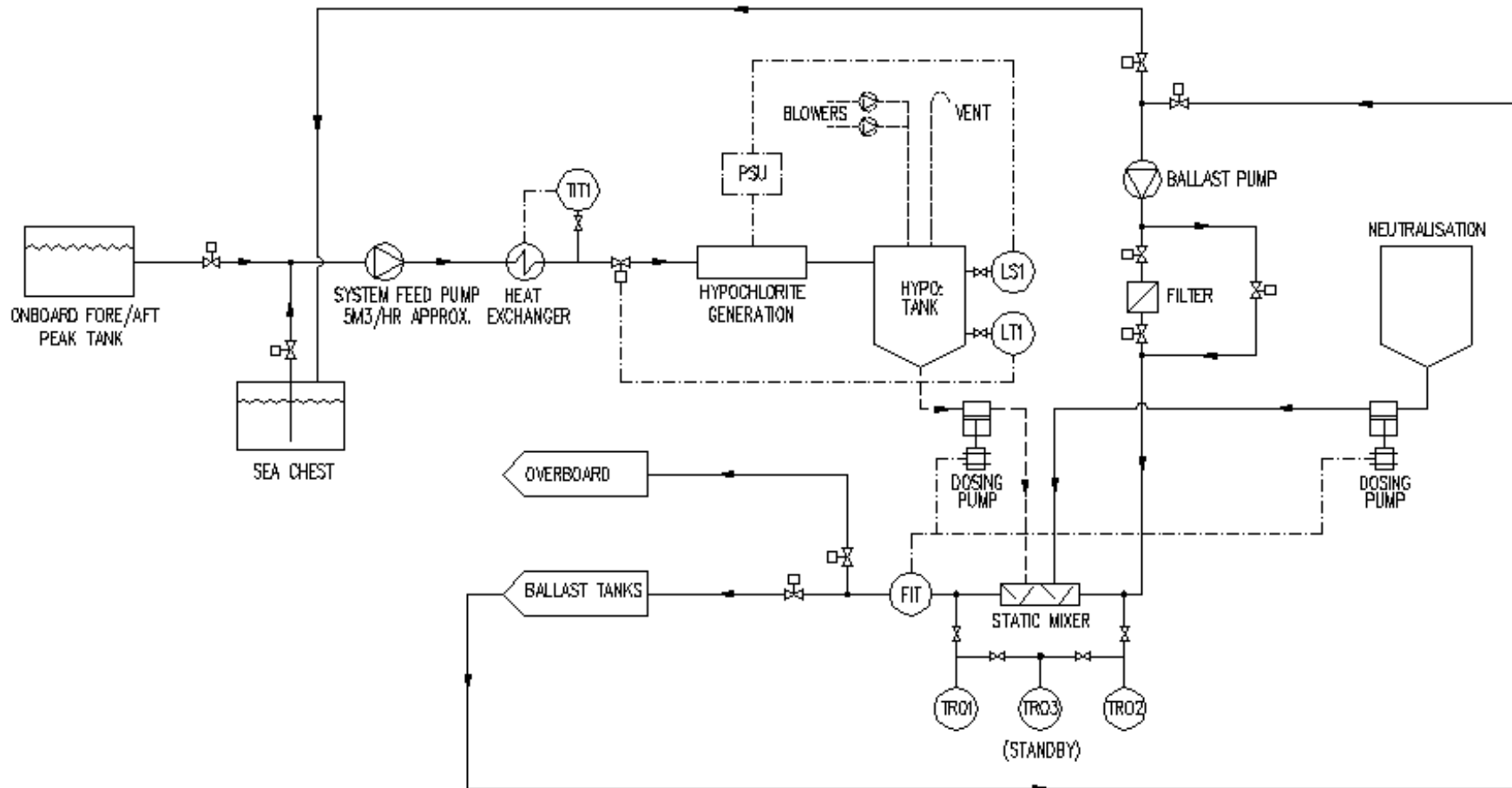
- 65 systems have type approval under G8
- 40 systems have type approval under G9, 55 have Basic approval
- Setup:
 - Filtration step for large organisms and sediment
 - Treatment step for disinfecting / inactivating
- Systems using active substances (G9) only treat at BW uptake
- Other systems treat at uptake and discharge



- G9 systems:
 - Ozone injection
 - Chlorine suppletion
- G8 systems:
 - UV treatment
 - Inert gas



1. Inlet	7. Worm gear motor
2. Outlet	8. Air release valve
3. Suction Nozzle	9. Raw water inlet chamber
4. Suction Scanner	10. Drain port
5. Flush valve	11. Fine Sintered screen
6. Flushing Chamber	12. Primary coarse screen



Typical chlorination system



Port State Control

Art. 9 BWM Convention – Inspection of ships

- MEPC.252(67) Guidelines for PSC under the BWM convention
- PSC Instruction 48/2015
- BWM.2/Circ.42 – Guidance on ballast water sampling
- IMO Guidelines “G2” – General recommendations for ballast water sampling by PSC Authorities



Four-Stage inspection

- Initial
- More detailed
- Indicative analysis
- Detailed analysis





Inspections

Initial:

- BWM Certificate
- Procedures on board according BWM Plan
- BWRB on board and up-to-date
- Type approval certificate for BWMS
- Ballast water record book
- Appointment of the Designated Officer
- Overall condition of BW equipment

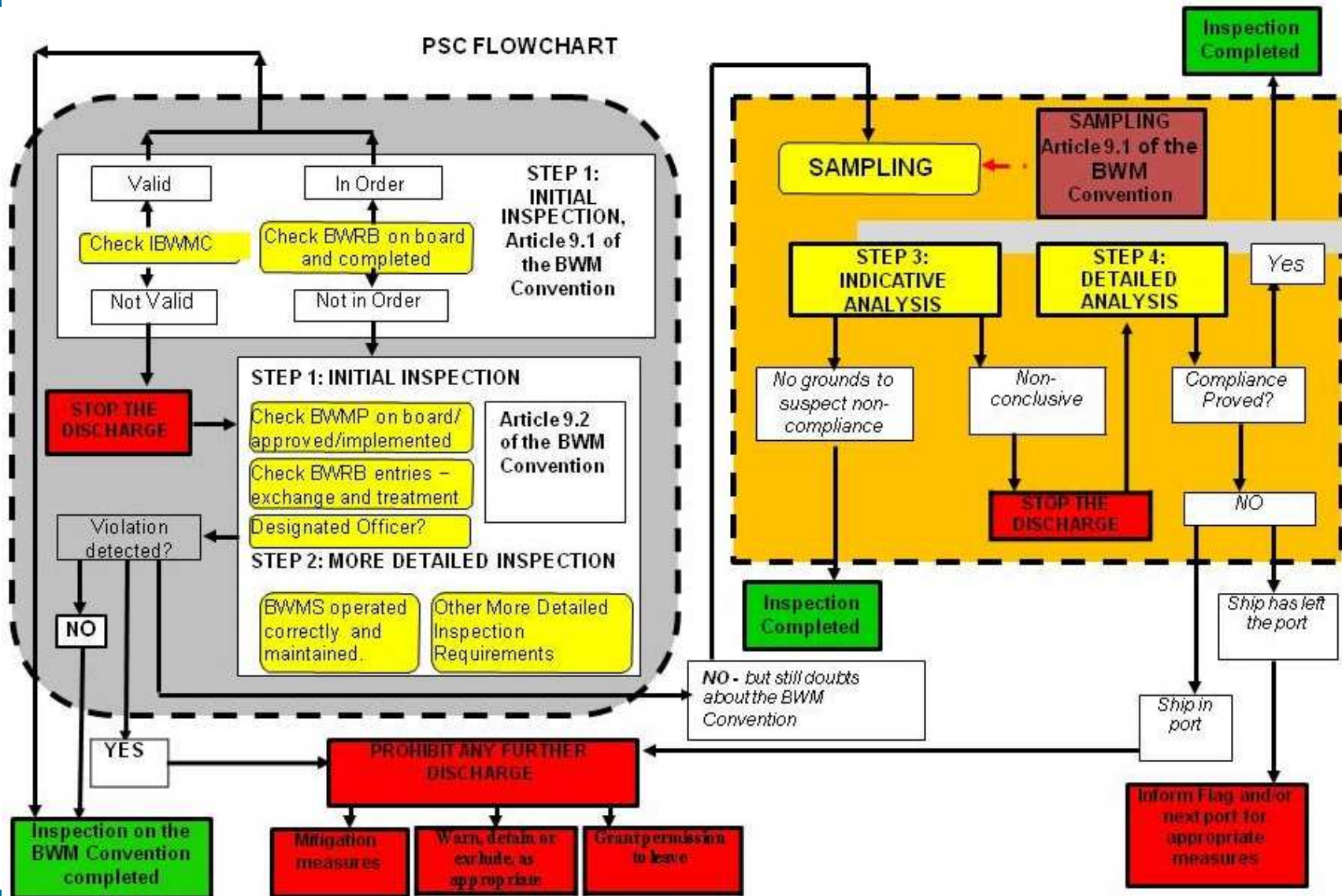
- Clear Grounds, is any of the above is not met



More detailed:

- Check of the duties of the Designated Officer – detailed knowledge
- Check of the record-keeping applied on board (if in compliance with the Convention)
- BWMS in good working order / bypass / active substances
- BWMS operational / self-monitoring / check BWRB against log files
- Check for changes since the initial / last survey

- When doubts exist, proceed to sampling





Sampling and analysis

- Two methods: Indicative and detailed
- Indicative to prove (gross non-)compliance
- Detailed to prove compliance to D2
- Sampling should be undertaken in a safe, rapid and practical manner (= e.g: samples should be concentrated to a manageable size)
- Samples should be taken from the ballast water discharge line
- Sampling protocol should result in samples that are representative of the whole discharge of ballast water from any single tank





- **Indicative Analysis for D-2 Method selection criteria**
- Reliable results to prove (non-)compliance
- Deliver prompt results (at best less than 30 minutes)
- Address all D-2 organism groups
- Simple to use
- Portable





Indicative Analysis Methods organisms $< 50 \mu\text{m}$ and $\geq 10 \mu\text{m}$

- Presence/absence methods (no viability, no counts)
 - e.g. DNA, ATP, Chl are methods that deliver results in less than 5 minutes
- Viability and counts
 - Flow cameras (less than 60 minutes, not portable, viability stain needed)
- Best compromise: PAM (phytoplankton) and ATP (all organisms)
 - portable, easy to use, low expertise needed
 - Viability in less than 10 minutes
 - No counts, but biomass



Detailed analysis:

- Sampling still under discussion
- Harmonised approach is necessary – compliance in one port, non-compliance in another. Laboratory standards are not harmonised.
- Organisms $\geq 50 \mu\text{m}$: 6 methods
- Organisms $< 50 \mu\text{m}$ and $\geq 10 \mu\text{m}$: 8 methods
- Bacteria: 11 methods



Sampling according D2:

3 replicate samples at beginning, middle, end

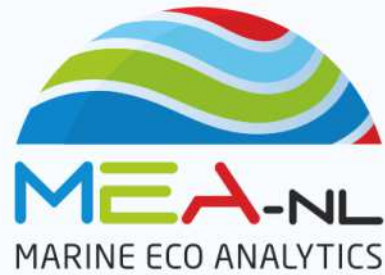
- Sample sizes:
- Large organisms – 1m³, concentrated to 1l
- Small organisms – 1l
- Bacteria – 0,5l





- 27 samples in total to be analysed
- Analysis cannot all be done on board





10 Years Ballast Water Testing; an (one time) experience !!

Dr. Marcel Veldhuis PhD



content

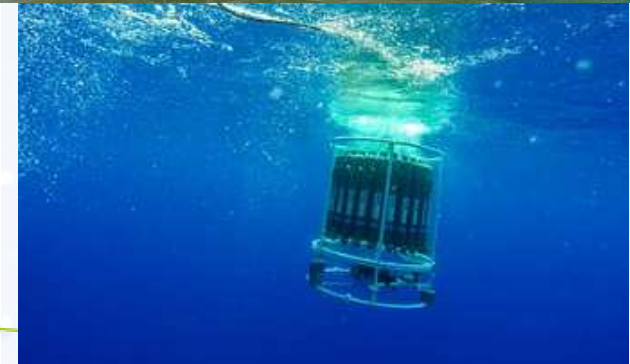
- Introduction
- BWMC: from a scientific point of view
- From experimental science to standardized testing (ISO17025/ EPA)
- Commonly applied technologies
- Problems associated with introduction of new technologies
- Practical experience
- Ask the vendor of BWMS the right questions
- Conclusions





What do biologists know about shipping


- Unless they Biological Oceanographers
- 55 expeditions on-board 25 different ships,
- Polar to tropical waters
- >100 scientific publications, dealing with ecosystem, life/dead, toxic phytoplankton, biology behind BW treatment





Intention BWM Convention

Goal: prevent the transfer of harmful aquatic organisms through the control and management of ships' ballast water and sediment

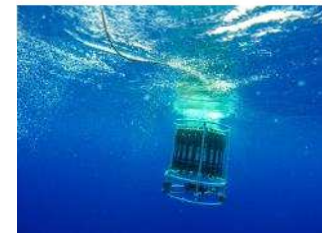
- IMO: BWM systems should reduce the number of viable organisms
- Influence: volume, time, frequency (risk reduction, cf. epidemics)
- Requirements: disinfection tools  BW will be cost factor !!
- The biological treatment efficacy of BWMS must be tested by using land based and shipboard verification tests

**Impacts invasive species:
ecological,
economical and
human health**



Verification procedures for environmental technology; problems associated with new technologies

- EU-Guidelines, EU Environmental Technology Verification pilot programme, Version 1.1 – July 7th, 2014 General Verification Protocol
- ISO 17025 (laboratory)
- National Council for Accreditation (NL RvA)
- IMO Guidelines G8 (2008/2016?) and Procedure G9
- ETV (USCG) (procedure)
- Application of (new) technologies
- Large diversity in technologies
- Global application, largely changing environments
- Legal implication (national/international)
- Familiarisation of responsible authorities (NA, classification societies)



Lessons learned; uniform testing

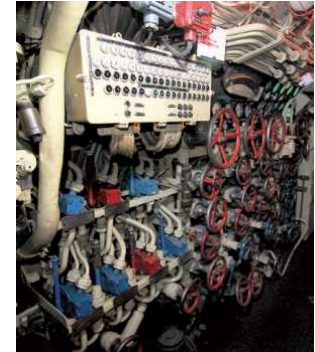
- Different guidelines for testing; differing in degree of maturity. G8, ETV and GTV (EU)
- Laboratory qualification ISO 17025 or equivalent
 - ISO or prescriptive methods (not always suitable for present purpose)
- Statistics procedures, high accuracy/precision
- BWM system testing; large outdoor experiments under controlled conditions; way of reality, technical exercise with some biology added to it

Other lessons learned; vendors, NA, class, vendors and “expert consultants”

➤ Low degree of familiarization with biology

➤ Auditors: Lack of expertise (biology)

- Ticking of their check list
- Desktop inspectors



➤ increasing focus on technical rather than biological aspects (monitoring parameters)

➤ High ‘turnover’ of officials; witnessing instead of auditing

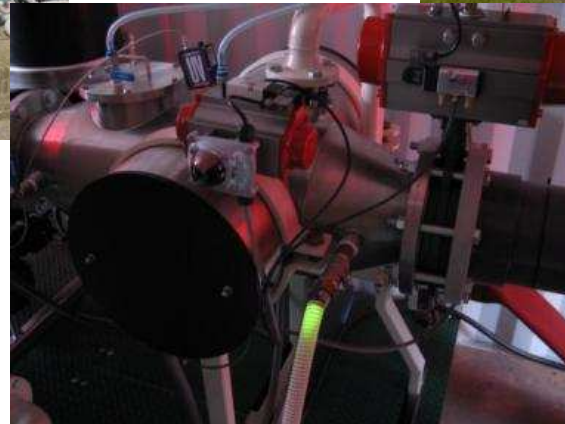
➤ Increasing volume of ‘undefined expert’ consultants helping to streamline process



Available technologies (LR)

- >50 TA (IMO), <0 (USCG/ETV)
- ca 40 % electrolysis/chlorine
- ca 35 % UV-C radiation (MP/LP)
- remaining: organic chemicals (Peraclean Ocean), deoxygenation, silver bullets
- Modular: physical separation (filter, Hydro-cyclone), disinfection step

BWMS-systems



BWM alternative methods NL



➤ Drinking/potable water as ballast water



➤ (G8 & G9 procedure)

- External drinking water source
- Water-maker

➤ Mobile BWM system (**DAMEN** concept)

➤ Flush-through system

➤ Ships without ballast



Biodiversity

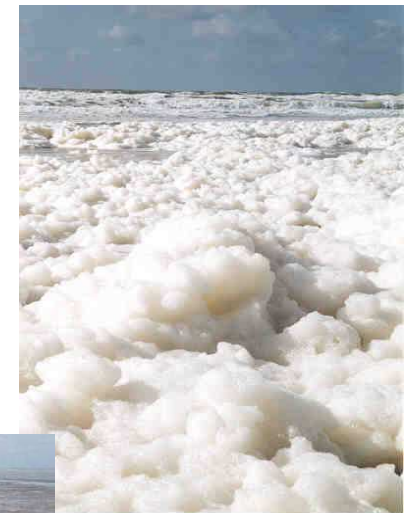
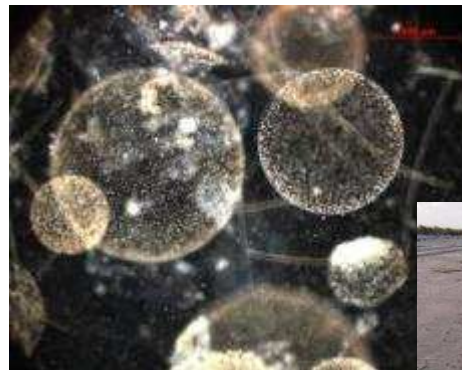


Bacteria

Viruses

Interferences; that makes the sea complex, but realistic

- Testing at the same spot within a few days
- 1e; flow rate of $> 50 \text{ m}^3/\text{h}$
- 2e; flow rate dropped to $< 5 \text{ m}^3/\text{h}$
- Sediment masking organisms
(underestimation of 40%)

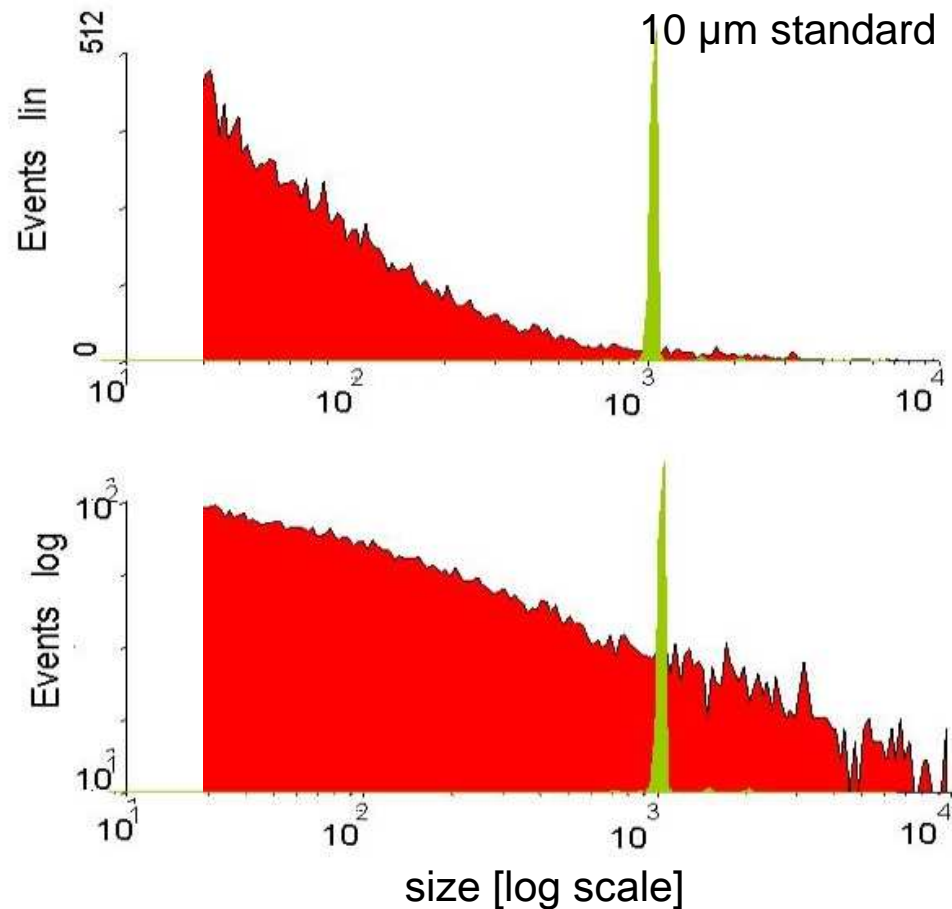


Lessons learned; sediment why so difficult? a crucial but still difficult component

particle size
distribution
(Coulter Counter):
Dutch Wadden Sea



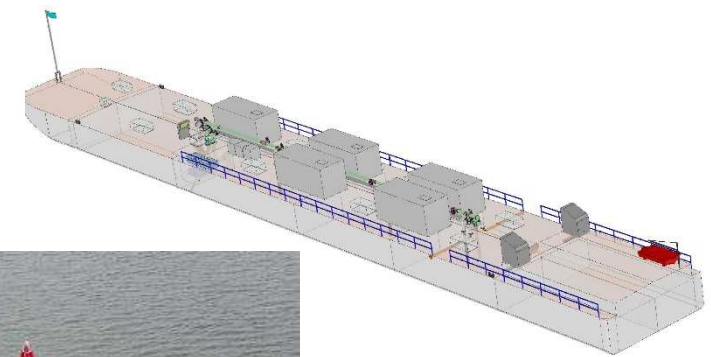
Reduce larger sized
organisms



particle size class distribution: mainly silt, clay minerals

Lessons learned; improvement of test conditions (listening to manufacturers, ship-owners)

- Static to dynamic testing (MEA-INNOVATOR, 2012)
- Fresh water; underestimated water type !!!





Practical experience (shipboard)

Bakalar, G.

- Little interest/familiarization with BWMS
- Operational problems (7%)
- Down-time (9%)
- Co-insistency, maintenance and biological efficacy (BE)
-
- Note: study conducted <1Q 2015
- Bakalar, G. 2016: Comparison of interdisciplinary ballast water treatment systems and operational experiences from ships Springer plus 2016: 5:240



Asking the right questions !

No globally applicable BWMS,
so a choice must be made

➤ Homework

- Type of vessel, trading characteristics, holding time,
- Type of harbours; salinity, turbidity, organisms load
- Regular supplier of ship-owner or newbie

➤ Vendor

- Listed BWMS installations, to whom (references)
- Modularity of the BWMS system, (change capacity)
- Experts to go from long- to short-list
- Independent laboratory ask for BE test

METEOR Cruise





conclusions

- BW will be a cost factor, so reduce the discharge !!!
- Look for smart solutions/alternatives
- Training of crew and use the BWM system
- Ongoing development (maturity)
- Modular systems, exchange of components
- Sharing of information and experience
- Don't be afraid to ask for information
- Type Approval is increasing in complexity (liability)

- Reasons for concern: filters/sediment and longer holding time





Still confused but at a higher level



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MEANL is an independent research and test facility

www.mea-nl.com



Ballast Water Treatment A shipyard perspective

Wat komt er bij kijken om een
ballastwaterbeheerssysteem te installeren?

Platform Schone Scheepvaart
Rotterdam 22 Juni 2016

Stef Loffeld, Manager Projects & Engineering
www.damengreen.com | green@damen.com | +31(0)183639163

Member of the DAMEN SHIPYARDS GROUP



Agenda



Intro

Vessel perspective

External factors

In Practice

Conclusion & Questions

Stef Loffeld:
19 jaar reparatie ervaring, conversies & retrofits
5 Jaar Damen Shipyards /
Damen Green Solutions
Focus on BWT retrofitting and Port Solution
Scrubbers and other env. related retrofits



87 JAAR ERVARING



SCHEEPSBOUW



SHIPREPAIR &
CONVERSION



MARINE
COMPONENTS




SERVICES

Damen General



Annual Turnover:	€ 2 bn
Annual Deliveries:	160
Annual Repair & Conversion jobs:	1,500
The Damen Family:	9,000 Employees
Global Presence:	32 Yards
Vessels delivered since 1969:	> 5,000



Hoe werkt een werf?

- 1001 klussen gelijktijdig: planning/safety.
- Is niet betrokken bij basic design.
- Zeer laat betrokken
- Tijdsdruk

Open deur:

- 1) Alleen succes indien goed voorbereid!
- 2) Vroegtijdig betrekken van uitvoerende werf

- Keuze van treatment technologie is slechts één stukje vande puzzel (het eerste stukje?)

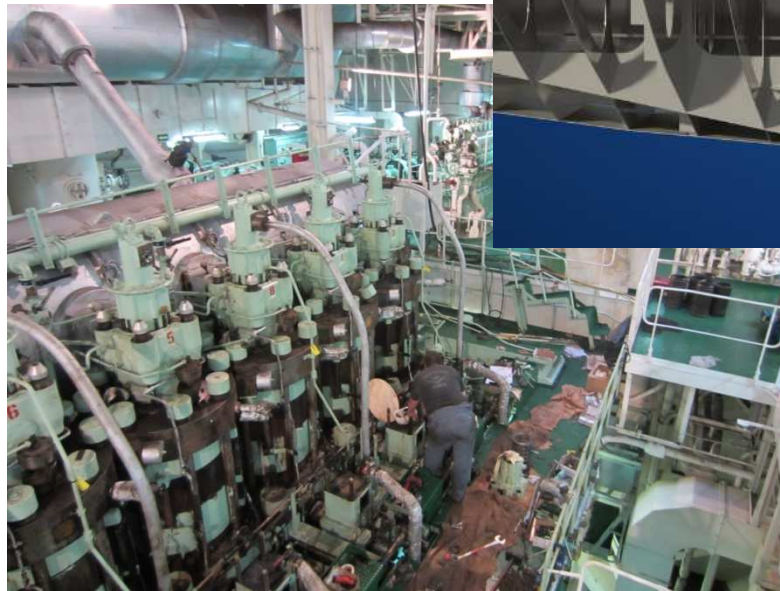


Picture: courtesy Trojan Marinex

- Footprint & onderhoudsruimte
- Energie verbruik
- Leidingstelsel
- Pomp- en leidingkarakteristiek
- Bediening
- Intern transport
- Certificering
- Conflicterende werkzaamheden:
 - Planning
 - **Veiligheid!**

Footprint & ruimte voor onderhoud

- Hoeveel ruimte neemt het equipment in beslag?
- Uit hoeveel componenten bestaat het equipment?
(Opslagruimte voor chemicaliën en neutraliseer middel)
- Voldoende ruimte om onderhoud uit te voeren



Picture: courtesy Bio Sea

Energie verbruik

Voldoende vermogen beschikbaar /
vermogensbalans?



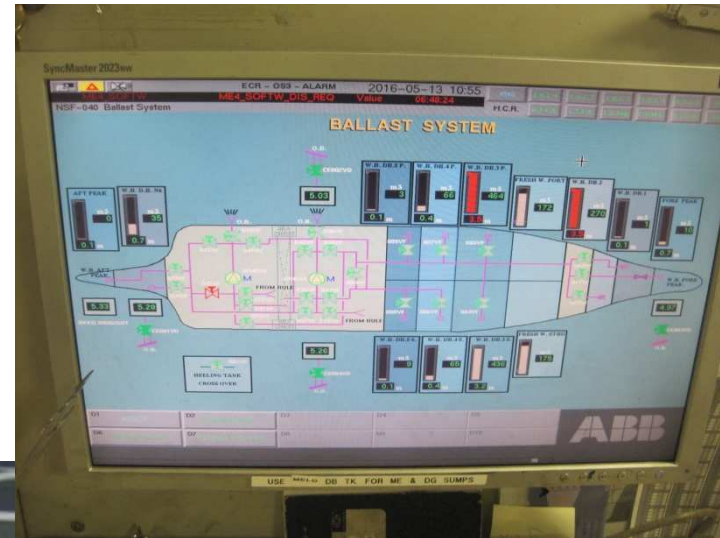
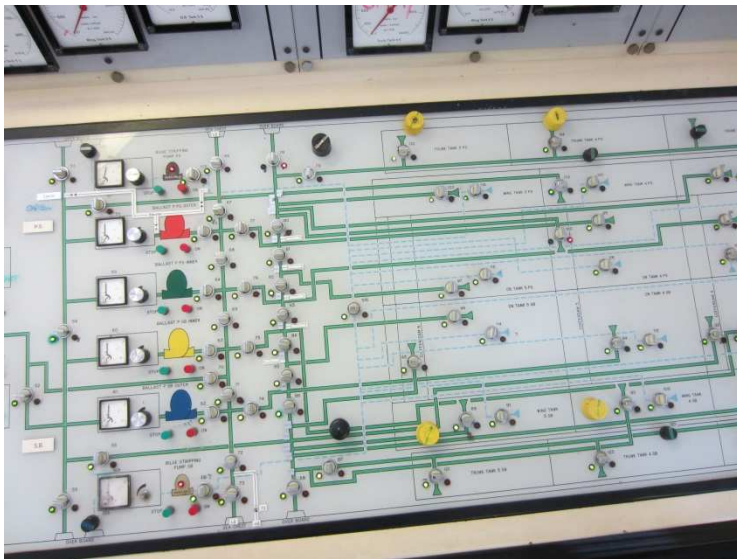
Voldoende ruimte beschikbaar in
bestaande panelen?

Leidingsysteem

- Gebruikte materialen (lassen/monteren vs Hazardous areas)
- Dimensies
- Gebruikte flens standaard
- Klepbediening



Hoe in bestaande systeem te integreren?



Intern transport

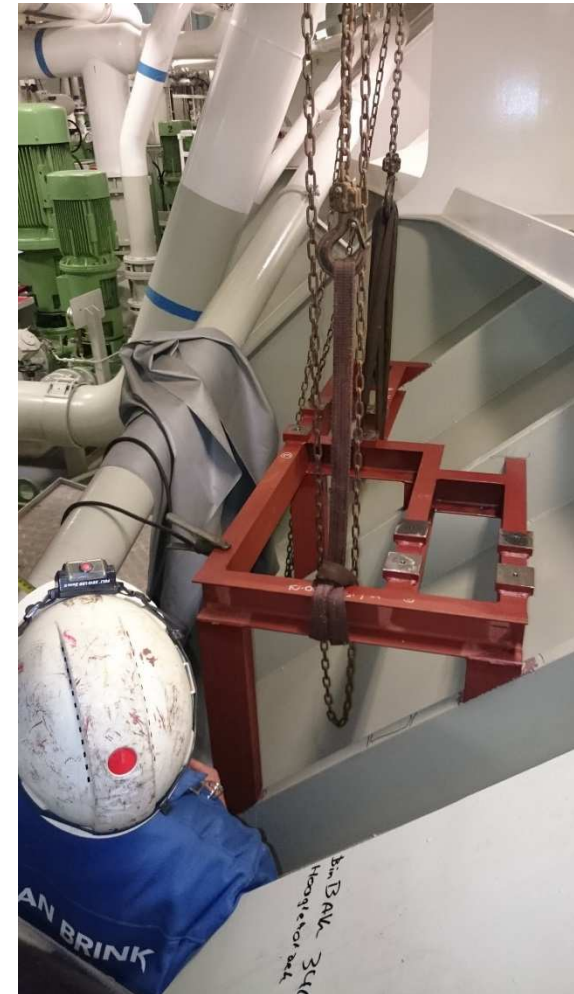


Vorbereitung

Skids

Intern transport

Waar ligt het optimum?





MARINE DIVISION

Certificate number: 34153/A0 BV
 File number: ACM 223/1403/01
 Product code: 9086I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

BIO-UV SAS
 LUNEL - FRANCE

for the type of product

BALLAST WATER MANAGEMENT SYSTEM

BIO-SEA® Ballast Water Treatment System (BWTS)

P

Trojan Technologies
 Attn: Allison Miller
 3020 Gore Road
 London
 Canada N5V4T7

ALTERNATE MANAGEMENT SYSTEM ACCEPTANCE

The Coast Guard has completed its review of the Alternate Management System (AMS) application submitted by Trojan Technologies for the Trojan Marinex ballast water treatment

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



Commandant
 United States Coast Guard

2703 Martin Luther King Jr. Ave. SE
 Washington, DC 20593-7509
 Staff Symbol: CG-OES
 Phone: 202-372-1431
 Fax: 202-372-8382
 Email: John.A.Meehan@uscg.mil

5760
 July 21, 2014



MARINE DIVISION

Numéro de certificat : 34154/A
 Numéro de dossier : ACM 223/
 Code produit : V

Ce certificat n'est pas valable lorsque présenté sans les pages suivantes comprenant au moins 7 pages

www.veris

CERTIFICAT D'APPROBATION DE TYPE

Ce certificat est délivré sous l'autorité de l'Etat Français par BUREAU VERITAS, organisme habilité selon les dispositions des Divisions 140 et 310 du Règlement annexé à l'Arrêté du 23 novembre 1987 tel qu'amendé.

BUREAU VERITAS atteste avoir réalisé la procédure d'approbation relative au matériel ou matériau désigné ci-après selon les dispositions applicables des exigences énumérées ci-dessous.

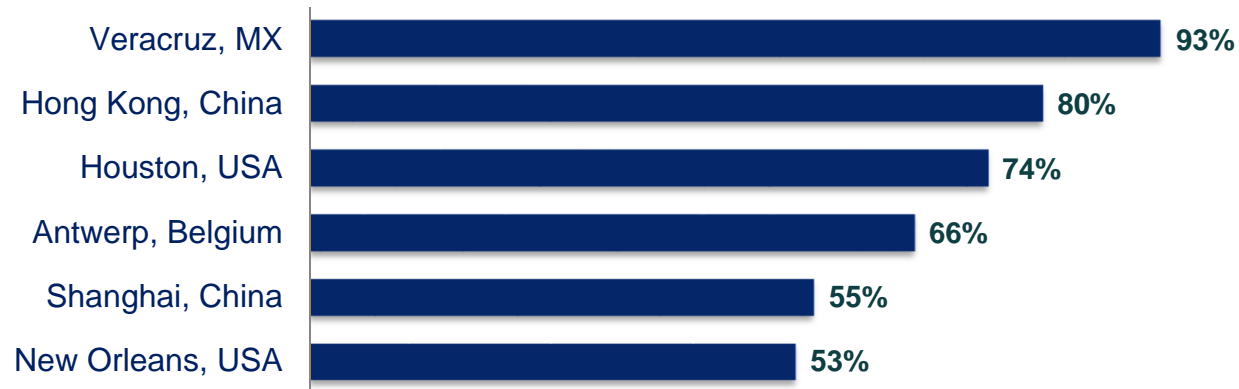
BIO-UV SAS
 LUNEL - FRANCE

pour le type de produit

BALLAST WATER MANAGEMENT SYSTEM

BIO-SEA® Ballast Water Treatment System (BWTS)

■ UV Transmittance



Supplier A
44% Minimum UVT



Supplier B
70% Minimum UVT

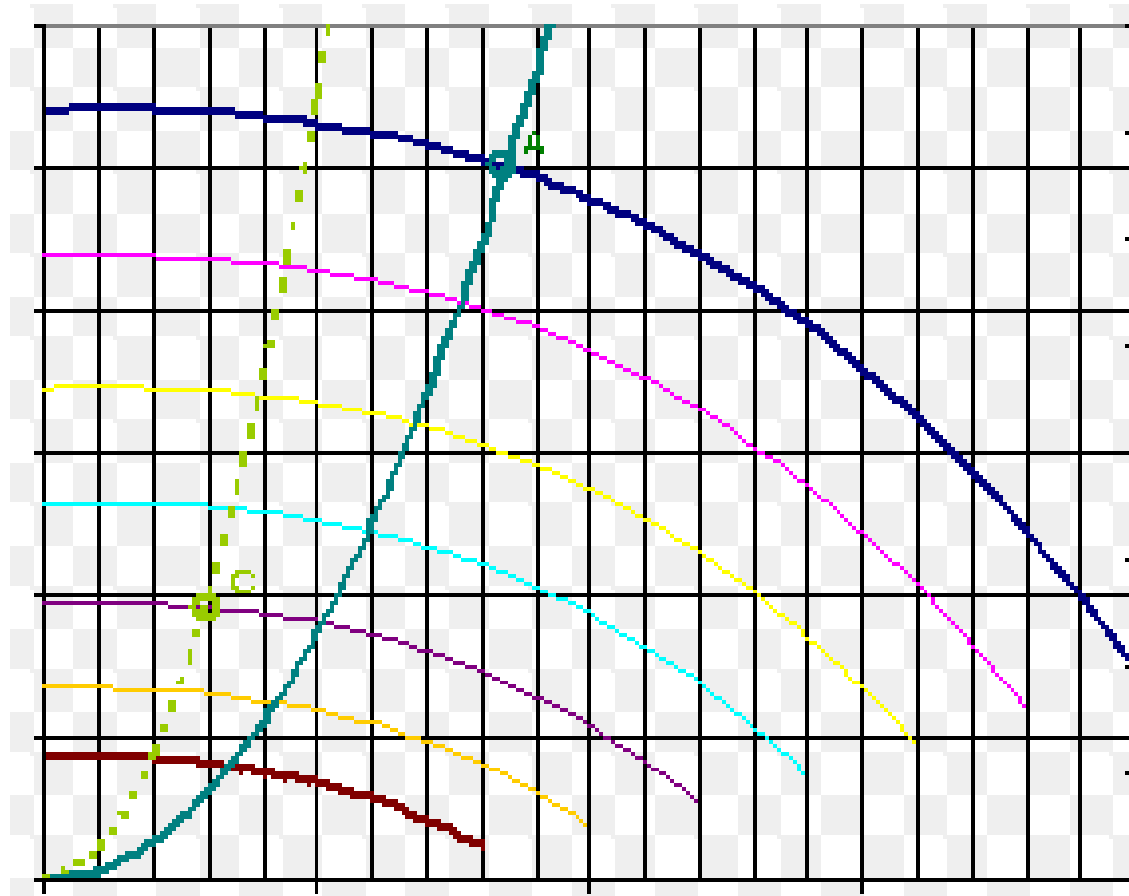
Not all systems have been tested at low UVT's !

Supplier C
85% Minimum UVT



Pomp- en leidingkarakteristiek

- Druk [bar]
- Debiet [m^3/hr]



Interfering jobs / safety



- Keuze van treatment technologie is slechts één stukje vande puzzel (het laatste stukje?)



Picture: courtesy Trojan Marinex

External Factors

BWT retrofit is toch gewoon “een retrofit als zovelen”

Wat maakt de BWT retrofit anders ?



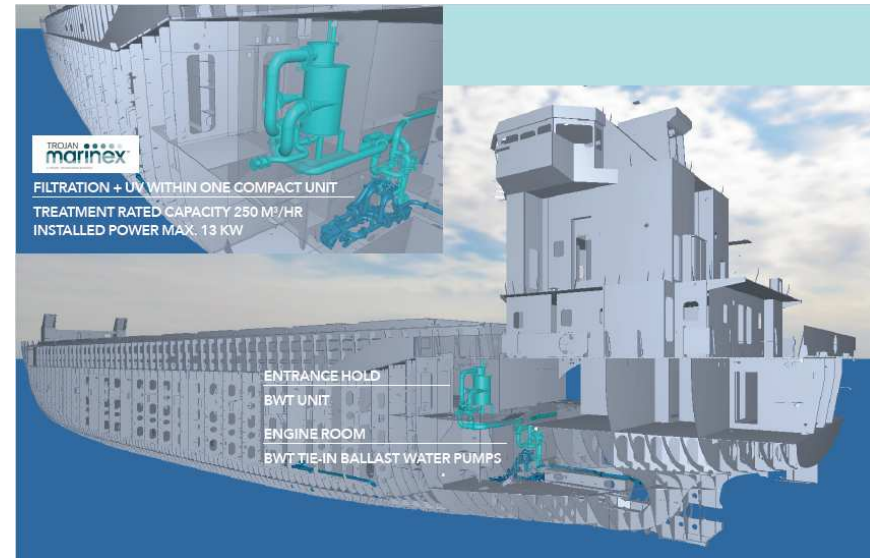
○ How to deal with practical Bottle Necks ?:

- Equipment supply
- Engineering capaciteit
- Project management
- Class capaciteit
- Beschikbaarheid werven of reparatie faciliteiten
- Financiering
- Hoe bereik ik “One time right”

55.000 schepen = minimal 55.000 BWT systemen

Levertijden?

- Capaciteit TD
- Bestaande capaciteit?
- Specialisatie?
- Scannen?



Verantwoordelijkheid van het gehele pakket t.o.v.
verantwoording van disciplines daaruit:

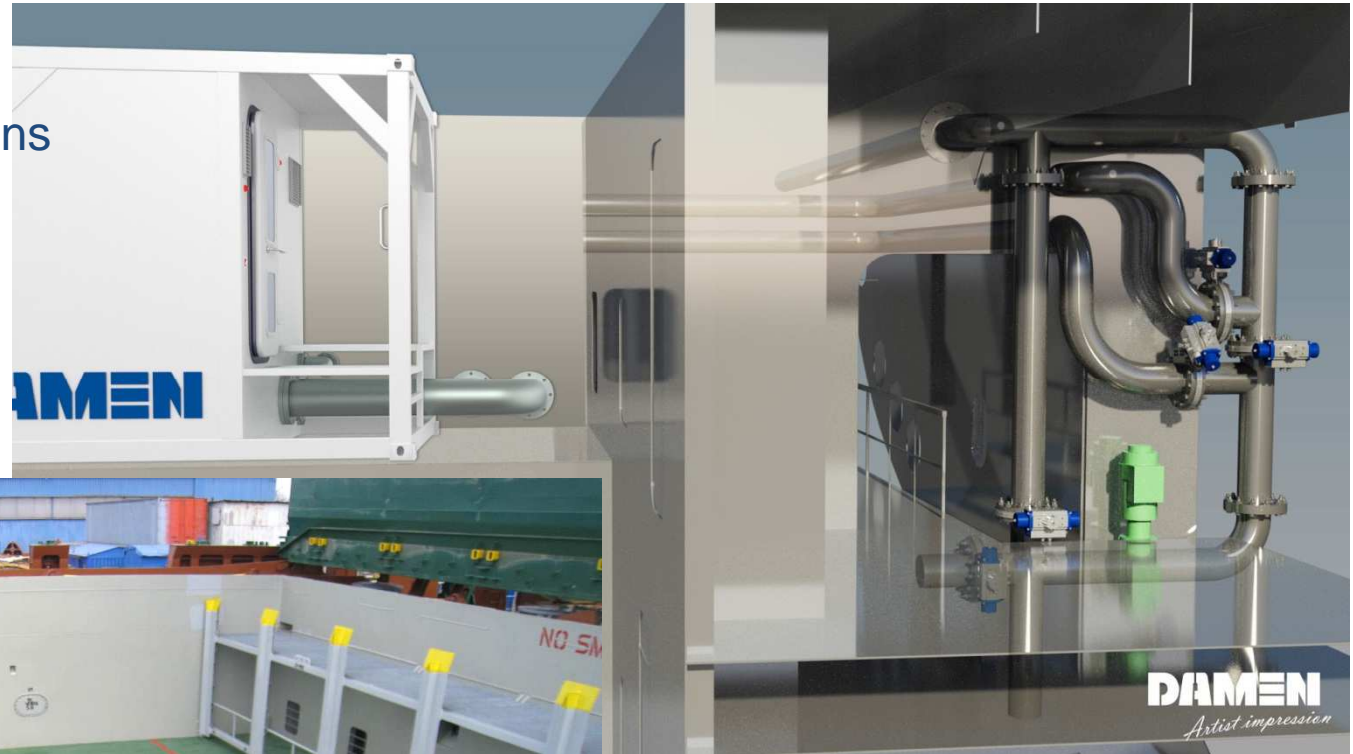
- Engineering
- Piping
- Electrisch
- Installatie
- Commissioning

- Capaciteit bij Class
 - Beschikbaarheid werven
 - Financiering
-
- Hoe bereik je “One time right”

- Beschrijf de randvoorwaarden; operationeel profiel
- Beschrijf daarbij de verschillende modussen: ballasten, deballasten, strippen, etc.
- Survey & basic design in één stap.
- Voer een FMEA/HAZOP uit.
- Engineering, installation en commissioning (risk assessment).
- BWM-plan
- Training!

In Practice

Containerized solutions



In Practice

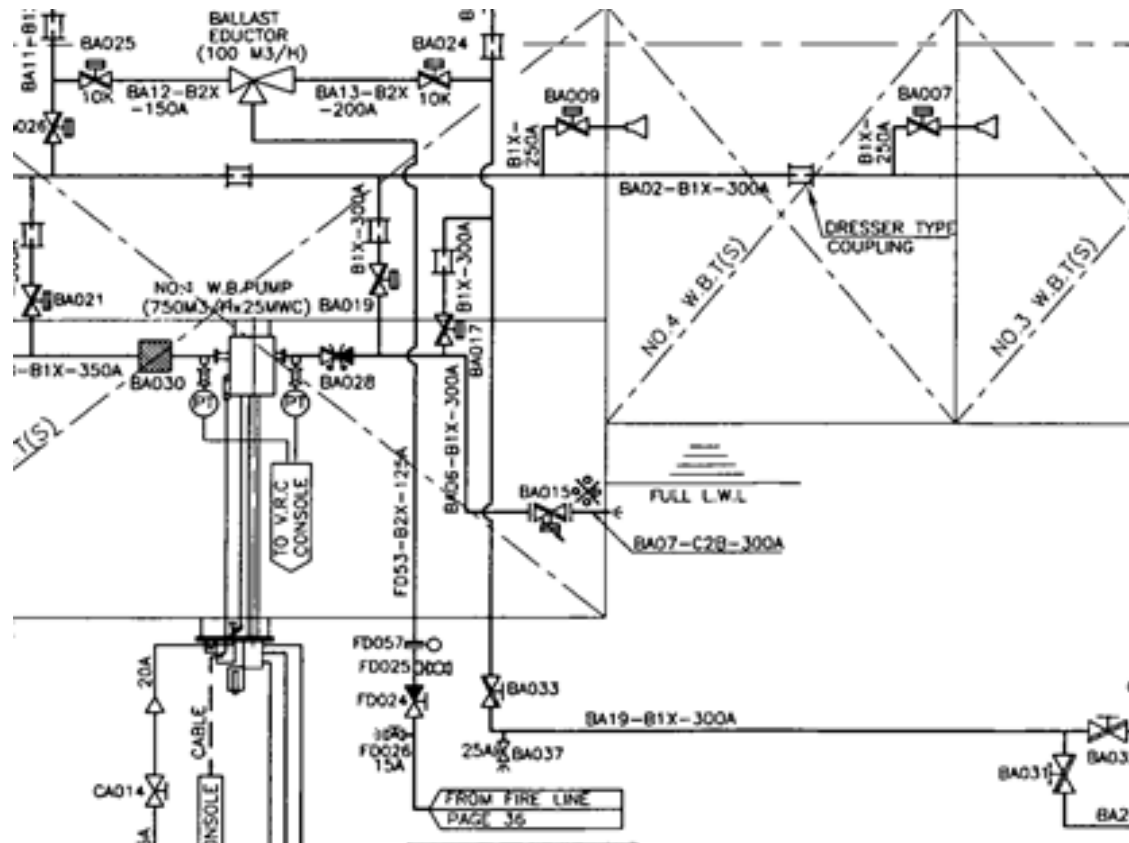
Hazardous areas



23 June, 2016

Damen Green Solutions

Ejector Systems



Low capacities

LoFlo 30
LoFlo 60
LoFlo 90



DAMEN LoFlo BWM Skid – Powered by BioSea®

In Practice



ZR. MS. Mercur

Vessel type
Type of project
Plant make
Location of execution
Delivery date
Deliverables

Submarine support vessel
Retrofit
Damen Loflo 60
Damen Shiprepair Den Helder
In progress
-Plant
-3D laserscanning
-Engineering
-Installation
-ILS



Vessel type
Type of project
Plant make

Location of execution
Delivery date
Deliverables

Support Vessel
Retrofit
MMC Green Technology
2*150
Damen Shiprepair Vlissingen
2014
-Installation

Seven Pacific



Vessel type
Type of project
Plant make
Location of execution
Delivery date
Deliverables

Retrofit

The Netherlands/Damen Schiedam
2014
-Installation

Karel Doorman

Vessel type
Type of project
Plant make
Location of execution

Delivery date
Deliverables

Joint Support Ship
New build
Panasia
Damen Shipyards Romania/
Damen Naval Shipyards
Vlissingen
2014
-Plant
-Engineering
-Installation
-ILS



800 TEU vessel

Vessel type
Type of project
Plant make
Location of execution

Delivery date
Deliverables

Container vessel
Retrofit

Damen Shipyards Romania/
Damen Shipyards Netherlands
2007
Feasibility study



Geo Celtic

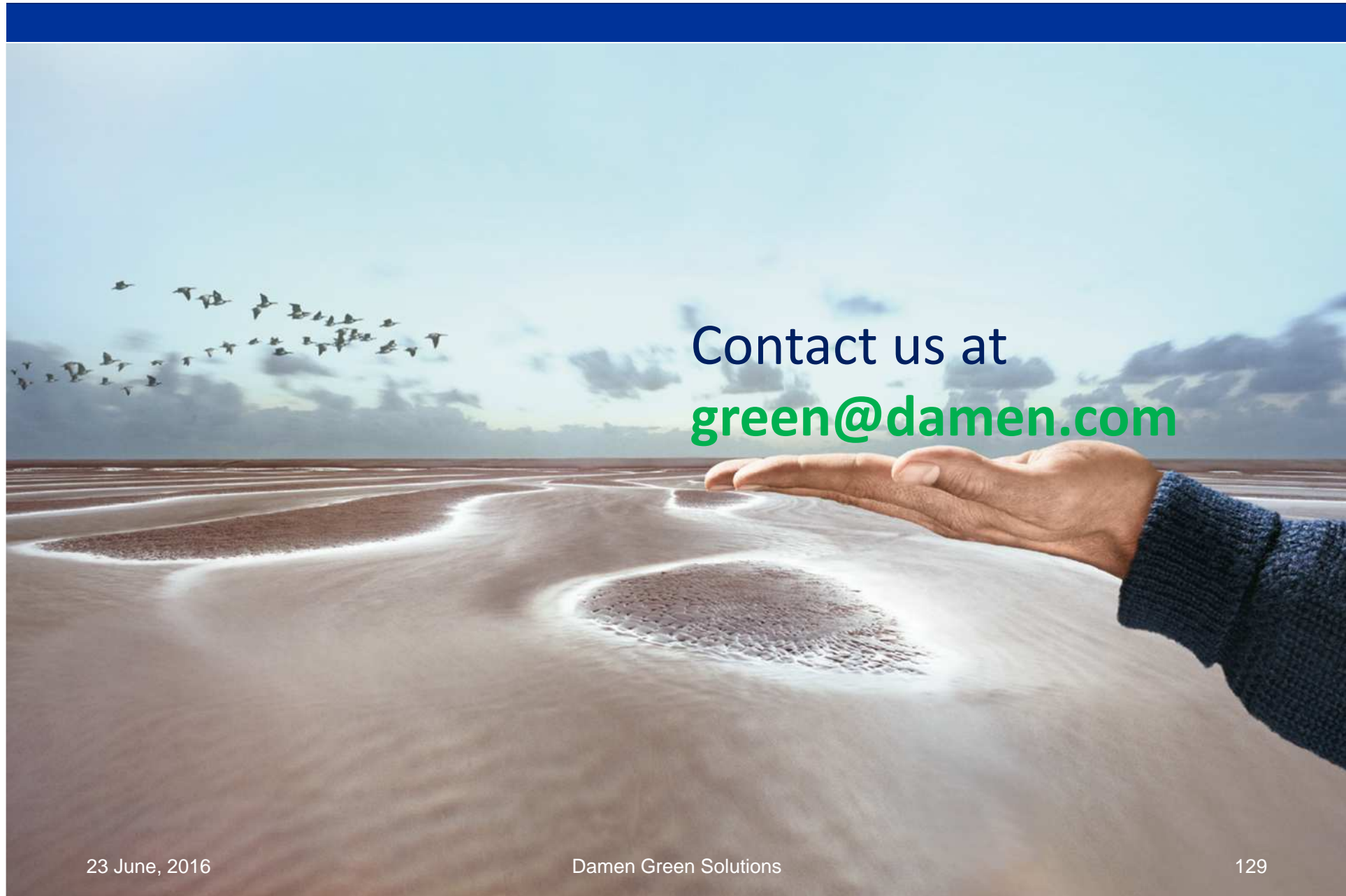


Vessel type
Type of project
Plant make
Location of execution
Delivery date
Deliverables

Seismic Vessel
Retrofit
Bio Sea 100
Damen Shiprepair Brest
2014
-Installation

- **Clear demarcations / responsibilities / project management.**
- **As few as possible responsible parties/ avoid loss of info.**
- **Preparation is everything (knowledge of both systems and vessel).**

Questions?



Contact us at
green@damen.com