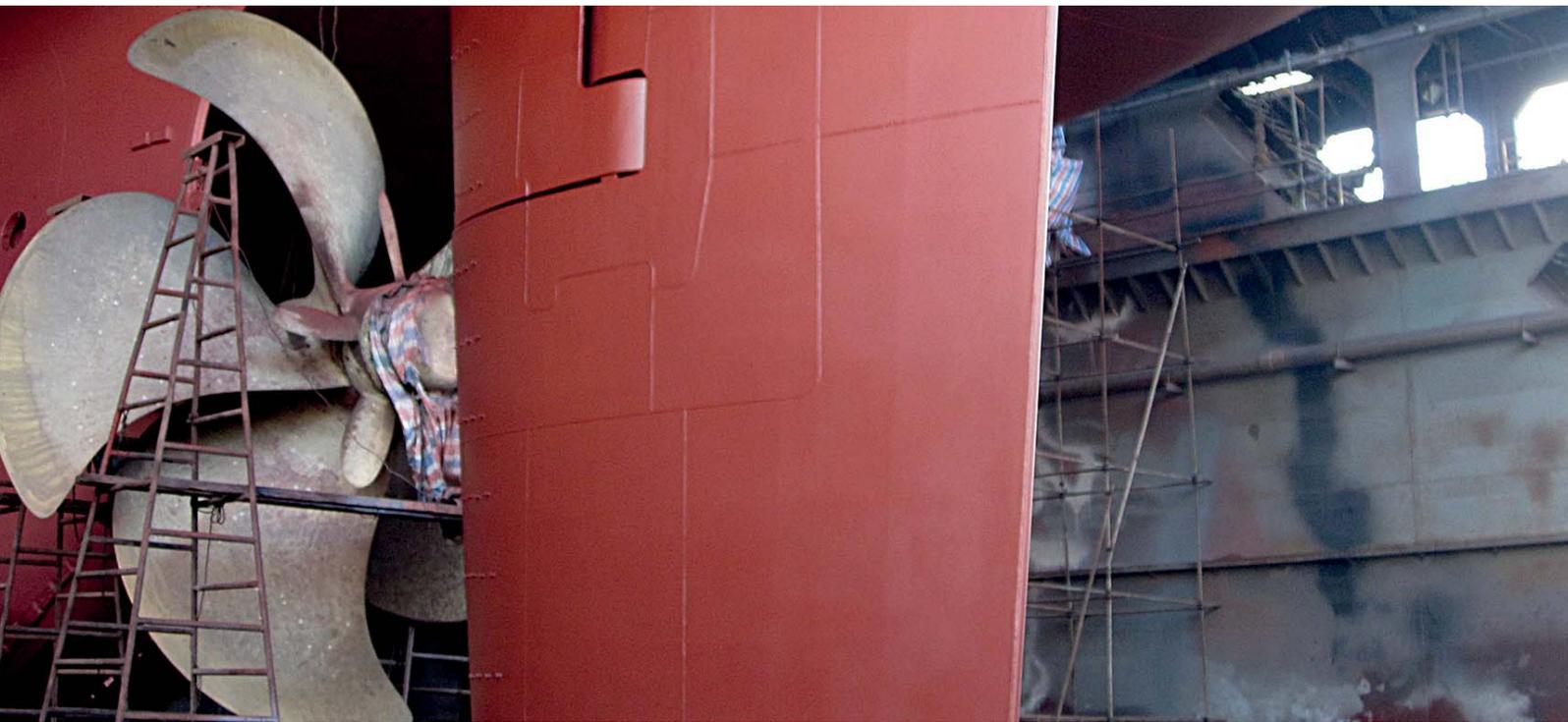


SUBSEA

PROTECTION AND PERFORMANCE

Magazine



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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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Editorial



Welcome to the first issue of our Subsea Magazine of 2017. In it you can read articles on several of the products we offer to shipowners.

Our ship hull performance system Ecospeed is off course still an important part of our line of durable non-toxic coatings, but over the last couple of years our magazine has also given a lot of attention to Ecoshield, our coating for underwater running gear. In 2015 Ecolock, designed for offshore units, joined the ranks.

The latest members of the family are Ecofix, a superior, tested and proven filler and Ecolast, an ultraviolet resistant coating that preserves its color while at the same time offering the corrosion and abrasion protection our coatings are known for. Both were launched last year.

We hope you enjoy reading this magazine. Do not hesitate to contact us if you have a question or want to know more about the benefits our coating systems can offer.

A handwritten signature in black ink, appearing to read 'BVR', with a long horizontal line extending to the right.

Subsea Industries NV
Boud Van Rompay
Founder

Ecospeed strengthens Polar Code compliance



Ecospeed and Ecoshield have been applied to a new AHTS vessel.

Subsea Industries has received an order for its specialist hull and rudder coatings for application to a shallow draught anchor handling tug supply (AHTS) vessel under construction at Turkey's Atlas Shipyard.

The hard-type coatings were selected amidst strong competition because of their proven performance in polar waters. The Ice-Class 1A, 65m tug will carry out anchor handling and oil recovery duties in the ecologically sensitive Arctic in compliance with the IMO Polar Code requirements, due to enter into force in January.

Orkun Comuoglu, managing director, Amat Engineering, Subsea Industries' agent in Turkey who secured the contract, said: "This is a super ice-class vessel and required extensive hull protection for the operations the vessel will undertake. The entry into force of the Polar

Code is likely to result in more vessels applying the Ecospeed technology."

Manuel Hof, Production Executive and NACE Coatings Inspector at Subsea Industries, explained that the Polar Code recommends the application of abrasion resistant, low friction coatings to vessels operating in ice-covered waters.

"There is a risk that conventional anti-fouling can degrade rapidly in polar ice, leach chemicals or leave paint fragments behind when ice impacts damage the coating. There is no such risk with a hard-type coating. Ecospeed and Ecoshield are tough, durable and highly abrasion resistant protective coatings," said Hof.

The operational success of the 1995-built *RRS Ernest Shackleton* – the British Antarctic Survey ship due to be replaced by the *Sir David*



Application of Ecospeed on hull of ice-going vessel.

Attenborough, now under construction by UK shipbuilder Cammell Laird – is an example of the Ecospeed coating’s performance.

When the 4028gt survey ship was drydocked after navigating 2.5m thick ice with a high content of gravel and volcanic lava, the original coating, applied seven years ago, was virtually intact, undamaged. This was in stark contrast to the vessel’s dockings before Ecospeed application, where the conventionally-coated hull had to be stripped back to bare steel and recoated.



Condition of hull of icebreaker RRS Ernest Shackleton before Ecospeed application (left) and after sailing with Ecospeed for several seasons (right). Note that the boot top and rudder, seen to have suffered damage in the photos on the right, were not yet coated with Ecospeed at this point.



Ecospeed coated Royal Navy ice patrol ship in Antarctica. Source: <http://www.defenceimagery.mod.uk>.



Ice-going newbuild general cargo vessel protected with Ecospeed.



Due to its unique composition, Ecospeed is the best protection available for underwater hulls of icebreakers and ice going vessels.

Hof revealed that the trend for arctic operations together with the implementation of the Polar Code is resulting in increased interest in the hard-coat concept.

“Ecospeed is highly relevant to ice-going tonnage,” Hof said. “We have a number of icebreaker references now, all of which are producing some very positive results. We are focusing on the icebreaking and ice-going market and are in discussions concerning a number of projects, some of which are high-profile vessels.”

Subsea Industries has applied its Ecospeed hull and Ecoshield coatings to the new vessel last December. The contract includes options for an additional two more OSD-designed tugs. ■



Ecolast: UV resistant corrosion



The latest member in our range of coating systems is ultraviolet (UV) resistant and preserves its color while at the same time offering the corrosion and abrasion protection our coatings are known for.

Regular coatings will quickly lose their original color when exposed to the ultraviolet radiation present in sunlight. This is problematic when colorfastness

is required, as is the case in for example offshore wind farms.

Ecolast is highly resistant against salt, ultraviolet radiation, waves or even ice. Mechanical damage to the coated surface is minimized. This is especially important for (semi-)submerged structures like wind turbines that are located in splash or tidal zones.

Like all other coatings systems in

the Subsea Industries family, Ecolast is also unaffected by corrosion. As a result no repaint is required once the coating has been applied.

Application of Ecolast is done in two homogenous layers, with no need for primer or any other extra layer. This makes the application very fast and easy to adapt to the schedule of a yard.

ECOLAST®
LONG TERM UV RESISTANT

Bursting the cavitation bubble

The decision to apply Subsea Industries' award-winning Ecoshield hard coating to rudders and thrusters is paying dividends, with a number of shipowners noticing zero cavitation damage and failure compared to equipment coated with other protective systems.

Ecoshield safeguards propulsion systems and steering gear against cavitation and corrosion damage throughout the vessel's service life.

According to Miltos Synefiias, Technical Director, Pleiades Shipping Agents, who first applied the coating in 2013 to the rudder of the crude oil tanker *Evrotas*, "the results made the choice to extend the coating to other vessels obvious".

Since 2013 Subsea Industries completed Ecoshield applications to the rudders and thruster nozzles of a further nine Pleiades vessels. Some of these vessels have since drydocked but their rudders and nozzles



Not protecting rudders properly can lead to very extensive cavitation damage.



Ecoshield application can easily be fitted into a yard's schedule.

experienced zero cavitation damage and did not need to be recoated.

Similarly, five years after Ecoshield was applied to the rudders of three containerships operated by a major liner company, the coating was still intact needing only touch-ups. The performance resulted in the shipowner going on to apply the coating to rudders of 40 more vessels.

When *Maersk Deva* drydocked at the Santirul Naval Constanta shipyard, in Constanta, Romania, Georgios Zolatos, Fleet Technical Coordinator, Danaos Shipping, said:



Overcoating time in between coats can be as short as three hours.



Only two layers of Ecoshield are needed to offer full protection.

“Highly qualified professionals with FROSIO red level certificates evaluated the coating and gave the green light for application. After five years of operation at various speeds there were minor detachments and those were easily repaired.”

“Hydrodynamic cavitation causes damage to rudders and thrusters often resulting in serious erosion, pitting and sometimes complete failure of equipment. However, just one Ecoshield application to equipment affected by the phenomenon prevents cavitation and corrosion damage throughout the vessel’s operational life,” said Subsea Industries’ Production Executive and NACE Coating Inspector Manuel Hof.

“The confidence we have in our hard coating technologies is backed up with a ten-year performance guarantee.”

The performance of Subsea Industries hard coating technology has also been independently verified by DCNS Group, the France-based defence research establishment.



No repaint will be needed during future dockings of the vessel.



No cavitation damage will occur on nozzles coated with Ecoshield.



All running gear can be protected with Ecoshield.



An Ecoshield application prevents cavitation and corrosion damage throughout a vessel's operational life.

In cavitation tests, the coating passed all six stages of its stringent testing regime. A seventh stage was added with an Ecoshield test plate

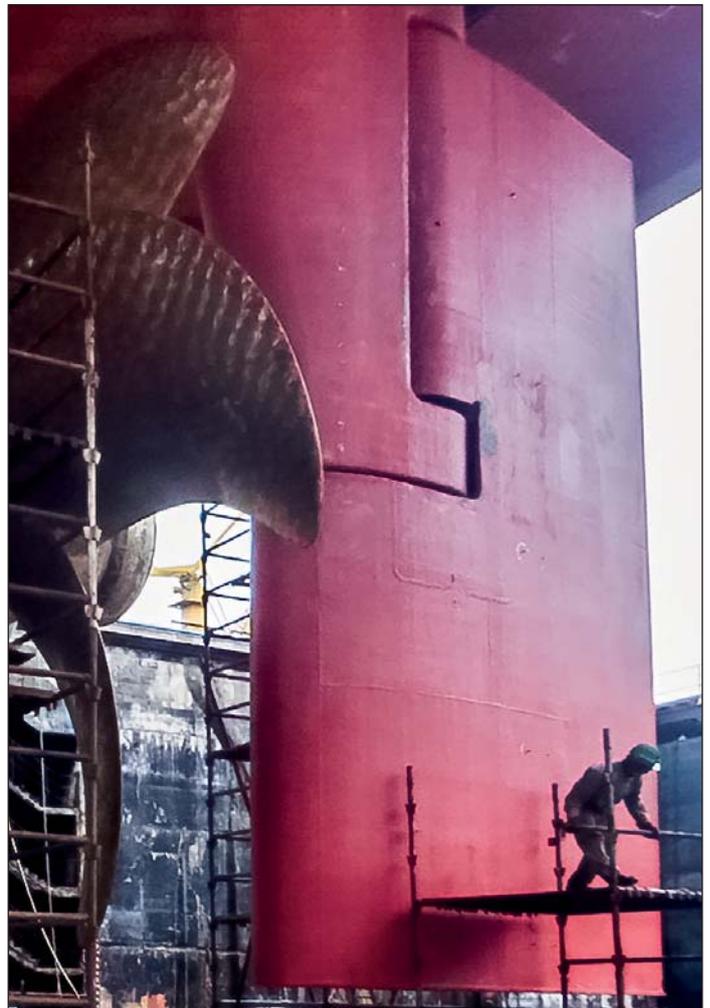
placed in a cavitation tunnel for a further 40 minutes. DCNS ended up endurance testing the coating through 16 stages but just couldn't

damage the coating.

“We now have more than 400 ship references for Ecoshield on rudders but we are also seeing a marked increase in application to thruster tunnels and gearboxes,” said Hof. “More and more owners are specifying the coating because they know the savings it will bring them.”

Recently shipyards in China, Romania, Turkey, the USA, the UK and France have applied the Ecoshield coating to rudders and thrusters of a number of vessels, including several containerships, vehicle carriers, passenger vessels and an oceanographic research vessel. ■

ECOSHIELD®
THE DIAMOND STANDARD IN STEEL PROTECTION



When drydocking after five years or more, no repaint is needed to rudders coated with Ecoshield.

Ecofix: Corrosion damage repair

In 2016 Subsea Industries announced a new product for filling and building up a corroded and pitted steel surface to its original form prior to recoating with Ecoshield. Ecofix® is as tough as the steel itself, machinable, and can be used to repair most pitting or corrosion damage on rudders, stabilizer fins, thrusters and other underwater gear.

Ecofix is used in combination with Ecoshield, the ultimate rudder protection coating. When a rudder or other piece of underwater ship gear has not been properly protected, the surface will become corroded. Cavitation damage can cause severe pitting. The steel needs to be restored to its original shape with a smooth surface prior to recoating. This is where Ecofix comes in. It is a superior, tested and proven filler. Because it uses the same basic resin



Test plate to show the benefit of an Ecofix and Ecoshield combination.

as Ecoshield, the coating can be applied just one hour after the filler. The bonding and hardness are extraordinary. This is the effective alternative to metal facing or very expensive alternative fillers. And because it is part of the Ecospeed/Ecoshield family, it is fully compatible with the coating.

Ecoshield gives permanent protection against cavitation damage for rudders. The glassflake reinforced coating protects the rudder for the service life of the ship without need for recoating or major repair and comes with a ten-year guarantee. It is the only coating known to fully protect a rudder from all cavitation damage for the remainder of a vessel's service life. Now with the launch of Ecofix, the repair work needed on the underlying steel can be done effectively and economically prior to the Ecoshield application.

Ecoshield and Ecofix are also suitable for stabilizer fins, thrusters, nozzles and other underwater ship gear which needs special protection from corrosion. Now these items can also be repaired prior to recoating where other, less effective coatings have permitted corrosion and cavitation damage to occur.

With the launch of the new product, Subsea Industries offers a full package; Ecofix restores the surface of the rudder or other underwater gear



Corroded areas like this can be filled with Ecofix.

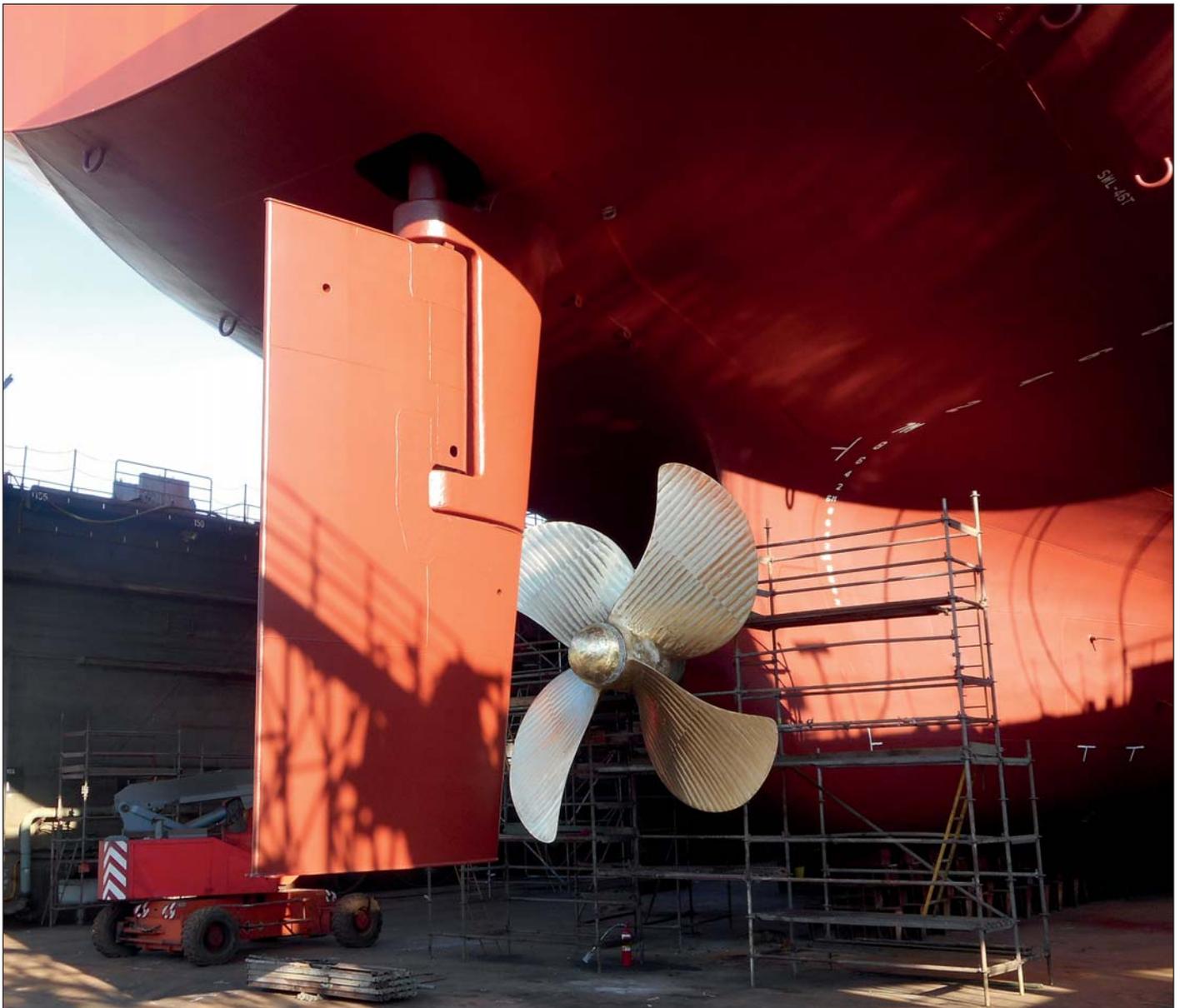


Ecofix application on rudder of LPG tanker.

and Ecoshield will protect the area from ever suffering corrosion and cavitation damage again.

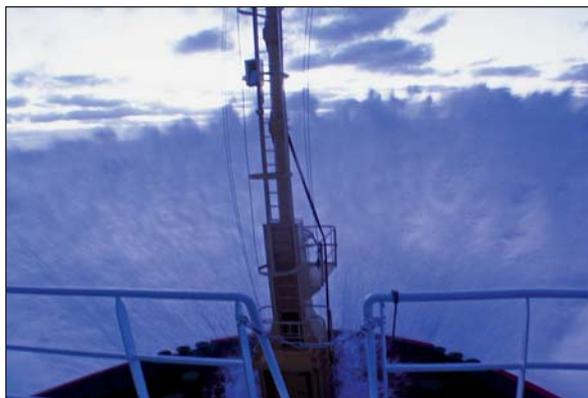
Contact one of our offices today and put a permanent end to worries about cavitation and corrosion damage to rudders and underwater gear. ■

ECOFIX[®]
CORROSION REPAIR



The combination of Ecofix and Ecoshield will keep the rudder in pristine condition from now on.

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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