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NORTH SEA BALLAST WATER

THE BALLAST WATER TIMES

PORTS SPECIAL

Note from the management

After the warm response to the first issue we now proudly present you the second issue of the Ballast Water Times. This time it's a Ports Special. We believe that ports are key players in the implementation of the IMO Ballast Water Management Convention (2004). We would like to thank all authors for their contribution to this edition of The Ballast Water Times. There are a lot of challenges to face and a lot of solutions to be found. But we believe that with the right momentum and by joining forces this can be made possible. The North Sea Ballast Water Opportunity project goes on for another two years and we will be able to accomplish our goals. Please don't hesitate to contact us with any questions, and for more information please visit our renewed website. You can also follow our experiences on twitter @NSBWO.

Enjoy reading!

Ballast Water Management – Port State Responsibilities

Stephan Gollasch[1] & Matej David[2]

The Ballast Water Management Convention, adopted by the International Maritime Organization in 2004, may enter into force within the next two years. To date, 33 IMO member states representing 26,46% of the world's merchant fleet gross tonnage have ratified the Convention (status as of March 2012). Twelve months from ratification of the Convention by 30 States with more than 35 % of the world's merchant fleet gross tonnage, the BWM Convention will enter into force.

The regulations of the Convention impose requirements on several stakeholders, including Port States (PS). PS should be prepared and equipped for compliance monitoring of ships which discharge ballast water in their waters. This may be done by checking documents or certificates and possibly by taking ballast water samples. PS need to have plans to check vessels, which may include guidance how to check the records in the ballast water record book, how to find out if the crew is familiar with their obligations in regard to the implementation of the Ballast Water Management Plan, how to check if a vessel has conducted ballast water exchange, how to sample for compliance control with the Ballast Water Discharge Standards. Further, violations of the requirements of this Convention shall be prohibited and sanctions shall be established under Port State law, and sanctions should be adequate in severity to discourage violations. If a violation is identified, the ship and the administration shall be notified, and evidence should be provided.

Should cleaning or repair of ballast tanks occur, the relevant ports and terminals should have adequate reception facilities for sediments. PS are also encouraged to designate areas where ships may conduct ballast water exchange in accordance with the BWM Convention in case arriving ships were unable to conduct a ballast water exchange outside the 50 nm limit from the nearest land and in waters of at least 200 meters depth. PS may prepare for risk assessments to exempt low risk ships from ballast water management requirements, or to impose more stringent measures upon high risk vessels. PS are also encouraged to monitor their waters where ships may take up ballast water and to inform mariners when and where they should not do so because of e.g. an outbreak of harmful organisms or pathogens, or in shallow or turbid waters with poor flushing and / or high nutrient concentrations that should be avoided if possible. PS should also promote and facilitate scientific and technical research related to ballast water management and to monitor the effects of ballast water management in waters under their jurisdiction. PS should provide for adequate training of their personnel and cooperate at the regional level, e.g. in joint Research & Development programmes and actions for the implementation of the Convention.

PS may refer to the Ballast Water Management Convention and its supporting guidelines for further information, or contact the authors to consult with them in the field of ballast water management, tests of ballast water treatment systems, risk assessment and administrative matters.

www.gollaschconsulting.de

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Zen and the art of (de) ballasting

Geert Jan Reinders, Staff Officer

There are many ways to address a problem. One can bluntly attack it, go for a subtle solution, or -as some do- even ignore it. I must confess the first option is the one which works for me. But in many cases a solution created (or even enforced) by me does not necessarily work for the next person (as I found out on the odd occasion).

Ballast water. A problem? I didn't think so. In the old days, being a merry sailor and later working as a merchant officer on board of seagoing vessels, ballast water never was an issue. There was plenty of it and always, when needed, an opportunity to get rid of it. No questions asked, no harm done? Of course we must have known about little critters being present in the water, but none of us ever gave them a second thought. One can imagine many people working at sea nowadays have not evolved in this sense.

Before going further on the topic of ballast (water), I do think it might be a good idea to try to explain what it is in the first place... and why it is being used.

In the old days one of the predecessors of the modern day seafarer must have found out by trial and error that it was a good idea to put some weight in his ship. Smart as this person was, he thought of placing some stones in his canoe when his sail was up. It gave him (extra) stability, which prevented him from tipping over. *Continued on page 4.*

Ballast Water Treatment Barge

Niels van de Minkelis,
Staff Member Technical & Environmental Affairs

The Ballast Water Management (BWM) Convention requires that ballast water being transported by seagoing vessels must comply with certain standards before discharging. It is expected that the majority of ships will install a ballast water treatment system on board in order to meet the D-2 standard of the Convention. For numerous ships it is a technical challenge to install a treatment system due to limited space available on board or due to the unique design or operation of the ship. For older ships it might not be economically justifiable to install a ballast water treatment system. Ship owners may therefore benefit from alternative ways to comply with the BWM Convention.
Furthermore, the presence of an approved ballast water treatment system cannot guarantee that discharged ballast water meets the D-2 standard at all times, even when the necessary approvals have been granted, possibly leading to a situation where a vessel cannot discharge its ballast water while in port. In order to avoid congestion in a port, the port authorities could therefore also benefit from allowing ships with alternative ways of de-ballasting.
The Royal Association of Netherlands Ship owners is participating in a Maritime Innovation Impulse Project (MII) in order to explore the possibilities of developing a ballast water treatment barge. It should be a barge that receives, processes and discharges ballast water into the port or only receives and transfers the ballast water to a port reception facility. Depending on the outcome, this project may lead to the actual construction of a prototype ballast water treatment barge, aiming at a future commercial exploitation of several barges for collecting ballast water, similar to the collecting of bilge water and sludge, presently common in most ports. Furthermore this barge could be used in case of a calamity (PSC detention) in one of the Dutch ports, providing an emergency treatment of ballast water. For a cleaner environment, the ballast water treatment barge should be equipped with an environmentally friendly (LNG) engine or a fuel cell to provide the necessary electrical power, thus avoiding additional NOx and SOx emissions from the seagoing vessel operating an onboard treatment system while in port.

www.kvnr.nl

Shoreside treatment: a future ballast water management solution?

Jolanda Matthijssen,
Project Engineer Ballast Water Solutions

Looking at the current ratification status of the IMO BWM Convention and the implementation schedule it is clear that time is the common factor. Time is of the essence for making the right decision, planning the implementation and the execution of the installation. We, as Cofely, know that as a technical service provider giving our clients a turn-key solution for a BWT retrofit. This is our main focus but with the time factor in mind we've looked beyond a ship retrofit. There are various reasons why it is possible that a ship will not be in compliance with the Convention the moment it should be. Think of a failed BWT system, the financial challenge or maybe the delivery of the BWT system has been postponed because of all the orders that a factory has to handle. The ship will not be able to enter a port and money will be lost.

This is the reason why we're into the development of a shoreside solution for ballast water treatment. The concept should not only solve the non-compliance of ships but also serve as a tool for the port authorities for the compliance control. That means that a BWT system will be combined with a detection system to make it a total solution.

In order to check this new concept and its feasibility, we cooperate with ship owners, ship owner associations, port authorities and marine research facilities. Currently we're in the process of getting the concept subsidized by a European government program, together with Germany and Denmark.

www.cofely-gdfsuez.nl

Marine environmental awareness and the Port of Rotterdam

Erik Bogaard,
Director

Sustainable development is and will be an important aspect of the future of the maritime industry. The Port of Rotterdam Authority has identified sustainable development as a starting point for the future, in the Harbour Vision 2030. In addition to new technology, procedures, rules and regulations, the port realizes it also needs to educate and inspire its employees (the Human Factor) to play a part in shaping a sustainable future.

In 2011 and 2012, the ProSea foundation and Port of Rotterdam offered marine environmental awareness courses to port personnel (both port inspectors and policy makers). The course for ports is based on the IMO model course for ships' officers, developed by ProSea. This course for ports addresses both the sea and the port perspective.

The course takes place in the inspiring environment of the Rotterdam Zoo and includes lectures about sustainability and marine ecology, an excursion to the ocean section of the zoo and lectures/films about the environmental challenges for the maritime industry. In addition, several workshops make it an active course and participants are asked to voice their own opinions.

The final workshop of the course addresses the future of the Rotterdam Port. How can the Port of Rotterdam Authority achieve the goal of becoming the most sustainable harbour of its kind? And as a port employee, what can or should my contribution be? Which responsibilities do I have as a person?

The marine environmental awareness course for ports contributes to a general awareness of the importance of sustainable development and to the involvement of people. And at the same time invites port personnel and policy makers to play an active role towards a sustainable future.

www.prosea.info

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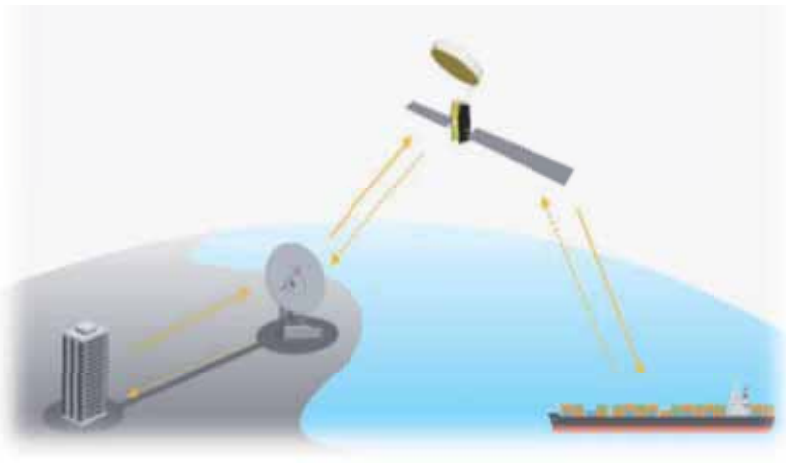
A thesis on a remotely controlled BWTS

Goran Bakalar,
Technical Coordinator

This article gives a short description of work done for a thesis to be submitted as a doctoral dissertation in January 2013. The thesis is titled 'Self-monitoring of treated BW on board by using newest sensor technologies and satellite communications.' The model includes three sub-systems and remote operation from the shore side office to be autonomous from the ship's crew.

Remote operations on ships are used more and more every day. This thesis describes a technique for remotely operating a ship's BW system from a land-based office. Also, a fixed Flow Cytometer on the ship is remotely run that analyses treated ballast water by recirculation. The data of the Flow Cytometry scans are transmitted by an INMARSAT satellite communication system. When the detection shows the water conforms to the D-2 regulation, the ship receives a 'cleanliness confirmation' and can enter the port. Ship officers supervise the operation by watching a monitor in the cargo control room.

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This way of detection keeps the ship's stability untouchable and the detection and information remains autonomous. Also, ships' crews cannot enter the system and cannot influence the detection or detected data transmission. The main goal of the technique described in the dissertation is that a ship enters port with the BW 'cleanliness confirmation'. This way there is no need to sample the BW and no time is lost for analysing the samples.

www.mhsystemscorp.com


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Quick compliance tools: ATP & FDA

Cees van Slooten,
PhD Student

With the successful development of dozens of effective and reliable ballast water treatment systems, a big hurdle for implementing the IMO convention has been taken.

The next challenge will be to efficiently monitor the performance of these systems onboard ships when the convention will be enforced. Ships operate under time-constrained and unpredictable schedules and can't afford long delays in ports due to ballast water compliance testing. So the need for quick, easy-to-use and reliable monitoring tools is obvious.

One candidate currently under investigation as part of my PhD thesis is Adenosine Triphosphate or ATP. The ATP molecule is the universal energy currency of all organisms ranging from bacteria to whales. It is exclusively produced by living cells so measurements of ATP can give a good indication of total viable biomass. The analysis can be performed within minutes and the equipment itself is very easy to use.

Another promising candidate for onboard compliance control is Fluorescein Diacetate (FDA). The FDA test assesses the enzyme activity in water samples. Enzymes are exclusively produced by living organisms so this test can be another reliable indicator for living biomass.

Besides compliance testing by Port State Control officials, these methods could also be applied by ships' personnel to check if their treatment system has achieved sufficient disinfection levels. Using these tools, the crew is able to know whether additional action should be taken before discharging their ballast water.

Whenever the ATP levels or enzyme activity exceed a certain threshold, Port State Control officials may decide to conduct additional, more time-consuming tests such as taking samples for counting organisms. The main benefit for having these quick indicator tests is to identify the few vessels that might be non-compliant to the ballast water standard and let the others move on quickly with their business.

www.nioz.nl


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BWO Technical Outline and Requirements for Organism Detection

Stephan Gollasch, independent consultant & Peter Paul Stehouwer, PhD Student NIOZ

In February 2012, Stephan Gollasch and Peter Paul Stehouwer completed a report on 'BWO Technical Outline and Requirements for Organism Detection. Systems for Establishing Compliance Enforcement'. In the report, a wealth of organism detection technologies is described. However, the report is meant to give an overview of methods and does not attempt to deliver a fully comprehensive summary. Most of the methods considered were not initially designed for the purpose of biological ballast water sample analysis.

It further became clear that no single method is available to identify all organism groups addressed in the Ballast Water Performance Standard (D-2 of the IMO BWMC). The practicality of selected methods was tested by using them on board of commercial vessels. A particularly challenging condition is that no laboratory facilities are available on such vessels for sample processing. Further, compliance tests with the D-2 standard require a low detection limit, i.e. a high sensitivity of methods. As a result, it becomes clear that a compromise is needed to select the most appropriate method. Aspects to consider include: accuracy, reliability, time to a result, expertise, portability and costs.

Organism group	Indicative analysis onboard	Detailed D-2 compliance test
> 50 µm	Stereomicroscopy (viable organism count), flow cameras	Stereomicroscopy (viable organism count)
< 50 / > 10 µm	PAM / FDA / flow cameras, **ATP, flow cytometry** (semi-quantitative)	**Stains, flow cytometry** (viable cell count)
Escherichia coli	**Fluorometry** (semi-quantitative)	Möller & Schmelz / IDEXX (colony forming units)
Enterococci	**Fluorometry** (semi-quantitative)	Möller & Schmelz / IDEXX (colony forming units)
Vibrio cholerae	Enzyme detection (presence/absence)	**Traditional TNBC agar plating** (colony forming units)

In summary, the methods in the table seem to be the most promising approaches for compliance tests with the D-2 standard. The table is structured to show methods for an indicative analysis which may be undertaken onboard a vessel or in a van driven to the pier. Further, methods for a detailed sample analysis in a laboratory are added in bold. However, it should be noted that the suitability for the purpose of ballast water testing of other methods than the ones listed above, remains to be checked. Therefore, this summarizing table needs to be considered as a preliminary result.

It is planned that during the remaining duration of the NSBWO project more methods will be tested so that this table may needs to be adjusted accordingly.

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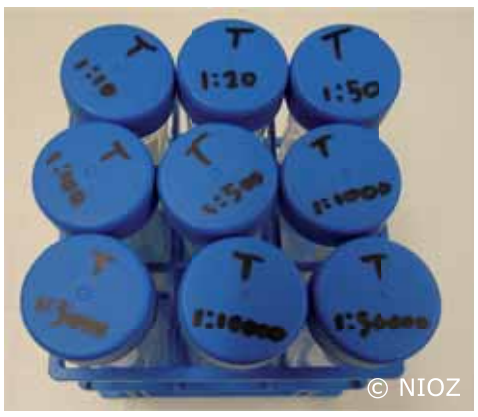
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Continued from page 1.

His mates however had to swim back to the coast because they failed to do the same. Later on this principle was refined and ships started to bring e.g. bricks (as ballast) from the old country to the new land (colonies) and return home a year or (maybe) two later laden with spices, silk or other valuables. The next two quotes from the Dictionary Of Shipping Terms, give you a clear idea of Ballast as a phenomenon:

*"**Ballast** Heavy weight, often sea water, which gives a ship stability and improves handling when she is not carrying cargo. Such a ship is said to be steaming in ballast".*


© Stephan Gollasch

*"**Ballast** (to) To steam between two ports without a cargo. Reasons for a ship having to ballast include: (a) no further cargo being available at the port where the ship is discharging; (b) in some trades, a ship may perform a series of voyages between two ports with a (suitable) cargo available in only one direction; (c) in other trades, it may be more economical to steam empty to a port to pick up a lucrative cargo than to take low-paying cargo to that port".*

Again, is ballast water a problem? It definitely is! The proof for that is overwhelming. According to the European Maritime Safety Agency (EMSA), a massive 3000 to 4000 million tons of ballast water are being used by ships on a yearly basis. All kinds of harmful aquatic species are carried around by them in this ballast water. It is estimated that about 10.000 marine species are globally transported every day, i.e. are loaded in one place and discharged in the other. Many of these aquatic organisms have to be classified as invasive species, which means they can or will cause a lot of damage to the environment in which they are introduced.

Two examples from the area where I live and work and which I encounter just now and again: the introduction by ships of the Atlantic jackknife clam[1] appears to be harmless. Since it is considered to be a delicacy - it is great in your paella - by some (apart from humans, it's eaten by birds also), it might be looked upon as an asset to the Wadden Sea. The introduction of the chinese mitten crab is a different story. Like the Atlantic jackknife clam it was introduced by ships in the Wadden Sea area in the early years of the last century (1912 first sighted in the river Elbe[2]) and it travels from salt to fresh water and visa versa. On one hand it is fished for and thus giving a few people some extra income. On the other hand, it is not particularly liked by people and organisms who are confronted with this snapping creature. It damages the nets of the (professional) fisherman. It eats the baits of the angler and besides that it feeds on spawn and siblings of e.g. fish and frogs. Since it takes over stretches of water, it makes fishing at least very challenging, if not to say nearly impossible.


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The problem with the introduction of invasive species in a particular environment is that it is practically irreversible. So what can we do, or maybe, must we do to stop these water based ninjas? Where shipping is concerned, I gladly refer to the excellent articles published in this Ballast Water Times about this topic. Being a port guy I would like to share my views on what can be done by ports. First of all an answer to this question: what does a port have to do? According to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, the answer to this almost rhetorical question is: not much! A port where cleaning and repairing of ballast tanks occurs, has to prepare to be able to receive the residues which come from cleaning or repairing ballast tanks (art. 5). But again, what can a port do? Here I can elaborate. Of course it depends. It depends on how a port wants to operate or, in other words, will a port take the responsibility to do more than legally required? Does it want to upgrade its service level? Groningen Seaports, the port authority I have the honour to work for, recognises the fact that its ports are bordering the ➲

[1] First found in the river Elbe in 1979 (Waddengids, EcoMare and Waddenvereniging)
[2] De Chineesche Wolhandkrab In Nederland, L.F. Kamps

sensitive Wadden Sea Conservation Area, which is on the World Heritage List of the United Nations. Because of this we have been challenged, by N.G.O.'s years ago, to put our money where our mouth is. This resulted in obtaining the so called Ecoport Certificate and above all, in making sure that we will not lose it again. For this we have to submit a new plan every two years, to bring us further in our goals concerning the care for environment and sustainability and thus making environment and sustainability embedded topics in our day to day operations. This brings (at least moral) responsibilities.

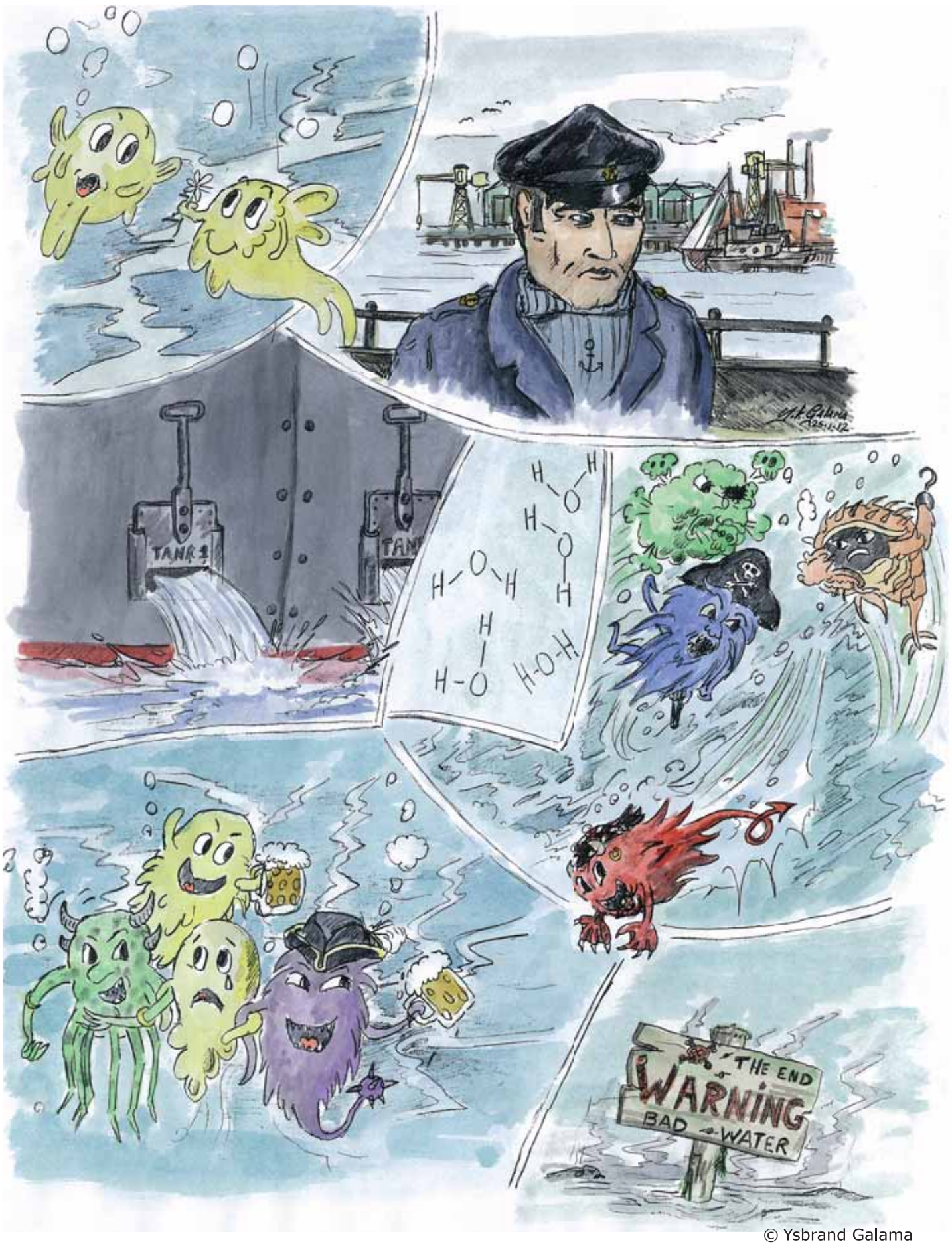
Because of our certification we are thinking about ways we can help our customers, the ships and their owners, in dealing with their future problems and how the environment can benefit from this. Presently we are looking at the possibilities of participation in (a) pilot project(s) where we would, together with other partners, try to build and exploit a shore (or better said port) based system which can receive and treat ballast water of ships. This, being one of the most obvious things that a port can do, is consuming most of our attention in the area of the ballast water treatment. Since vessels equipped with a proper ballast water treatment system obviously have no problem, they can treat their ballast water and be on their way after loading. But for older ships it is a completely different story. From what we know now, from 2016[3] on there will be numerous vessels which will not be (retro) fitted with a ballast water treatment system. The latest estimation that I heard of, mentions a mere 16.000 ships will be in need of a retro fit. So first of all, it is obvious that there will be no time to fit all of them with the necessary equipment before the deadline. Second, it might be too costly to build a new system into an old ship. It might prove to be cost ineffective. A solution for this problem could be a port based system as mentioned. From my point of view such a system would be operated by market parties. The port authority could be facilitating in the sense that it will be interesting for parties to invest in a treatment system for a particular port. We will, if the pilot project will be realised within our harbour, gladly share our knowledge gained in the project with other ports.

Would there be other possibilities for ports to play a role in the process? One could think of rewarding ships to comply with the law. Since this is not making real sense, after all ships have to be compliant to the convention, one could think of a penalty for ships that aren't. Personally, my feelings are quite ambiguous when it comes to this, but none the less it is an option.

Are there more things we can do? Definitely! But again, it depends on a port and what its objectives are. Whether it wants to take part in the process of solving the ballast water issue and is prepared to act rather than to react or wait. Is a port prepared to work on this issue and cooperate with shipping and government? Both playing their respective roles. This process of cooperation will not always be an easy one, but because of the stakes, which are very high, it is worth trying. It will take patience, vision and a positive attitude. One could say a Zen-like approach is wanted here.

www.groningen-seaports.com

[3] it is the overall expectation that the convention will be in force in 2016



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Once upon a time in a harbour, creatures lived in harmony together. Till the day a ship arrived from far far away. The ship carried a lot of ballast water. It looked like normal water. But, if you took a closer look, you could also see that in the water a lot of strange creatures travelled along. Finally released from the tanks, these creatures started to multiply. Without their natural enemies they took over the local environment and influenced the natural inhabitants. They plan on staying happily ever after.

The End.

BWMC: a challenge for ports?

Maurits Prinssen,
Project manager
Sustainable Development

Like many others ports, the Port of Rotterdam Authority is preparing for the implementation of the BWMC. During the many discussions regarding the prevention of the introduction of invasive species and the necessity to treat discharged ballast water, the consequences for ports were discussed, too. Parties of IMO:

- defined the problem of transport of invasive species;
- one source is ballast water;
- problems occur on board;
- so the solution should be on board.

Now as time is pressing for ratification, it is becoming clear that the BWMC will have substantial effects on port activities. What the effects are and how to prepare as a port authority isn't that obvious. This was one of the reasons the port of Rotterdam joined the INTERREG program 3 years ago – to gain some prior experience on the subject. However, within this program various questions remained unanswered. In the mean time, more port authorities seem to be joining us in the search for answers.

In a port with more than 33,000 calling vessels of which almost 10,000 are tankers, it is clear that the BWMC will have an impact on port activities. Beside the 433 (2011) million tons of cargo the ships brought in, a further (in 2008) 77 million tons (m^3) of ballast water were taken in and 35 million tons (m^3) were discharged. More details of our study are published in the report ´Ballast water quantities Port of Rotterdam Ballast water intake and discharge February 2008' on www.scheepsemissies.nl.

Furthermore, informed ship owners who want to be ready when the BWMC enters into force generally approach the ports for solutions for vessels which will be taken out of operation a few years after the BWMC is ratified. The investments are simply uneconomical if they have to invest in a BWT for such a short period of time. Is it possible to discharge the untreated ballast water at a Port reception facility or does a port need to have a mobile treatment facility?

How will PSC deal with vessels without an adequate or working BWT once the BWMC is ratified? Depending on how PSC will deal with those vessels, delays in the port operations are expected.

At this moment, small amounts of ballast water or sediments can be discharged in the port of Rotterdam, however for large amounts the present capacity is insufficient.

Another question which is still unanswered: what is the effect of a BWT on air quality?

The stakeholders in the Dutch platform on ship emissions organised a workshop recently. If you were not able to attend, you can find the presentations on the website www.scheepsemissies.nl.

We look forward to further discussions within the NSBWO project and assume that the answers will become clearer as we go forward.

www.portofrotterdam.com


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Port of Gothenburg in short

The Port of Gothenburg is the largest port in Scandinavia, with over 11,000 visits by ships each year. Almost 30 per cent of Swedish foreign trade passes through the port. The Port of Gothenburg can offer a very wide range of routes, with traffic to over 130 destinations throughout the world. There are, for example, direct routes to the USA, India, Central America, Asia and Australia.

The Port of Gothenburg is also the only port in Sweden with the capacity to receive the largest ocean-going container vessels. A total of 24 rail shuttles depart each day, offering companies throughout Sweden and Norway a direct, environmentally wise link to the port and the opportunity to utilise the broad range of routes.

At the Port of Gothenburg, there are terminals for containers, ro-ro, cars, passengers and oil and other energy products. Since 2010, the port has been divided into a municipal Port Authority and separate terminal companies that deal with the operational side.

The Swedish economy is totally dependent on trade. The long distances to key markets mean that transport costs are a vital factor for Swedish industry.

The Port of Gothenburg reinforces the competitiveness of industry by being a strong freight hub with a wide range of routes to key import and export markets. The large number of direct routes means safe, cost-effective, rapid transport.

The Port of Gothenburg has good, natural conditions for developing further as a freight hub, thanks to its strategic position as a link between the Atlantic/North Sea, and the Baltic Sea. The aim is to continue to develop the infrastructure within and outside the port in order to generate even greater capacity and improved access.

The Port in figures, 2011

- 887,000 containers, TEU
- 549,000 ro/ro units
- 227,000 new cars
- 1.7 million passengers
- 20.4 million tonnes of oil
- 41.8 million tonnes of freight

www.portofgothenburg.com

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Interview

With Jens Haugsöen (Terminal Manager Oil) and Anna Andersson (Environmental Manager) of Copenhagen Malmö Port (CMP)

Can you give some more information about CMP?
In 2011 13.7 million tonnes of cargo were handled at the ports in Copenhagen and Malmö. We are working in several business areas: cars, RoRo, dry and liquid bulk, container, cruise. Most of the ships arriving at the ports of Copenhagen and Malmö come from other parts of Europe.

Why does CMP participate in the NSBWO project?
With the upcoming new regulation on ballast water handling, it was of interest for us to gain more knowledge on this topic. One question was (and still is) 'How will the new regulations affect the business in our port?' Taking part in the NSBWO project gave us a nice opportunity to inform ourselves.

Does CMP do anything concerning ballast water at the moment?
At the moment at CMP there are no special activities concerning ballast water. There haven't been any requests from arriving ships, as far as we know, on how they should manage their ballast water after the BWMC is ratified.
There were tanks for receiving ballast water at the oil terminal at Prøvestenen in Copenhagen, but not anymore. The tanks were taken over by another actor in the area, because of the demand for maintenance. It would be possible that there are other actors in that terminal area that could provide reception of ballast water. But there are no clear plans for that.

Will there be changes for CMP after the BWMC has been ratified?
As far as we know right now there will be no changes. For us it is unclear what the role of CMP will be after ratification of the BWMC.

Are there plans for services for ships without or with not functioning BW treatment installations?
At the moment we do not have any plans for that. There also haven't been any indications from the arriving ships that this is a service they would ask for in the future. But if it turns out that our customers are interested, then we will take action, of course. This may have to be done with other actors, like a waste water treatment plant for instance.


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Ballast water and ports: many questions, few answers

Peter van den Dries, Technical Environmental Manager

Ships and ballast water make a natural combination, as ships need ballast water for their safety and stability. Loading and unloading operations of cargo in ports automatically lead to uptakes and discharges of ballast water. And as many examples worldwide have already shown, ballast water discharges can also be an extremely efficient vector for the introduction of non-native aquatic species in local ecosystems.

Also in the port of Antwerp, with yearly 15,000 calls of seagoing vessels handling over 187 million tons of cargo, several million tons of untreated ballast water are being discharged. Especially now with its improved overall water quality, the port area is vulnerable to the introduction of alien species.

Since 2004 the Ballast Water Management Convention (BWMC) provides an international legal framework, with technical measures and guidelines aiming to prevent the transfer of harmful aquatic organisms through the control and management of ships' ballast water.

The BWMC also requires parties to provide adequate sediment reception facilities in ports and terminals where cleaning or repair of ballast tanks occurs.

Until now, the BWMC has not yet entered into force. And despite the fact that IMO's 63rd Marine Environment Protection Committee (MEPC) noted that there are now 21 type-approved ballast water treatment systems available, few ships have been equipped with one.

In addition, the role of enforcing authorities and Port State Control remains unclear, as the delay in agreeing on a harmonized sampling procedure does not provide them with clear guidance to develop their monitoring schemes.

Although the ports are preparing the entry into force of the BWMC, many port authorities are still struggling with the lack of guidance on the issue: how to deal with ships that are not equipped with a properly working treatment system? When will port authorities be informed when this situation occurs? What with unloading operations when ballast water analyses are not available? How to de-ballast ships that are in port? As there is not sufficient storage capacity in ports for large amounts of untreated ballast water, mobile ballast water treatment systems may be a solution: who is going to pay for the costs?

Many questions, few answers...
Until now the ballast water debate has mainly focused on the role of ship owners, treatment system providers and enforcing authorities. Maybe it's time that also port authorities become more closely involved in the discussions?

www.portofantwerp.com


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Killing time while (de)ballasting

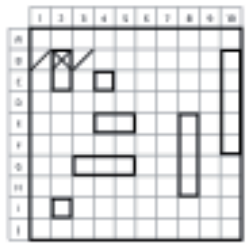
BALLAST BATTLE

Player _____ ROUND _____

YOUR INVASIVE SPECIES

ENEMY INVASIVE SPECIES

example



short rules

1. Arrange your invasive species on the upper map according to “invasive species” table
2. Take turns firing a salvo to your enemy calling out squares as “A3.B3”, etc.
3. Mark salvos fired on “enemy species” grid / marks water, X marks hit
   You must call out when your invasive species is erased
4. Eliminate ‘em all

invasive species table

*	name	size
2x	cholera	1
2x	North Pacific Seastar	2
1x	mitten crab	3
1x	Zebra mussel	4
1x	round goby	5

Environmental safety from treated ballast water

Stefan Kools,
Director Ecological Risk Assessment and Laboratory

In harbors, ballasting and de-ballasting takes place when ships load and unload cargo. Recent estimations indicate that, for example in Rotterdam, over 50,000 m^3 are discharged on a daily basis. A single large chemical tanker may load and discharge even double that amount in the harbors. This leads to large quantities of ballast water exchange between ports. In the future, all ballast water will be treated in some manner to eliminate invasive species, but environmental safety remains an important issue. Grontmij is a consultancy company and test laboratory focusing on sustainability, and the risk assessment of ballast water is our business. In several of our recent projects, this aspect receives attention during the process of certification, especially systems that make use of active substances (IMO guideline G9). The process states that ‘the risk evaluation should qualitatively take into account cumulative effects that may occur due to the nature of shipping and port operations’. By means of chemical measurements and modeling (MAMPEC model), the concentrations measured in the discharge water are extrapolated to Predicted Environmental Concentrations in the waters (PEC). The actual risk is then calculated by comparing the level where effects are expected (the predicted no effect concentrations; PNEC). In case the PEC is lower than the PNEC, effects on the environment are not expected. Next to that, tests (bioassays) aim to verify the lack of toxicity of effluents and these systems can be certified by authorities. In the future, after the certification process and systems are installed on-board, control mechanisms for ships in port locations may be needed. Grontmij is currently looking for tools that can be developed to verify that systems are indeed safe and not emitting toxic compounds during voyages and (de-)ballasting operations.

www.grontmij.com

Ballast Water Management Convention and Port State Control (PSC)

Meindert Vink,
Senior Inspector

In the first lines the Ballast Water Management Convention states:
'States shall take all measures necessary to prevent, reduce and control pollution of the maritime environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment which may cause significant and harmful changes thereto.'

In order to comply and to enforce the future convention in our ports, inspectors of the Human Environment and Transport Inspectorate (ILT) are the designated persons to investigate ships in our ports and take the actions necessary in cases of non-compliance.

A PSC Inspector first determines whether the BWM Convention is applicable to a subject vessel. The convention does for example not apply to ships not carrying ballast water and ships taking and discharging ballast water at the same location.

Next, the inspector will check whether the ship is exempted from the Convention. An exemption may be granted to a ship on voyages between specified ports or locations based on the guidelines on risk assessment as developed by the Organization (IMO). Exemptions may be applied for to ILT.

Furthermore, the inspector will verify the required documentation. All ships concerned shall have on board:

- Ballast water management certificate (>400GT)
- Ballast water management plan
- Record book

The following step may be the inspection of the ballast water management system. A system that works well treats ballast water in such a way that almost all species, alien or new, are not viable any more.

Systems for ballast water management shall be approved by the authorities of the Flag State of the Ship. In the Netherlands, ILT is the organization which approves these systems. As of April 2012, the following systems are approved:

- Hyde Guardian QUA-VAC, type UV, valid until 1 August 2015
- GloEn-Patrol, Hatenboer water, type UV, valid until 1 September 2015
- N.E.I. treatment systems for ventury oxygen stripping, valid until 18 July 2016
- AlphaLaval PureBallast 2.0, valid until 15 January 2017

All these management systems contain a log in which all relevant data are stored. This has to be in line with the data in the ballast water record book. Also, the log indicates if the system has been working properly.
The inspector may ask the crew to demonstrate the proper functioning of the system and check the familiarity of the crew with the system.

Finally, the inspector may decide to take a sample of the ballast water in order to check for compliance. Sampling is possible in several ways and up to now subject of IMO working groups in order to agree on a reliable system of sampling.

If the system does not work properly, the ship may be detained and will be released as soon as the system has been repaired. Ballast water still on board shall not be discharged before it has been treated. In some cases, it may be discharged in port to shore treatment facilities.

The Convention comes into force in the course of 2013 at the earliest, but already many approved ballast water management systems are placed on board.

www.ilent.nl

Exemptions in the North Sea

Dick Brus,
Senior Policy Advisor

North Sea countries are, in close cooperation, in the process of ratifying and implementing the Ballast Water Management Convention. The North Sea Ballast Water Exchange and Exemptions Group, in consultation with the North Sea Ballast Water Opportunity project and EMSA, is preparing the implementation of issuing exemptions in the North Sea. Vessels expected to apply for exemptions are short sea vessels on regular service, such as ferries or specials, like tug boats and wind-park support vessels Exemptions are regulated in Regulation A.4 of the Ballast Water Management Convention. Exemptions may only be given to ships on a voyage or voyages between specified ports or locations. For granting possible exemptions, guidelines are developed for risk assessments (G7).

The North Sea Ballast Water Exchange and Exemptions Group has considered the approaches to risk assessment provided under the IMO guidelines. Concept conclusions are that key risk criteria for issuing exemptions within the North Sea are limited to:

- Difference in water salinity between ports/locations being visited;
- Presence of non-indigenous invasive species in either port/location being visited, that is, target species.

Not only North Sea countries, but also Baltic countries are consulting on issuing exemptions. Part of this consultation process is a project proposal 'Pilot risk assessment of alien species by ships on intra-Baltic voyages'.

Both North Sea and Baltic countries share the view that a coordinated approach is most welcome. Such a coordinated approach stimulates a consistent approach on risk assessments on alien species transfer, enhances clarity to ship owners applying for exemptions and makes best use of the expertise in the two regions.

The North Sea countries will submit their concept proposal on exemptions to OSPAR, with the recommendation to form a HELCOM OSPAR working group. This group should finalize a joint proposal for issuing exemptions in the North Sea and the Baltic Sea.

www.rijksoverheid.nl/ministeries/ienm

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Ports: vital link in ballast water

Ellen Kuipers,
Project leader shipping safety

Globally, we have agreed that the effects of the introduction of alien species by ballast water should be avoided. For this reason, the IMO Ballast Water Management Convention (BWMC) was adopted in 2004. The purpose of this convention is that in 2016 all ships are required to deal with their ballast water in a proper way.

Until now, scientists and governments have put a lot of time and effort to work out this BWMC. Now it's time for ship-owners and ports to step into action: time is running out! It is physically impossible to fit the world fleet with a certified ballast water treatment system before 2016. We could ignore this fact, but the time has come to actively look for alternatives. If we do not, the aim of the BWMC will not be met.

The Wadden Sea Society sees an important role for the ports. They could realize 'onshore' ballast water treament solutions with the support of their governments. Effective maintenance of the ballast water convention is impossible when no alternative treatment options are offered. A fine is easily imposed, but ultimately it is our goal to prevent the spread of exotic species through ballast water. We sincerely hope that enforcement, the onshore treatment of the water and the extra time that this treatment costs, will be compelling enough, to motivate the shipping industry to come into action.

The North Sea Ballast Water Opportunity project is an excellent platform to discuss this problem. Let's start!

www.waddenvereniging.nl

Project partners

BSH Bundesamt für Seeschifffahrt und Hydrographie
Brockmann Consult GmbH
Cathelco
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MAHLE Industrial Filtration
NFV
Newcastle University
zebra bioscience
WMU World Maritime University
OVIZIO Imaging Systems

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The Interreg IVB North Sea Region Programme

Project consultants

evers + manders

Welcome Cathelco as new partner of the NSBWO project

Since October 2011 Cathelco has been a full member of the NSBWO project. Cathelco is the world leader in Seawater Pipework Anti Fouling and Impressed Current Cathodic Protection Systems (ICCP). They have more than 30,000 installations of Cathodic Protection and Anti Fouling systems on all types of vessels including container carriers, ferries, cruise ships, tankers, FPSOs, tugs, frigates, destroyers, fast patrol craft, luxury yachts and offshore structures.

Cathelco is conducting a major research programme to examine ways of producing a more effective ballast water treatment system. To gain greater insight into the problem, Cathelco has set up a new research facility in Kiel, Germany where a research team focuses on the factors which influence ballast water treatment. The aim is to develop new methods of treatment which are effective against the widest possible range of organisms. The team is headed by Dr Matthias Voigt, an acknowledged expert in the field. His history in ballast water related research reaches back to 1997.
"The biggest challenge for the treatment of ships' ballast water is the fact that the quality of the water to be treated is unknown", said Dr Voigt.

He explained that ships carry out their ballast water operations in many different environments from freshwater to open ocean water and that the physical and chemical properties of these waters may vary greatly. In addition, the species and density of organisms vary considerably between locations and with time. "Any effective treatment of ships' ballast water must recognize the extreme variability of the source waters and still reach the fixed IMO standard for the discharge of ballast water", Dr Voigt commented. The new Cathelco research and development facility in Kiel is located on the harbour side. This allows seawater to be pumped directly into the laboratory for biological and physical analysis, giving a very realistic picture of a typical port environment in the Baltic Sea.

Justin Salisbury and Matthias Voigt (Cathelco)

Colophon

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