

SUBSEA

PROTECTION AND PERFORMANCE

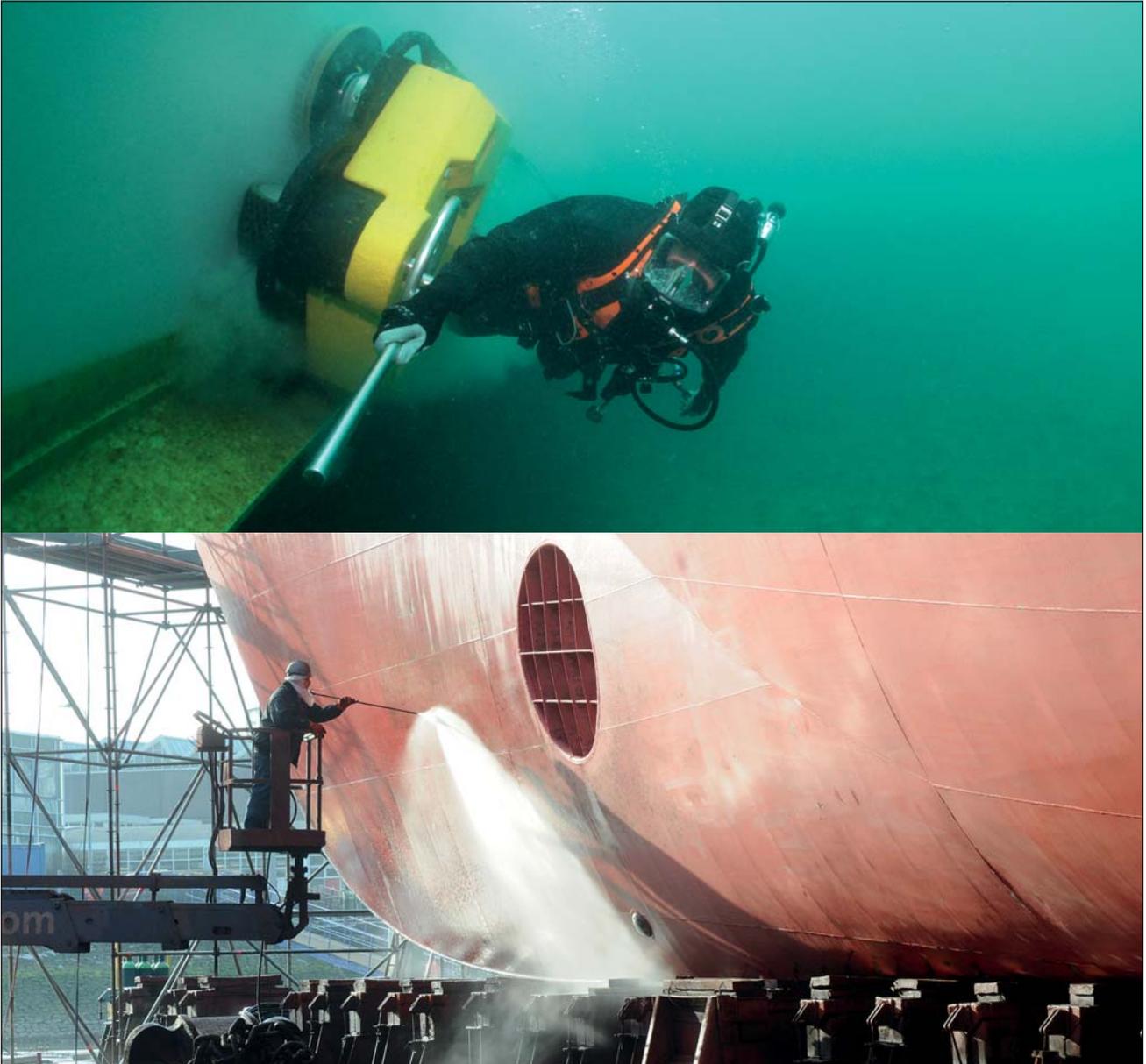
NEWS

LETTER



Ecospeed application on roro vessel helps owner achieve ecological goals

The washable coating



Ship hulls should be protected with a system that lends itself to fast, effective cleaning without risk of damage to the coating and without posing any kind of hazard to the environment. Ecospeed is this system.

There is currently no hull coating available which will not foul. The only way to remove this fouling is to clean it off. The Ecospeed coating has a glassy surface that was designed to be washed without being damaged. This enables

fast and efficient fouling control throughout a ship's entire service life, either by fast and easy underwater maintenance or high-pressure cleaning in drydock.

ECOSPEED[®]
SHIP HULL PERFORMANCE TECHNOLOGY

Ecospeed application on roro vessel helps owner achieve ecological goals

Last July the underwater hull of the roro vessel *Magnolia Seaways* was coated with Ecospeed in Gdansk, Poland. This non-toxic and easy washable coating system will keep the hull smooth for the service life of the vessel with minimal repair and no replacement. At the same time the rudder of the ship was treated with our Ecoshield coating which was designed specifically to protect underwater gear against cavitation and corrosion damage.

The 200-meter roro vessel is currently sailing a fixed Ghent-Gothenburg-Immingham route and is owned by DFDS. In 1866 several small Danish shipping companies merged to form what has come to be the oldest major shipping company in Denmark: DFDS - "Det Forenede

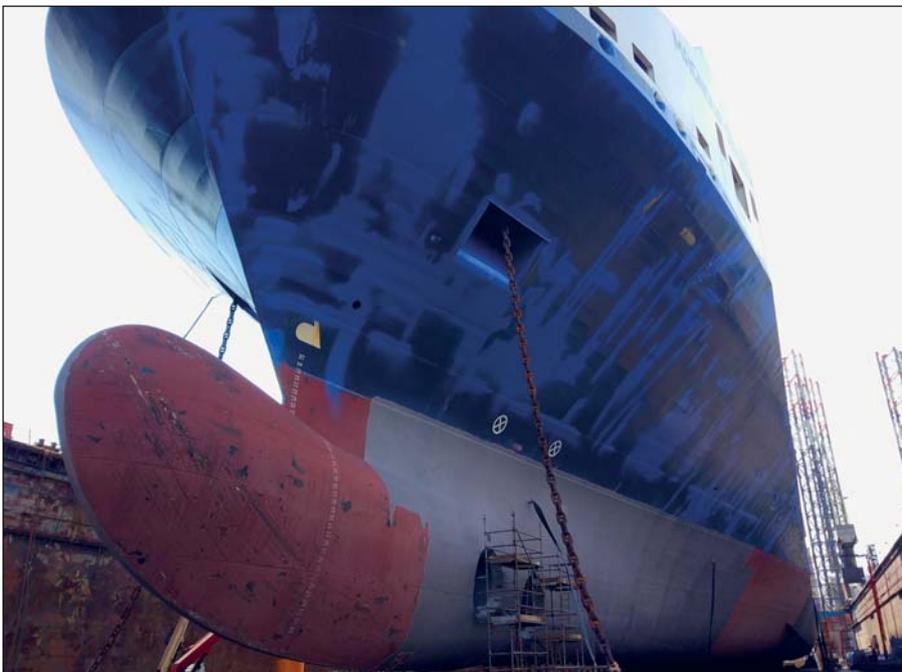


In July the underwater hull of the roro vessel Magnolia Seaways was coated with Ecospeed.

Dampskibs-Selskab" (The United Steamship Company). The company is still sailing on some of the same routes begun in the 1800s.¹

DFDS takes its environmental responsibility very seriously. "In 2006 DFDS decided that we could be most influential by engaging our community with marine conservation issues, by providing educational material about the wildlife of the North Sea. It was at this point that we formed a partnership with marine conservation charity ORCA. ORCA is one of Europe's leading whale and dolphin conservation charities, and is dedicated to forging links between people and the sea."²

"DFDS is committed to reducing its energy consumption and impact on the environment by improving its operations and activities on an ongoing basis. Our environmental work is therefore focused on reducing emissions from ships, as well as on developing and implementing new environmental technology for use at sea."³



Surface preparation of the underwater hull prior to application.

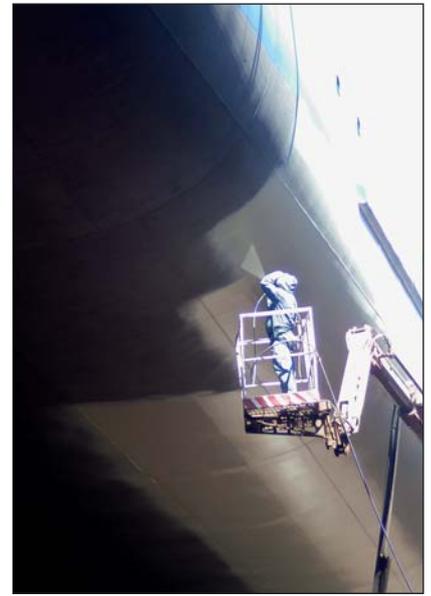
¹Source: <https://www.dfdsseaways.co.uk/about-us/history>, accessed September 27 2018

²Source: <https://www.dfdsseaways.co.uk/about-us/environment>; accessed September 27 2018

³Source: <https://www.dfdsseaways.co.uk/about-us/environment/reducing-our-impact>, accessed September 27 2018



After surface preparation only two Ecospeed layers are required.



No top coats, no primers or any other additional layers are needed.



The second layer can be coated as fast as three hours after the first.



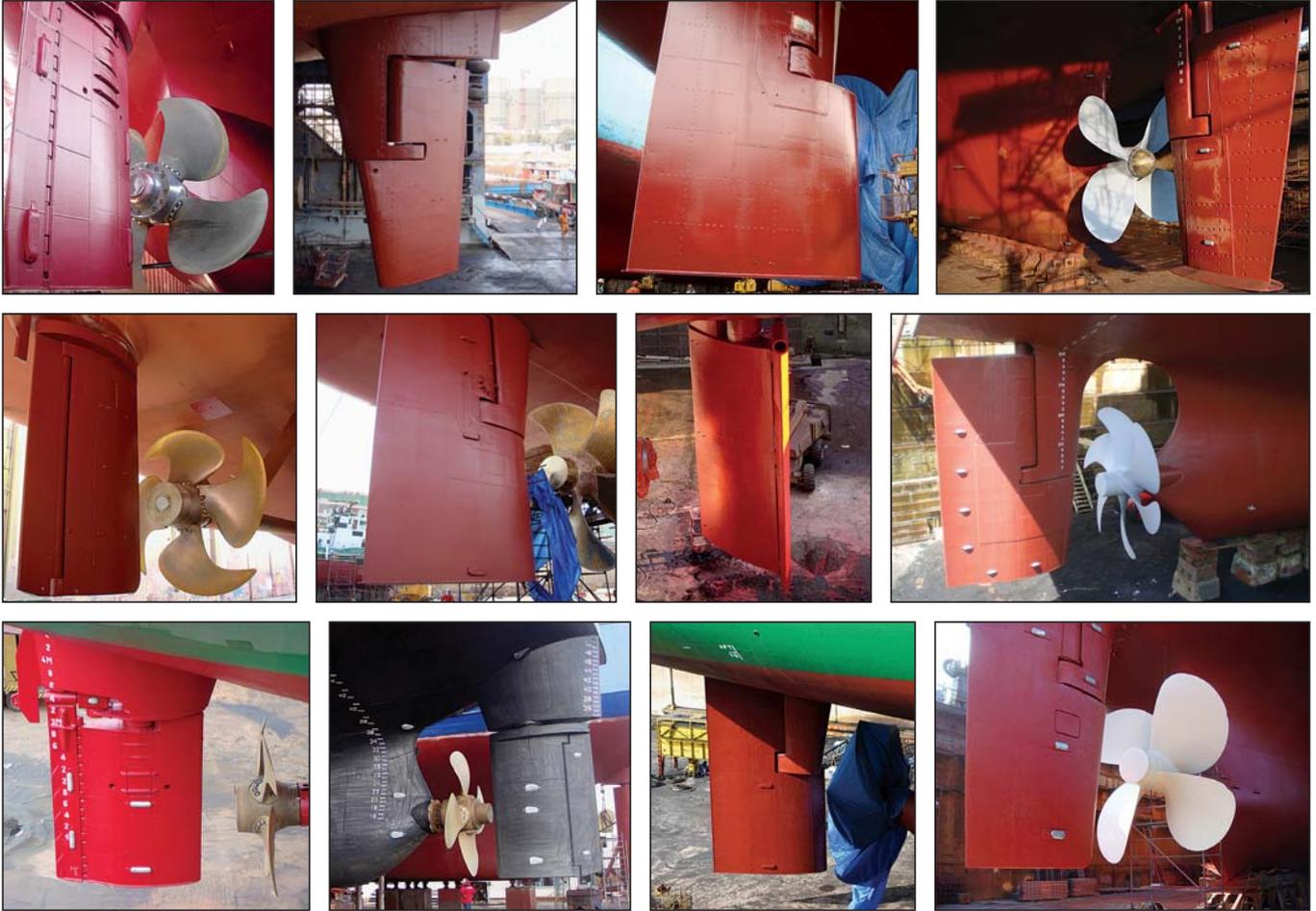
Application can be adapted to the yard's schedule.

A 100% non-toxic underwater hull coating

Ecospeed ties in perfectly with the ecological ideas of DFDS. The coating offers a TBT-free, copper-free, biocide-free and silicone oil free solution for the protection of the underwater hull. The Ecospeed hull protection and performance system is today's Best Available Technology for reduction of fuel consumption, GHG and other emissions through hull hydrodynamics and fouling control.

Stringent independent tests were carried out in the Netherlands to provide scientific data and to authenticate the non-toxicity of our coatings. Similar testing was conducted in Canada with the same results. This research proved that the coatings are 100% non-toxic and that there is no negative effect on the water quality or the marine environment at any point of their use. The emission of massive amounts of VOC and zinc anodes associated with conventional coating systems is reduced to almost zero.

LASTING PROTECTION



Ecoshield gives a very thorough and lasting defense against cavitation and corrosion damage for a ship hull's entire service life.

The coating equally provides the rudder with an impenetrable protective layer while its flexibility enables absorption of the forces that are produced by cavitation. This prevents the damage normally caused

by this phenomenon.

Without proper protection against cavitation and the resulting erosion and corrosion damage, the financial consequences can be severe.

By removing the existing paint layers and applying Ecoshield on the rudder we can break the never ending cycle of painting, suffering damage, having

to perform extensive repairs in drydock followed by a full repainting, again and again.

With an Ecoshield application no full repaint will be needed during drydocking. Ecoshield is guaranteed for ten years. At the most, minor touch-ups will be required.

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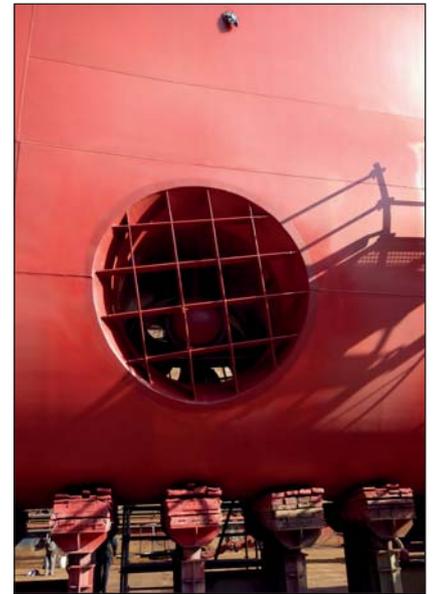
ECOSHIELD®
THE DIAMOND STANDARD IN STEEL PROTECTION



Treatment of the flat bottom of the ro-ro ship.



Ecoshield will protect the rudder from corrosion damage.



All running gear can be given lasting protection with Ecoshield.



Ecoshield is designed for those areas most prone to cavitation damage.

The definite biofouling solution: clean before you go

Over the last several years there have been concerns that non-indigenous species (NIS) are transported by fouled hulls even more than in ballast water. Once a hull becomes heavily fouled there is an increased risk of transporting NIS. This needs to be remedied either by out-of-water removal or by underwater cleaning. In this respect, underwater

cleaning has come under some scrutiny out of fear that viable NIS are released and spread by the operation, rather than contained and disposed of. Several ports and countries have banned underwater cleaning out of concerns of pulse release of biocides and an increased risk of transferring NIS.

Another important outcome of the independent tests was the submission of the results to port authorities and

environmental agencies worldwide in order to allow the underwater treatment of our coating systems. As a result several economically important ports have made an exception to the ban and this only for our coatings. These ports recognize the negative impact of biocidal paints and want to support environmentally safe solutions.

Underwater hull maintenance is carried out with specially designed underwater hull cleaning tools that simultaneously clean and optimize the smoothness of our coatings. This can be repeated whenever needed during the vessel's lifespan without causing damage to the coating's surface.

Summary

The use of an environmentally safe underwater ship hull coating can help DFDS fulfill their ecological goals. Ecospeed offers a perfect lasting solution for any individual or company that takes its environmental responsibility seriously. ■

ECOSPEED®
SHIP HULL PERFORMANCE TECHNOLOGY

ECOLOCK® ultra long-lasting protection for offshore hulls



Ecolock is designed to protect offshore vessels for decades without the need for drydocking. Increasingly, offshore units such as FPSOs, FSOs, FLRSUs and others used for offshore oil and gas exploration, drilling, storage and transport need to stay out of drydock for 15, 25 even 40 years.

The challenge has been to protect

the underwater hull from corrosion and to provide a cleanable surface so that the biofouling that accumulates can be removed successfully and safely for UWILD and to reduce weight. Ecolock is the answer to that challenge.

Ecolock is an extremely tough and durable coating designed to remain in excellent condition for 15 - 25

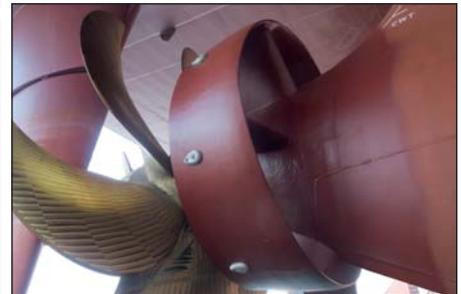
years without drydocking, repair or replacement. Ecolock can be cleaned underwater as often as needed to meet the UWILD and weight requirements of FPSOs, drill ships and other offshore vessels. Ecolock is the result of continual R&D on offshore hull coatings since the 1990s.

ECOLOCK®

LIFETIME CORROSION PROTECTION
FOR OFFSHORE UNITS

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SUBSEA INDUSTRIES



Subsea Industries NV, was founded in 1983 specifically to take care of the design, development and marketing of what has become an evolving line of underwater hull and propeller

cleaning equipment as well as the line of hard hull coating systems.

All products produced by Subsea Industries have the same goal in

mind: To keep the underwater part of your vessel in the best possible condition for its entire lifetime at the best possible performance.

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