

HARBOURS REVIEW

Ballast Water Management

VOICES

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red-hot port matters

Photo: www.pexels.com

Damen Shipyards Galati delivers a W2W SOV

Bibby Marine Services has received its Walk-to-Work (W2W) Service Operations Vessel (SOV), constructed at Damen's shipbuilding yard in Romania. After sea trials, the 90 m long, 20 m wide, and having 4.6 m of draught diesel-electric *Bibby WaveMaster 1* will as of August support offshore windfarm construction as well as oil & mining projects in the North Sea. The SOV is built specifically for the transfer and accommodation of offshore personnel, having among others six elevator landings for technicians to directly access the gangway from the ship's warehouse areas (incl. two container storages, also for high cube boxes). In addition, the *Bibby WaveMaster 1* has a helideck, a daughter craft, and CTV landings with refuelling. The vessel is able to remain at sea up to one month at a time. Moreover, a range of other options is available for the SOV to undertake other tasks, such as an additional 24 tn lifting capacity deck crane, tanks arrangements suited to liquids such as glycols and low flashpoint liquids with separate delivery intakes, as well as facilities for dive support and remotely operated underwater vehicle operations. "This is an important key milestone in the delivery of the vessel. Sea trials will start soon and we will take delivery in August. We are very impressed with the quality of the build and the whole process has gone smoothly," Stephen Blaikie, Bibby Marine Services' CEO, said. Peter Robert, Director Business Development & Market Intelligence at Damen, added, "I am honestly convinced that Damen has designed and built the best vessel for the tasks envisaged and which is going to be available on the market as of end of August this year. The combination of Damen and Bibby brings together a significant amount of knowledge, which has resulted in some impressive innovation. Carrying out the integrated hardware-in-the-loop (HIL) simulator analyses of the vessel dynamic positioning and gangway systems in a time domain simulation with the actual controllers connected to it proves, in real life conditions, safe operations in the 2.5 metre wave Hs required by the tenders – the only vessel currently able to achieve this in fact. Based on this the ship-owner can guarantee site specific vessel performance and safe operations."



Photo: Damen Shipyards

Sagunto added to Spliethoff's network

The Spanish Port of Sagunto has been incorporated into the Amsterdam-based shipping line's Medliner multipurpose service that connects the Mediterranean with the Americas. The route in question now links the following ports – Izmit, Monfalcone, Porto Marghera, Genoa, Sagunto, Chester, New Orleans, Palm Beach, Houston, Altamira, and Veracruz (the last one also recently added). Spliethoff's *Scheldegracht* is scheduled to call for the first time at Sagunto on June 5th. The Medliner service is focused on carrying across the Atlantic various break-bulk goods, such as steel and forestry products, as well as project cargo, e.g. yachts, but can also take on-board dry bulk in big bags.



Photo: Valenciaport

2017 CEF Transport Blending Call – launched

The European Commission is opening a new Connecting Europe Facility (CEF) call for proposals, aimed at combining EUR 1.0 bln together with other EU support mechanisms. For the first time, CEF's call for proposals will be combined with the European Fund for Strategic Investments (EFSI; part of Juncker's Investment Plan for Europe), along with financing from public financial institutions (such as the European Investment Bank or National Promotional Banks) and the private sector. As such, in order to receive Connecting Europe Facility support, applicants will be asked to show evidence of the projects' financial readiness to obtain complementary funding from public or private financing institutions. The main aim of the new call for proposals is for selected projects to contribute to sustainable, innovative, and seamless transportation along the Trans-European Transport Network (TEN-T), particularly within the Commission's strategy for low-emission mobility under the so-called Energy Union. Particular emphasis will be placed on initiatives removing bottlenecks, supporting cross-border links, and accelerating the digitalisation of

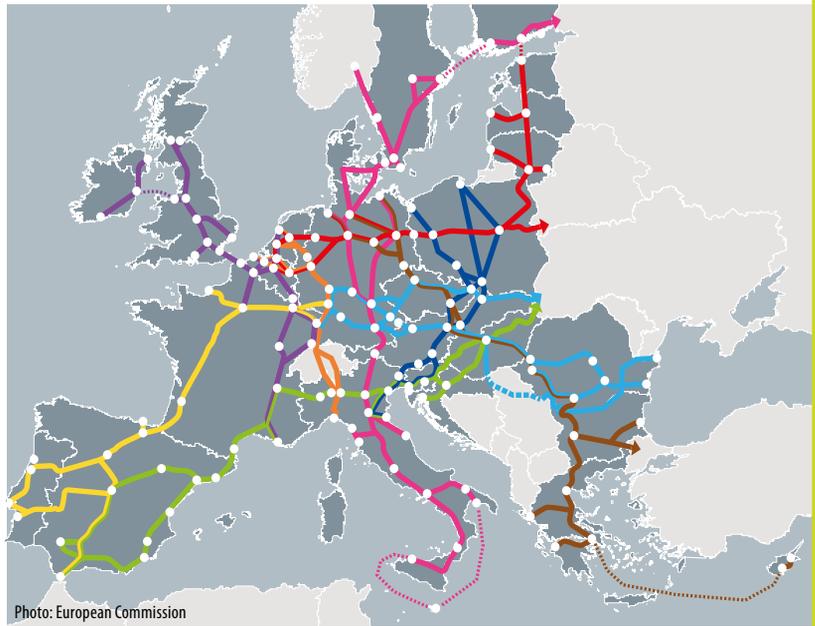


Photo: European Commission

transport through traffic management systems, such as the European Railway Traffic Management System, Intelligent Transport Systems for roads, or the Single European Sky Air Traffic Management Research Programme. Additionally, funds will be used for developing sustainable and efficient transport systems by i.e. enhancing inter-modality and inter-operability. Support will be granted on a competitive basis, following an evaluation and selection process. The call will have two deadlines for proposals' submission, the first one on July 14th, 2017, and the second one on November 30th, 2017. Under the CEF, EUR 24.05 bln will be made available from the EU's 2014-2020 budget to co-fund TEN-T projects of common interest to the EU Member States. Of these, EUR 19.3 bln has so far been legally committed. Hitherto, projects and agreements approved for financing under the EFSI are expected to mobilise over EUR 168 bln in total investments across 28 Member States, and to support more than 387 thou. small and medium-sized enterprises. "Future mobility must be clean, connected and competitive, and requires new ways of financing. Today's call for proposal is an important first step in this regard. We will build on it, this year, in our work to implement the Low-Emission Mobility Strategy for Europe," Maroš Šefčovič, Commission Vice-President responsible for the Energy Union, said. Jyrki Katainen, Commission Vice President responsible for Jobs, Growth, Investment and Competitiveness added, "The European Fund for Strategic Investments was designed as a flexible tool to be used in combination with other EU funding sources so as to maximise their impact and help achieve Europe's broader policy objectives. I am delighted that, with today's initiative, the EFSI will complement the Connecting Europe Facility to help support the investment and jobs needed to build smart, sustainable transport networks." "Achieving our vision for seamless, intelligent and sustainable mobility in Europe requires investments that public funds alone cannot provide. That is why we are launching an innovative solution to make the best of our resources, and unlock untapped private investments, with particular focus on Cohesion countries. Today's action is a sign of solidarity on the move," Violeta Bulc, Commissioner for Transport, summed up.

Swedish green project in Welsh Holyhead

Stena Line, owning the Port of Holyhead, has partnered with the also Gothenburg-based Minesto to carry out a project aimed at producing renewable electricity from the ocean. The Swedish ferry company will build an assembly plant in Holyhead, scheduled for completion in June this year, leased afterwards to Minesto which will use it for rolling out its Deep Green technology for generating electricity from slowly flowing underwater currents. In addition, Minesto's first commercial power plant array, the Holyhead Deep (recently upscaled from 10 MW to 80 MW), will be installed off the coast of North Wales, supplying as many as 80,000 Welsh households with locally-produced clean energy. "We are very pleased to have finalised this agreement with Stena Line. With its direct quay access for offshore transports to and from site we have secured a unique location that suits us perfectly. In the establishment of our technology, it is also crucial to work with professional and long-term partners such as Stena Line. We are two companies from Gothenburg, exploiting these ocean energy business opportunities together in Wales, which adds to the excitement," Dr. Martin Edlund, CEO of Minesto, said. Björn Petrusson, Chief Commercial Officer at Stena Line, added, "This investment creates value for Stena Line in several ways and demonstrates opportunities in port operations linked to ocean renewables. Our sustainability strategy has a clear focus on clean energy so participating in the development of new renewable energy sources is natural to us. This investment is good for our business and is also an investment in a better future for all of us."

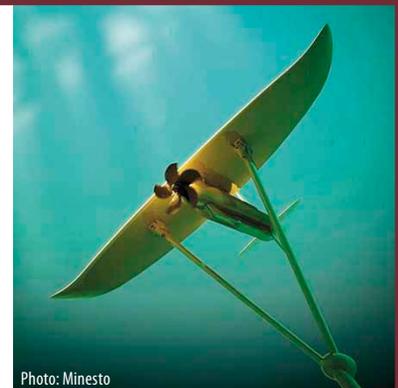


Photo: Minesto

Valletta Declaration approved

EU Member States' transport ministers have accepted the so-called Valletta Declaration on maritime transport, prioritizing competitiveness, digitisation, and decarbonisation. "Digitalisation is rightly identified as a key priority. From a technological point of view it should be very easy to establish a genuine European Single Window. We just need the political will to do it. Let's not lose the momentum we now have by backtracking on the level of ambition," Niels Smedegaard, President of the European Community Shipowners' Associations (ECSA), said. Niels also added: "The good news is that EU shipping policy as outlined in the current maritime strategy provides an excellent basis. But more maritime growth can be achieved with a more globally-oriented approach, which recognizes that shipping activities form the core of the maritime cluster. We want to work together on an ambitious shipping strategy for the period 2019-2028. We are ready to share our ideas in a constructive and open-minded spirit, using the opportunity of the European maritime year to the fullest extent possible." Find more information about the Blue industry in *Harbours Review* 1/2017 E-zine.



Photo: Wikimedia Commons

Liebherr exports to India

Bothra Shipping Services, taking care of container handlings in the Port of Kakinada (Andhra Pradesh state), has taken in a brand-new Liebherr LRS 545 reachstacker. Bothra's reachstacker from Liebherr features an individual drive concept, with a hydraulic motor independently driving each of the wheels, a solution that helps in reducing tyre scrubbing, hence increasing tyre life. Additionally, the mechanical gearbox has been removed, making the drive from accelerating to braking smoother, adding sensitivity at low speeds, Liebherr's press release says. Bothra's new machinery is fitted with a Tier 4f-compliant 4-cylinder 230 kW engine as well as with a hydrostatic drive system, which makes it possible to reduce the engine's size. The reachstacker's fuel consumption can go as low as 12-14 l/h, according to the manufacturer. The new machinery will be chiefly used for container stacking inside the company's terminal. Moreover, the Bothra Shipping Group (operating 11 mobile harbour cranes from Liebherr, encompassing the LHM 400, 425, and 550 models), has installed a new training classroom with the Liebherr LiSIM simulator, offering the company's original controls, also being equipped with simulation software for both mobile and ship cranes.



Photo: Liebherr

Baltic Sea region LNG cluster & LNG Competence Centre established

The ceremony of setting up took place on April 26th in Vilnius. The event was marked by the presence of three Lithuanian officials: Mindaugas Sinkevičius, Minister of Economy, Rokas Masiulis, Minister of Transport and Communications, and Žygimantas Vaičiūnas, Minister of Energy, as well as the Polish Minister of Maritime Economy and Inland Navigation – Marek Gróbarczyk, and Ambassadors to Lithuania: Dag Malmer Halvorsen from Norway, Bert van der Lingen from the Netherlands, and Jarosław Czubiński from Poland. The BSR LNG Cluster is a business organisation which includes national parties from Lithuania, Sweden, Norway, Denmark, Germany, and Poland. The organisation's aim is to strengthen and speed up further development of on- and offshore LNG innovations, technologies, and infrastructure across the Baltic Sea region.



Photo: Motus Foundation

Photo: www.pexels.com

THE PORT OF HAMBURG:

35.4 mln tn handled in Q1 2017 (+1.7% yoy)

Containerised cargo totalled 23.1 mln tn in the reported period (-0.7% year-on-year), followed by dry & liquid bulk (+6.7% yoy to 12.2 mln tn), and break-bulk & ro-ro (-22% yoy to 324 thou. tn). Exports of containerised freight amounted to 11.9 mln tn in Q1 2017 (+3.4% yoy), while imports added the remaining 11.2 mln tn (-4.7% yoy). Hamburg's container traffic decreased by 0.7% yoy to 2.2 mln TEU, out of which laden boxes accounted for the bulk of the total throughput with 1.9 mln TEU (+0.04% yoy), empty containers dropping on the other hand by 4.9% yoy to 307 thou. TEU. Despite contracting by 2.0% yoy to 637 thou. TEU, China remains the port's main container trading partner. With 120 thou. TEU (+15.6% yoy) Russia is second, and the US third (+5.5% yoy to 89 thou. TEU). Other trades include among others Malaysia (+0.4% yoy to 76 thou. TEU), the UK and Sweden (+2.8% yoy and +4.0% yoy, respectively, both to 66 thou. TEU), as well as Australia/Pacific (+19.9% yoy to 13 thou. TEU). Hamburg's Q1 2017 bulk turnover is broken down into 6.4 mln tn (+18% yoy) of so-called grab cargo (e.g. coal, coke, and ore), 3.5 mln tn (-5.9% yoy) of liquids, as well as 2.3 mln tn (+0.4% yoy) of suction cargo (like grains). A total of 11.6 mln tn of freight came in or went out the port on rails (+0.4% yoy). Rail-borne container traffic summed up to 587 thou. TEU (+0.4% yoy).

CMA CGM:

15.6 mln TEU carried in 2016 (+20% yoy)

The double-digit spike in the company's container carriages stems from the integration of NOL's business as of June 14th, 2016. When excluding NOL's contribution, CMA CGM carried as many as 12.8 mln twenty-footers last year, down by 1.5% year-on-year. At 2016's end, CMA CGM operated a total fleet of 453 vessels, fewer by nine ships than the year before; however, following the takeover of NOL, the company's capacity rose from 1,819 thou. TEU up to 2,208 thou. TEU. "Year 2016 was a landmark year in the history of our development, with the strategic acquisition of NOL and the creation of OCEAN ALLIANCE, which will fully contribute to the Group's performance in 2017. Last year, we succeeded in maintaining a slightly positive core EBIT margin, despite historically low freight rates, focusing on the volumes generating the highest contributions. With the increase in freight rates observed in recent months and the operational discipline that we apply quarter after quarter, we recorded a positive result in the 4th quarter and delivered one of the best performances in the industry," Rodolphe Saadé, CMA CGM's CEO, commented.

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THE PORT OF GENOA:

13.43 mln tn handled in Q1 2017 (+8.1% yoy)

With nearly 8.40 mln tn (+12.2% year-on-year) made over this year's first three months, general cargo accounted for the bulk of the Italian port's freight traffic.

The Port of Genoa's volumes

	Q1 2017	Yoy
Containerised	6,185.1 thou. tn	+13.1%
Oil & oil products	3,777.2 thou. tn	+4.9%
Break-bulk	2,212.2 thou. tn	+9.9%
Steel products	695.9 thou. tn	+2.9%
Bunkers & supplies	223.1 thou. tn	-2.2%
Dry bulk	162.2 thou. tn	-35.4%
Chemicals	120.2 thou. tn	-3.8%
Vegetable oils & wine	51.3 thou. tn	-17.4%
Total	13,427.1 thou. tn	+8.1%
Container traffic		
TEU	608,430	+10.7%
Pax traffic		
Ferry passengers	158,147	-12.6%
Cruise travellers	104,950	-5.9%
Total	263,097	-10.1%



RUSSIAN SEAPORTS:

183.3 mln tn handled in Q1 2017 (+9.5% yoy)

In Q1 2017, exports totalled 144.7 mln tn (+6.7% year-on-year), followed by domestic traffic (+44.2% yoy to 16.9 mln tn), transits (+7.8% yoy to 13.8 mln tn), and imports (+9.7% yoy to 7.9 mln tn). With 61.5 mln tn (+7.9% yoy), the Russian Baltic seaports continue to handle the largest amount of Russia in- and outbound cargo. Next is the Azov-Black Sea (incl. volumes going through the Crimea) – 59.1 mln tn (+6.6% yoy), the Russian Far East – 45.9 mln tn (+6.4% yoy), the Arctic – 15.8 mln tn (+160% yoy), and finally the Caspian Sea – 0.9 mln tn (-47.8% yoy).

THE PORT OF CONSTANTZA:

59.42 mln tn handled in 2016 (+5.5% yoy)

Last year, the sharpest increase was noted by Romanian Constantza in the handlings of liquids – up by 12% year-on-year to 13.66 mln tn.

The Port of Constantza's volumes

	2016	Yoy
Dry bulk	35,189.4 thou. tn	+5.7%
Liquids	13,662.9 thou. tn	+12.0%
Containerised	6,897.35 thou. tn	+0.7%
Other general cargo	3,675.1 thou. tn	-8.1%
Total	59,424.8 thou. tn	+5.5%
Container traffic		
TEU	711,339	+3.2%



THE PORT OF LISBON:

10.26 mln tn handled in 2016 (-11.4% yoy)

On the other hand, passenger traffic at the Portuguese capital's port increased in 2016 by 3.0% year-on-year to a total of nearly 16.58 mln.

The Port of Lisbon's volumes

	2016	Yoy
Dry bulk [thou. tn]		
Grains, fodder, oilseeds	3,310.25	-0.5%
Other	1,247.0	-24.3%
Aggregate	21.6	+418%
Total	4,578.8	-8.0%
General cargo [thou. tn]		
Containerised*	4,018.1	-18.3%
Break-bulk	232.4	-7.8%
Ro-ro	5.1	-56.0%
Total	4,255.6	-17.9%
Liquids [thou. tn]		
Oil products	980.8	+7.6%
Other	426.5	-13.2%
Liquefied gas	14.9	-19.8%
Total	1,422.2	+/-0%
GRAND TOTAL	10,256.6	-11.4%
Container traffic		
TEU, of which	391,283	-18.7%
Laden	166,898	-18.0%
Empty	76,125	-35.0%
Pax traffic		
Passengers, of which	16,576,572	+3.0%
In river traffic	16,054,071	+3.0%
In sea traffic	522,501	+2.0%

* Incl. 861.6 thou. tn of containers' tare

THE PORT OF BARCELONA:

47.51 mln tn handled in 2016 (+3.4% yoy)

With 31.68 mln tn (+7.5% year-on-year), general cargo handlings accounted for two-thirds of Barcelona's total freight traffic last year.

The Port of Barcelona's volumes

	2016	Yoy
General cargo, of which	31,680.45 thou. tn	+7.5%
Containerised	20,935.1 thou. tn	+11.8%
Non-containerised (incl. ro-ro)	10,745.4 thou. tn	+/-0.0%
Liquids	11,401.7 thou. tn	-5.1%
Dry bulk	4,430.8 thou. tn	-0.8%
Total	47,513.0 thou. tn	+3.4%
Unitized freight traffic		
TEU, of which	2,141,396	+14.2%
Unloaded	1,080,097	+14.5%
Loaded	1,061,299	+14.0%
Ro-ro cargo units, of which	95,565	+20.1%
Loaded	50,189	+10.8%
Unloaded	45,376	+32.6%
Vehicles	916,834	+4.0%
Railway traffic		
TEU	225,996	+6.0%
Vehicles	271,669	+2.9%
Bulk, of which	494,792 tn	-16.9%
Dry	416,873 tn	-15.7%
Liquid	77,919 tn	-22.8%
Pax traffic		
Cruise ship passengers, of which	2,683,594	+5.6%
Transit	1,127,775	-4.1%
Disembarked	782,196	+14.9%
Embarked	773,623	+13.0%
Ferry passengers, of which	1,275,366	+9.2%
Domestic	762,426	+7.4%
With other EU Member States	409,759	+12.0%
Other destinations	103,181	+12.8%
Total	3,958,960	+6.7%



THE PORT OF BORDEAUX:

7.84 mln tn handled in 2016 (-6.5% yoy)

With more than 4.13 mln tn (-3.4% year-on-year), liquids made up over half of Bordeaux port's cargo turnover last year.

The Port of Bordeaux's volumes [tn]

	2016	Yoy
Liquids	4,135,575	-3.4%
Grains and oilseeds	1,570,677	-11.0%
Fertilizers	547,477	+4.0%
Containerised	546,524	-4.4%
Other	368,132	-2.8%
Granulates	282,072	-33.3%
Seed oil and meal	231,636	-20.1%
Coal and petroleum coke	159,996	+6.7%
Total	7,842,089	-6.5%

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featured article

A decade at the forefront

Photos: Alfa Laval

by **Kristina Effler**,
Msc, Global Business Manager, PureBallast

When the International Maritime Organization's (IMO) Ballast Water Management (BWM) Convention has been ratified, ship-owners are beginning to look seriously at ballast water treatment. As of September 2017, newbuilds will need treatment systems and existing vessels will have until their next renewal survey to retrofit.

“Today's PureBallast 3.1 is a mature system, offering unmatched biological disinfection performance and a unique combination of capabilities.”

Alfa Laval has long been a pioneer in ballast water treatment. The company's technology, developed in co-operation with Wallenius Water, is a marine-specific and enhanced form of UV treatment, optimized to make maximum use of the produced UV light and its wave-length spectrum.

PureBallast...

...was our product launched in 2006, as the world's first commercially available treatment solution. Soon approved by the IMO, it has now been submitted for US Coast Guard type approval as well. It is prepared for the revised G8 guidelines determined by the recent MEPC70 meeting, and a completed application for an updated G8 certificate is expected during the second half of 2017.

“When the BWM Convention appeared in 2004, there was a real sense of urgency,” Anders Lindmark, Head of PureBallast, said. “We were committed to reaching the market with a workable solution, which we refined and expanded in the years pending ratification,” Anders added.

...and how it works

Since its launch in 2006, more than 1,300 PureBallast systems have been sold worldwide – far more than any other. Those systems were chosen for a diverse range of vessel types, including container

ships, tankers, bulk carriers, offshore supply vessels, naval vessels, and many more. Moreover, they are not simply numbers in Alfa Laval's order book. Hundreds of them have already been delivered, installed and commissioned.

Meanwhile, PureBallast has continued to develop and is now in its third generation. Today's PureBallast 3.1 is a mature system, offering unmatched biological disinfection performance and a unique combination of capabilities.

PureBallast 3.1 is an all-water salinity solution, certified for use in fresh water as well as brackish and marine. This includes water in liquid form at frigid temperatures. Likewise, it is an ideal solution for low-clarity waters, where many other UV-based systems struggle. Even where UV transmittance is as low as 42%, the system can operate at full flow.

In addition, the high biological disinfection performance means high energy efficiency. Through effective power management, PureBallast 3.1 can run at just 50% of its potential operating power in most situations. When needed, it can then ramp up to full power for the most difficult operating scenarios.

Space-saving inline construction

In physical terms, PureBallast 3.1 is similarly efficient. Fully enclosed, fully automated, and thoroughly integrated with

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Nowadays there is heavy focus on one particular service – recommissioning. It’s usually conducted after a standstill of a year or more, a system designed for regular use may not perform as expected.”



the ballast water system, it requires no salt or chemicals, and no heating, even when operating in fresh water. Nor are tanks or ventilation systems needed to manage consumables or residuals.

It is also an inline solution, in which the major components (filter and reactor) are incorporated into the ballast water piping. This creates a highly flexible system with a small footprint, which is especially important for retrofits. Ex configurations are simple as well, since the system’s power supply can be placed outside the hazardous zone.

According to Anders Lindmark, “Footprint and flexibility are important on nearly any vessel, especially during a retrofit. With our PureBallast Compact solutions, we’ve achieved the smallest and simplest installation on the market, squeezing a full ballast water treatment system into a skid-based, plug-and-play module for up to 300 m³/h.”

Knowledge, partnerships and retrofit capabilities

Beyond the technical strengths of PureBallast is the ability to work smoothly with shipyards, engineering partners and other designers and installers in what are often highly customized projects.

In addition to the newbuild installations performed over the years, we at Alfa Laval have worked with hundreds of PureBallast retrofits. Building on the system’s overall compactness and flexibility, Alfa Laval has developed hands-on knowledge and proven working procedures for incorporating it into a vessel – even when there is no space allotted for ballast water treatment

in the original design. Likewise, the company has learned to navigate the complex partnerships involved in a retrofit, providing both flexible project management and a network of competencies for engineering support, 3D laser scanning, class approval and more.

Ready to deliver as demands increase

Given the far-reaching nature of ballast water treatment projects, as well as the massive wave of retrofits that will inevitably follow the BWM Convention’s ratification, there is considerable security in Alfa Laval’s global muscle. In addition to developing PureBallast itself, Alfa Laval has worked hard to create a comprehensive service offering to ballast water treatment. Besides from securing training and spare parts, we provide a full range of inspection and optimization services, which can also be incorporated into an Alfa Laval Performance Agreement.

Nowadays there is heavy focus on one particular service – recommissioning. It’s usually conducted after a standstill of a year or more, a system designed for regular use may not perform as expected. So by recommissioning PureBallast, we eliminate the risk of faults or issues at start-up.

Once the BWM Convention enters into force, the need to recommission ballast water treatment systems will eventually subside. What will remain, however, is the need for stability and customer focus from system suppliers. In more than a decade of working with PureBallast, Alfa Laval has shown an abundance of both. ■

The ballast of new regulations

Photo: www.pexels.com

by **Maciej Kniter**

The second event of the Harbours Review Spotlight series was organised during this year's Transport Week conference. This time we discussed the topic of ballast water, which gains particular attention thanks to new regulations entering into force soon. For a better understanding of this matter, our experts touched upon technical, legal, and biological aspects of ballast water treatment.

“
Yet, not every species carried unintentionally is invasive – it is estimated that the number of invaders is at a level of 10-15% of all species brought to Europe.

According to the International Maritime Organization (IMO) the use of water as ballast began some 120 years ago. The reason was the same as today – a certain amount of it can help balance a ship, providing better manoeuvrability, reducing stress on the hull, and compensating for weight changes. However, as time went by it was observed that picking up water in one place of the world and releasing it somewhere else leads to moving various species, sometimes very expansionist that harm a local environment. This is why the Ballast Water Convention is entering into force on September 8th of this year. In short, its goal is to enforce ship-owners to install systems onto their vessels that will ensure that no unwanted bacteria or animal will pose a threat to our seas.

What will be the cost of the retrofitting? Przemysław Myszka in his article entitled “Marine bioinvasion. Ballast water management,” published on pgs. 18-20 wrote, that: “60,000 vessels will need to be geared up with systems that kill organisms with an average cost from USD 200,000 per one offshore supply craft to USD 4.0 mln for an oil tanker which calls for costly fire and explosion-proof gear. All in all, companies owning ships will see a USD 100 bln bill – another grief added to their tumbling earnings. Maersk alone evaluates its costs to reach USD 500 mln.” On the other hand, the bioinvaders are responsible for a lot of damage done not only to the environment,

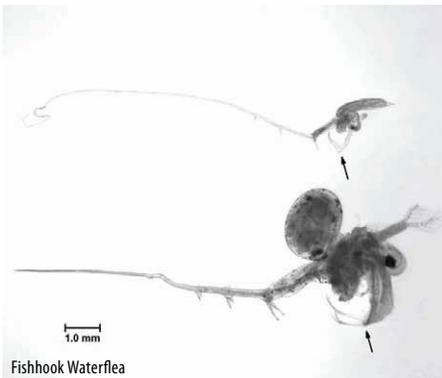
but also infrastructure, fisheries, and even human health (epidemics caused by contaminated water).

What's the regulation about?

The seminar was moderated by Andrzej Smoleński, Business Manager at Alfa Laval, who briefly introduced the subject and talked of the history of ballast water treatment. The first speaker, Sille Grjotheim, Head of Approval Centre Poland at DNV GL Poland, presented the topic in terms of a general overview, market impact, and enforcement. From this presentation we learned that one of the differences in ballast water treatment standards adapted on the one hand by the IMO and the US Coast Guard on the other, is the attitude towards organisms. The Americans want them to be eliminated, while the IMO is satisfied with just their inability to multiply. This results in a different number of accepted systems. When it comes to deadlines, a very important date will be the already mentioned one of September 8th, starting from which the vessels will need to carry a Ballast Water Management certificate, while from 2022 they will need to have a treatment system installed, too.

Tiny invaders

Professor Monika Normant-Saremba, from the University of Gdańsk's Department of Experimental Ecology of Marine Organisms, Institute of Oceanography,





Photos: Wikimedia Commons/Round Goby



Chinese Mitten Crab

discussed the issue of aliens that are invading our oceans. Obviously, the most vulnerable are the territorial waters of the countries with higher proximity to major trade routes, like Israel, Turkey, Italy, France, Egypt, and Greece. Yet, not every species carried unintentionally is invasive – it is estimated that the number of invaders is at a level of 10-15% of all species brought to Europe. They can be transported in a ballast tank, but also on a ship as well. Shipping in general is responsible for bringing slightly over half of all aliens to our seas, followed by species traversing the Suez Canal (35-40%), but also originating from aquaculture (15-20%) and aquarium trade (less than 5%), as well as going through inland canals and from other sources (both less than 5%). Among the four worst invaders we can find Pacific Oyster, Round Goby, Fishhook Waterflea, and Chinese Mitten Crab.

Solutions offered by the market

One can notice the weight of the problem when realizing how much ballast water is transported annually. Krzysztof Kolwzan, Head Office Gdańsk, Machinery and Equipment Department at the Polish Register of Shipping said that there is even up to 5.0 bln tn of it every year.

Fortunately, the market already has solutions put on the table. Karol Kruszyński, Sales Support Engineer at Wärtsilä Polska presented the concept of Aquarius UV and Aquarius EC. The first one is a piece of non-chemical equipment, dedicated to smaller

ships. Its major weapon against unwanted species is ultraviolet light, which can remove 98% of particles. Aquarius EC on the contrary, is a chemical tool designed for larger capacity. Here, the concept is based on the use of electro-chlorination.

The two products of Wärtsilä are designed for different ships. This topic was elaborated by Henrik Krull, Regional Sales Manager at Hyde Marine, who stressed that a ship must be treated individually, and choosing a system and project engineering is hard. There are even such factors as where the ship is going to sail. The same holds true for training needs, often neglected, but which may bring a lot of savings and remove potential damages. Finally, when thinking of a ballast water treatment system, one must consider such things as the budget and space.

The perspective of the shipyard was presented by Jacek Mađrala, Commercial Manager at the Remontowa Shiprepair Yard. Jacek forecasts that ballast water treatment is the future of the shipbuilding industry. And indeed, as the number of projects shows, there were seven projects

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Shipping in general is responsible for bringing slightly over half of all aliens to our seas.

completed by March 8th at Remontowa, and the time of retrofitting was spread from 12 till 23 days.

As far as ports are concerned, according to Maciej Brzozowski, Head of the Port of Hamburg Marketing's Office in Poland, ballast water is not a task for ports, at least not in Germany. In fact, the Port of Hamburg is not engaged in ballast water management, even when it comes to collecting sediments; however the City of Hamburg is. Instead, the institutions responsible for implementing the BWMC in Germany are: the Federal Maritime and Hydrographic Agency – BSH (Bundesamt für Seeschifffahrt und Hydrographie), BG Verkehr (responsible for the environment, working conditions, etc.), and the Water Police.

And finally, voiced by Fotios Katsoulas, Fleet and Newbuilding Analyst/Data Manager at Affinity, there is a lot of uncertainty over the convention and its background. Ship-owners have problems with choosing the right type of BWM system for them, and they don't know when to do it. Additionally, financial costs of installation are sometimes too high for certain ships, meaning that they will most probably be scrapped as a result of their BWM-noncompatibility. ■



Photo: all-free-download.com



Monika Normant-Saremba

Institute of Oceanography, University of Gdańsk

Why does ballast water pose a danger to eco-systems? Human-mediated introductions of species in habitats outside their native range is a dynamic and non-stop process of global concern. Everyday organisms representing different taxonomic groups are massively transported to large distances in ballast tanks and in a ship's hull. What is worrying, the scale of this process has significantly increased over the last decades due to a rise in volume of world seaborne commercial traffic and trade. The origin of newcomers in European seas is highly concurrent with major shipping routes where we can find mostly species inhabiting the Atlantic coast of America, Indo-Pacific and Ponto-Caspian regions. Of course not all species are able to survive the journey and establish a self-sustaining population in a new environment – the introduction of newcomers is more likely to be successful in environments that are similar to those of their origin; this means if the port of loading and port of discharge are ecologically comparable, the risk of a species introduction is relatively high. Growing in abundance and expanding its range, the population of non-native species may pose a threat to biodiversity (e.g. through competition, predation, hybridization, transition of diseases, alternation of habitats) and human health, as well as economy (e.g. through outbreaks of serious diseases, infrastructural damages, change of existing fishing patterns, damage to fishing gear, reduction in access to recreational resources). Only then does the non-native species become invasive non-native species. Unfortunately, due to the fact that invasiveness might be determined by different factors, all these unwanted impacts are usually unpredictable. Moreover, they are also almost always irreversible. Hence, it is important to take measures to reduce the number of new introductions. For the reason that eradication of new species is practically impossible in the marine environment and post factum management of invasive species is not easy and costly, the only reasonable alternative that should be prioritized seems to be prevention in the form of ballast water management procedures. Therefore, it is expected that the implementation of International Convention for the Control and Management of Ships Ballast Water and Sediments will significantly decrease problem of invaders in marine ecosystems.



Fotios Katsoulas

Fleet and Newbuilding Analyst/Data Manager at Affinity

There is still a lot of uncertainty across several ship-owners over which equipment to install and when, speaking of the BWM Convention coming into force on September 8th, 2017. The financial cost of installing one of the ballast water systems is rather significant, especially as asset prices are close to historical lows and earnings are under severe pressure across most commercial shipping sectors. The total amount of funds needed for ship-owners to install such system is estimated between USD 75-100 bln. The dilemma for owners of older ships, as scrapping the vessel just before their next special survey might look more attractive than carrying out the cost of installation, ranging from USD 500 thou. to USD 3 mln, depending on the size of the vessel. Several ships have applied for extensions from the US Coast Guard (USCG) for meeting rules on discharging treated ballast, as it has signalled stricter enforcement on the issue and ship-owners face challenges installing USCG-approved BWT systems. But the availability of three systems creates a bigger hurdle for ship-owners to get extensions for complying with US ballast water rules. The USCG considers extensions for each ship individually, rather than issuing blanket extensions covering multiple ships. This equals more detail on a BWT systems product's suitability for each individual ship in a fleet. For tankers, most vessels with surveys due after September 2017 are aged less than 15 years, but installations would mean even short-term supply reductions.

COMING SOON



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Marine bioinvasion

by Przemysław Myszka

Who could have foreseen that the introduction of steel-hulled vessels 120 years ago, which enabled full scale use of sea water as ballast, would have had such a tremendous impact on the environment? The invention aimed at reducing stress on the hull, improving transverse stability, propulsion and manoeuvrability along with compensating the weight lost due to fuel and water consumption. But it also backfired at humans by launching a scourge of bioinvasion.

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It’s estimated that ballast water is associated with at least one-third of the hundreds of documented marine invasions worldwide.”

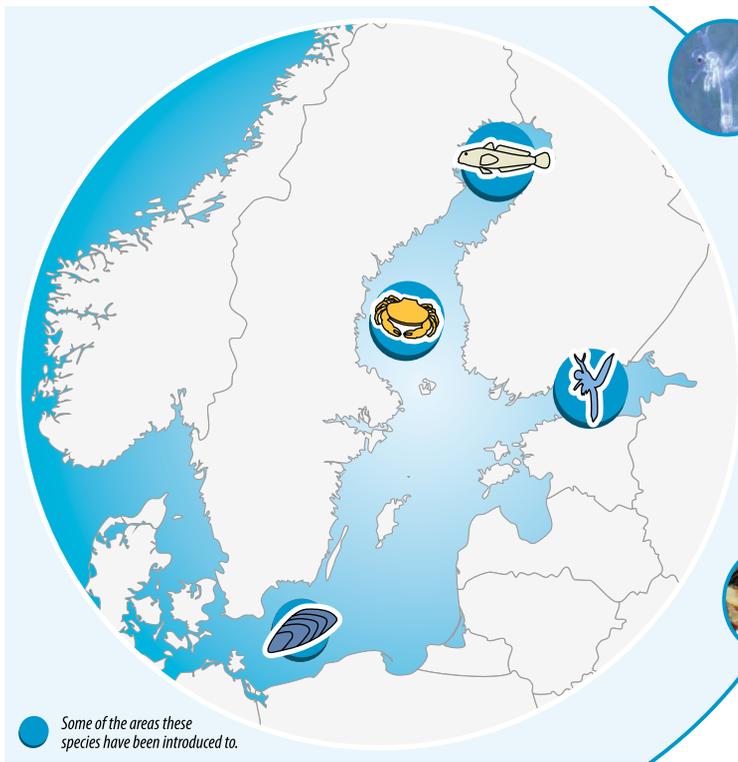
In those days no one thought about tiny invertebrates, bacteria, microbes, eggs, cysts and larvae – the so-called aquatic invasive species – that are going to travel thousands of miles floating in ballast water and devastate local ecosystems, cause economic disbenefits and even kill people. It’s estimated that ballast water is associated with at least one-third of the hundreds of documented marine invasions worldwide.

Wanted – little, armed and dangerous

It didn’t take much time to discover the first signs of an alien introduction. In 1903 a large mass of the Asian phytoplankton algae *Odontella* (*Biddulphia sinensis*) occurred in the North Sea. But it took 70 years for scientists to start investigating the issue in detail. In the late 1980s invasive species particularly troubled Canada and Australia. The first country was struck by the Eurasia zebra mussels’ (*Dreissena polymorpha*) invasion of the Laurentian Great Lakes, while the latter experienced negative consequences from the introduction of toxic dinoflagellates from Japan. Having no chance to follow suit in 1989, Canada drew up its own guidelines to prevent ship biofouling in the Great Lakes and St. Lawrence Seaway. A year later the United States of America enacted its “Non-indigenous Aquatic Nuisance Prevention

and Control Act.” Throughout the 1990s several countries voluntarily adopted guidelines, which afterwards transitioned into mandatory requirements. Exchanging vessels’ ballast water on the open ocean was the main weapon in fighting off aquatic invasive species.

But this wasn’t enough as the problem didn’t vanish but kept intensifying. Additionally, dumping ballast water far away from mainland coasts didn’t prove to be 100% effective, as alien species demonstrated an iron will to live, drifted peacefully and raided island chains. The method is also worthless if it is obligatory in one state, but it is not in a neighbouring state. Since a marine organism hardly ever bows down to boundaries and breeds like mad, they can colonize both countries, not mentioning the whole region. In light of this a global law is therefore necessary and should be mandatory for all areas. Canada and Australia brought their concerns to the attention of the International Maritime Organization’s Marine Environment Protection Committee (MEPC), which in 1991 adopted guidelines for preventing the introduction of unwanted stowaway organisms and pathogens. The IMO guidelines were followed by two resolutions (in 1993 and in 1997), but it took 13 years to finally come up with the International Convention



Cladoceran Water Flea *Cercopagis pengoi* 
Native to: Black and Caspian Seas **Introduced to:** Baltic Sea
Impacts: Reproduces to form very large populations that dominate the zooplankton community and clog fishing nets and trawls, with associated economic impacts.

Mitten Crab *Eriocheir sinensis* 
Native to: Northern Asia
Introduced to: Western Europe, Baltic Sea and West Coast North America
Impacts: Undergoes mass migrations for reproductive purposes. Burrows into river banks and dykes causing erosion and siltation. Preys on native fish and invertebrate species, causing local extinctions during population outbreaks. Interferes with fishing activities.

Round Goby *Neogobius melanostomus* 
Native to: Black, Asov and Caspian Seas
Introduced to: Baltic Sea and North America
Impacts: Highly adaptable and invasive. Increases in numbers and spreads quickly. Competes for food and habitat with native fishes including commercially important species, and preys on their eggs and young. Spawns multiple times per season and survives in poor water quality.

Zebra Mussel *Dreissena polymorpha* 
Native to: Eastern Europe (Black Sea)
Introduced to: Western and northern Europe, including Ireland and Baltic Sea; eastern half of North America
Impacts: Fouls all available hard surfaces in mass numbers. Displaces native aquatic life. Alters habitat, ecosystem and food web. Causes severe fouling problems on infrastructure and vessels. Blocks water intake pipes, sluices and irrigation ditches. Economic costs to USA alone of around USD 0.75-1 bln between 1989 and 2000.

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Dumping ballast water far away from mainland coasts didn't prove to be 100% effective, as alien species demonstrated an iron will to live, drifted peacefully and raided island chains. The method is also worthless if it is obligatory in one state, but it is not in a neighbouring state.”

for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) on 13th February 2004.

The BWM Convention requires all vessels to implement a Ballast Water and Sediments Management Plan as well as to carry a Ballast Water Record Book. The convention also formulates standards according to which the water is to be exchanged and purified, protecting the sea from the “end justifies the means” rule. IMO rules will only allow such ballast water management systems which do not pose unreasonable risk to the environment, human health, property or resources. A technical task force has been set up under the auspices of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) in order to determine which systems, i.e. making use of active ingredients (in other words – chemicals), are safe.

Is it just eco hysteria?

In the USA an invasion of zebra mussels from the Black Sea blocked water pipes, floodgates and irrigation ditches, causing USD 1 bln in damages over a decade. It didn't take the North America much time to also “invade” the Black and Azov Seas with ctenophores (*Mnemiopsis leidyi*) that wiped out the fisheries in the Azov and Black Seas (now also the Caspian Sea is threatened). But the most tragic incident occurred in Peru. All of a sudden in 1991 an outbreak of cholera struck the country, affecting over 300,000 people and killing 3,500 of them. Contaminated ballast water originating from China is the prime

suspect. The overall negative economic impact of the cholera epidemic in 1991 and early 1992 in Peru amounted to USD 200 mln.¹ Through the 1990s epidemics of cholera returned to Latin America a few times and killed over 10,000 by 1994. At the same time cholera also dispersed to the USA in ballast tanks from South America.

In the Baltic Sea region the mitten crab (*Eriocheir sinensis*), round goby (*Neogobius melanostomus*), cladocera water flea (*Cercopagis pengoi*) and zebra mussel are among the most aquatic-invasive species. The mitten crab undergoes mass migrations for reproductive purposes. It burrows into river banks and dykes causing erosion and siltation, preys on native fish and invertebrate species, causing local extinctions during population outbreaks and interferes with fishing activities. The round goby is highly adaptable and invasive. It increases in numbers and spreads quickly, competes for food and habitat with native fishes including commercially important species and preys on their eggs and young. Spawns multiply several times per season and survive in poor water quality. The cladocera water fleas reproduce to form very large populations that dominate the zooplankton community and clog fishing nets and trawls. Zebra mussels foul all available hard surfaces in mass numbers and displace native aquatic life, alter habitat, ecosystems and the food chain. They also cause severe fouling problems on infrastructure and vessels.

In general, harmful bioinvasions are responsible for fundamentally disrupted

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In the USA an invasion of zebra mussels from the Black Sea blocked water pipes, floodgates and irrigation ditches, causing USD 1 bln in damages over a decade. It didn't take the North America much time to also “invade” the Black and Azov Seas with ctenophores that wiped out the fisheries in the Azov and Black Seas.

ecosystems, damaged fisheries, billions of euros in infrastructure expenses and serious human health concerns. The intensity, scale and endurance of aquatic invasive species' impact are here to stay and break new records due to the growing sea trade.

What to do?

The BWM Convention makes installing ballast water treatment plants mandatory for all ship-owners. This means that 60,000 vessels will need to be geared up with systems that kill organisms with an average cost from USD 200,000 per one offshore supply craft to USD 4 mln for an oil tanker which calls for costly fire- and explosion proof gear. All in all, companies owning ships will see a USD 100 bln bill – another grief added to their tumbling earnings. Maersk alone evaluates its costs to

reach USD 500 mln. Naturally, these are only direct expenses. It's relatively trouble-free to equip a vessel presently under construction with an appropriate installation, but vessels already sailing will have to be retrofitted between voyages, berthed at dry docks. During that time not only will they not earn their living but will generate extra costs, since a vessel will also need new ballast pumps and generators. And of course, as every piece of machinery, ballast water cleaning systems weigh and add to higher power consumption as well as require maintenance, i.e. replacement of tattered cleaning filters. What raises doubt is that even vessels operating on short routes will have to be equipped with cleaning systems. Such ships can be sold though, and start to operate on international waters. Less stringent rules may only apply to services within the country's territorial limits, but it's hardly a consolation for shipping companies doing worldwide deals.

Anticipating upcoming events, Hapag-Lloyd is investing in Mahle GmbH systems which combine filters and UV treatment to prepare their new 10 container ships (13,200 TEU) for future regulations. If this type of installation passes the exam, other companies' vessels are to be refitted. And as ship-owners are straining themselves to cope with the new rules, hard-nosed

businessmen are already eying the main solutions and are rivalling to introduce the best cleansing equipment to the market. They are all counting on major boosts to their earnings. Technologies offered by them vary from using, i.e. UV rays to chlorination; the first is incapable of penetrating highly silted water, while the latter performs rather badly in fresh water of rivers and estuaries. Because the environment is not to be exposed to unreasonable risk, the usage of active ingredients will be limited. Ultimately, the most viable solutions will be chosen by the invisible hand of the market and afterwards the prices for cleaning systems will decrease.

The abovementioned costs for the shipping industry are tremendous. But damages done to the environment are even more horrid and, as of now, in many cases irreversible. The shipping companies' expenses are striking because it is a huge amount of money to be spent in a short period of time. But, in the long run, doing nothing to help the environment can negatively affect humankind even more. ■

The article was originally published in the 3/2012 issue of the *Baltic Transport Journal*, on pgs. 16-17.

¹ *The range and strength of the epidemic was magnified by the country's problems. In 1991 Peru struggled with hyperinflation (2,000,000%), an overcrowded population in big cities along with a serious lack of sanitation and water supply, El Niño, terrorism, unemployment and scarce medical care throughout the highlands and the Amazon basin.*

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