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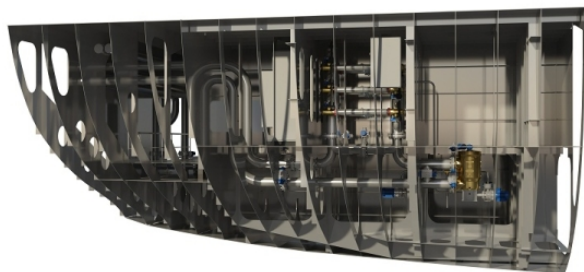
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market

15 December 2014 [Dr Gareth Evans](#)



The market for ballast water treatment technology is set to soar as stricter environmental regulation comes into force, requiring operators around the world to retrofit their vessels. But what exactly are the technological options, and how will the specialised market fare in the long term once all existing ships have been upgraded with new systems?



Courtesy Damen Shipyards

For as long as sailors have ploughed the seas, a whole range of marine life has been stealing a passage along with them as stowaways. Throughout history, ships' hulls have made mobile homes for a mixed assortment of organisms, and unintentionally helped many different species travel long distances to settle around coasts far beyond their original natural range.

While the number of organisms being transported in this way remained relatively low, the impact of these new arrivals was correspondingly small, but in modern times, as water replaced rocks and sand as ballast, and the volume of shipping crossing the oceans reached new heights, all that changed. With over 80% of the world's commodities now travelling by sea, the trickle literally became a flood.

A serious threat to biodiversity

Today, between three and five billion tonnes of ballast water is transferred internationally each year, leaving the shipping industry potentially delivering an unintended 'bonus' cargo of teeming foreign aquatic life in each ballast load it discharges.

The danger posed to native marine flora and fauna by invasive species from elsewhere has been identified as one of the four greatest threats facing the world's oceans and global biodiversity - making it a high-priority issue across the whole maritime sector.

Stricter standards by the International Maritime Organization (IMO) and US Coast Guard (USCG) have put the spotlight on ballast water management (BWM) as never before, and the industry now stands poised to enter an era of upgrades and improvements to meet their demands.

Smart cruising: a look inside Royal Caribbean's Quantum of the Seas

"In the future about 60,000 vessels will need to comply with BWM regulations. Most will have to be compliant after the first renewal survey/dry docking," says Gert-Jan Oude Egberink, Damen Shipyards' manager for ballast water treatment.

According to a recent report from market research specialist BCC Research, at its peak the coming boom could see as many as 10,000 treatment units per year - or around 30 a day - being installed globally.

Royal Caribbean's Quantum of the Seas is billed as the first 'smart ship'.

Technology options for ballast water treatment

Retrofitting BWM systems is anything but a one-size-fits-all activity. Egberink says that selecting the most appropriate treatment for any given vessel calls for a number of factors to be taken into account, including the available space and power onboard, existing systems, trading routes sailed, crew workload and training, and the customer's own preferences.

In essence, there are two fundamental approaches to BWM - separation and disinfection. Separation systems typically employ either sedimentation or filtration and thus mechanically extract unwanted elements from the ballast water, while disinfection techniques work by destroying or inactivating any marine life swept up in the inflow. This can involve some form of chemical dosing or a physical process such as UV irradiation, cavitation, heat or ultrasonic treatment or gas injection.

Although the particular technologies used and the precise details of individual processes differ, most commercially available ballast water treatment systems involve two or more steps, often with disinfection following initial separation.

There are a number of IMO and USCG approved systems available to date. With so many lucrative contracts up for grabs over the coming years in a market that is tipped to grow at a CAGR of 32.9% to exceed \$8.5bn by 2018, more are soon expected to be put forward for evaluation and approval. There is likely to be little shortage of companies and treatment systems competing for business.

Boosting business with strategic alliances

The large numbers of vessels needing to be retrofitted open the door for potential supply chain problems developing, and lead times becoming lengthy, especially for the most popular systems.

With a network of 15 repair and conversion yards across the world, Damen recently signed strategic alliances with three specialist suppliers of approved BWM solutions - Bio-UV, Evoqua Water Technologies and Trojan Marinex - to position itself ahead of the rush.

"By working with the selected BWM partners we will be able to offer a total cost effective package in a coordinated timely way," says Egberink. "We need to ensure installation is done first time right as the vessels need to be compliant when they leave the dock. This can only be done in close partnerships and by standardising and specialising as much as possible. Moreover we leverage our buying power to the advantage also of ship owners operating a few vessels."

The mix of partners reflects the range of technology options available and offers three distinct systems to choose from, each of which has its own particular features and merits. Bio-UV offers modular UV, Evoqua's solution is based on

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proven Chloropac electro-chlorination technology and can also be used to prevent marine growth in seawater cooling circuits during the voyage, while Trojan Marinex combines filtration and UV into a single, compact treatment unit - an obvious benefit where space is limited.

Waiting for regulation to catch up

The technologies are increasingly in place, but as Lars Nupnau, Evoqua's director of marine global business development, points out, 2014 saw the tenth anniversary of the IMO ballast water convention, and it still is not ratified.

Solving the mystery of Franklin's lost expedition

Canada's discovery of a sunken ship from the doomed 19th century Franklin expedition has shed new light on a great maritime mystery.

"The truth is that a lot of the damage has already been done. Therefore the ballast water regulations need to be implemented as soon as possible to stop the problem getting worse," he says.

Trojan Marinex market manager Jim Cosman echoes this view. "Many of the existing treatment approaches are very robust, and the technology quite sound," he says. "The challenge is to take a global regulation and implement it amongst all of the IMO member states - each with varying capabilities and knowledge. It could take ten or 15 years for the collective ballast water treatment industry to evolve to a point where we are at in other water treatment markets, such as drinking water and wastewater."

A short-lived market boom

Predicting the future direction of BWM is difficult, not least because the market is an atypical one. Once the retrofitting boom is over, apart from system failures or upgrades coming onto the market, effectively only new builds will need treatment units installed - amounting to an average of just five installations per day, the BCC report suggests.

Nupnau thinks that what happens then may prove particularly significant for the sector. "Most important for the industry will be the shakeout at the end of this boom when it can be expected that those companies only

relying on ballast water treatment system will give up," he says.

That, of course, remains to be seen, but according to Cosman the future of BWM will largely depend on two issues - the development of the IMO's G8 testing standard into a more precise and detailed form, that requires less interpretation by member states, and port state control enforcement of the convention itself. He believes that the evolution of technologies will be highly impacted by both.

One thing is clear; as Egberink says, "the retrofitting activity will, of course, decrease when the world fleet is equipped with BWM systems."

While that may be bad news for many involved in ballast water treatment, for those fragile ecosystems under constant threat of bio-invasion, that day cannot come too soon.

