SUBSEA

PROTECTION AND PERFORMANCE

Magazine

Corrosion damage repair made easy

Test plate showing the benefit of an Ecofix and Ecoshield combination.

Ecofix is used to fill and build up a corroded and pitted steel surface to its original form prior to recoating with Ecoshield. It 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 basics, the Ecoshield 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. ■

ECOFIX®
CORROSION REPAIR

Subsea Industries NV
Phone: + 32 3 213 5318
Fax: + 32 3 213 5321
info@subind.net
www.subind.net

Editorial

We start of this magazine with an overview of some of the many success stories achieved with Ecoshield.

This award winning technology was designed to offer lasting protection against cavitation and corrosion damage for all running gear. In every case study in this article the high expectations of our customers were not only met, but exceeded.

Further on in this magazine we talk about the many ecological benefits our coating systems can offer to ship owners. This is essential for any individual or company that takes its environmental responsibility seriously. We can help you achieve this goal.

We hope you enjoy reading this magazine. Feel free to contact us if you want more information on Ecospeed or one of our other products.

Subsea Industries NV
Boud Van Rompay
Founder

Results show Ecoshield is the best protection for a ship's running gear

Application of first layer on nozzle of crude oil tanker.

The decision to apply our award-winning Ecoshield coating to rudders and other running gear is paying off for our customers. Shipowners are experiencing zero cavitation damage and failure, which is in strong contrast with equipment coated with other protective systems. In this article you can find a selection of the many testimonies we have received.

Protecting Pleiades tankers since 2013

In the last few years the rudders and nozzles of ten tankers owned by Pleiades Shipping Agents S.A. have been coated with Ecoshield. Several of the vessels have since drydocked again without needing a recoat on these areas, much to the satisfaction of the owner.

At the end of 2013 Pleiades had the rudder of the crude oil tanker *Evrotas* coated with Ecoshield. They then went on to coat the rudders of other ships. In total ten tankers had their rudders coated with Ecoshield. Seven of these ships also had the coating applied on their nozzles at the same time, two more had the

Application of second layer.

Rudder and nozzle of crude oil tanker after sailing with Ecoshield for two years.

nozzles coated when they came in for a scheduled docking after sailing with Ecoshield on their rudders for two years.

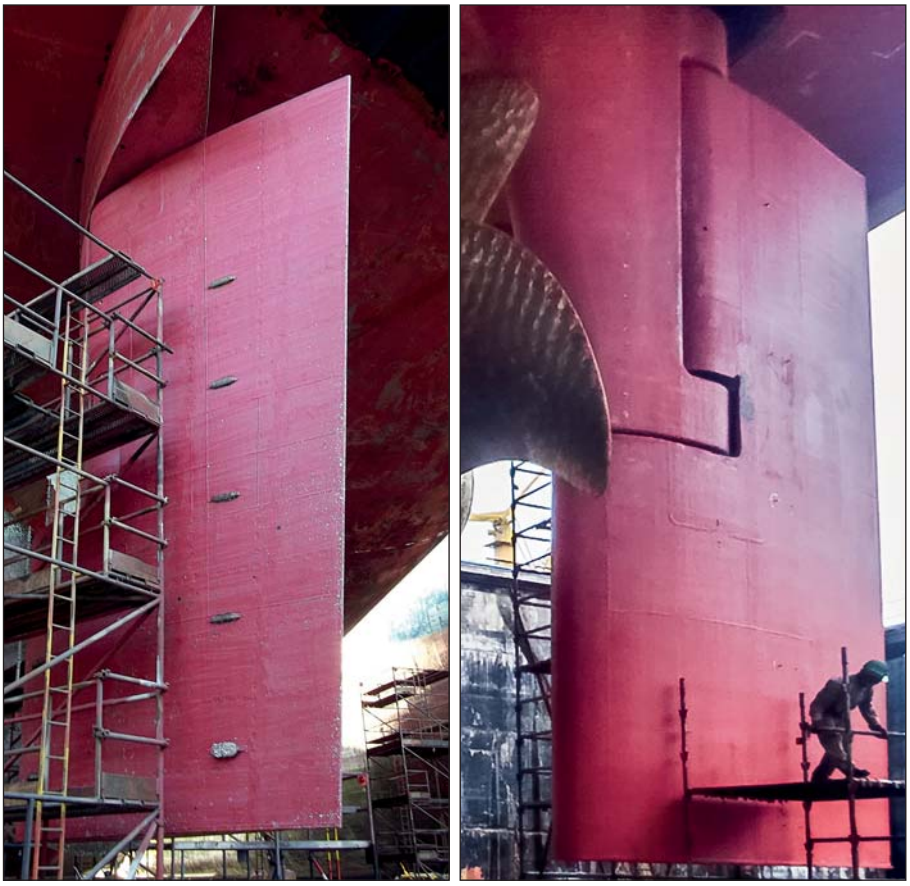
No Ecoshield repaint was needed on these vessels. At the most, quick and easy touch-ups amounting to less than 1% of the surface area was required.

Pleiades' Technical Director Mr. Miltos Synefias commented that the decision to apply the coating on the first vessel was not an easy one, but that the obtained results made the choice to extend the coating to the other vessels obvious.

Ecoshield still in excellent condition after five years

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 ship-owner 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: "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 only minor detachments and those were easily repaired."



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

Ernst Russ successfully ends rudder cavitation

Ernst Russ is a Hamburg based, family owned shipping company. The rudders of their five roro ships were originally coated with a standard epoxy coating. During the first intermediate docking, between two

Rudder of container vessel after five years in service.

The rudder of the Elisabeth Russ *7 years after Ecoshield application. The original cavitation pitting is still visible but no further cavitation damage has occurred.*

and three years from launch, extensive cavitation damage had already appeared on the rudders.

During a 2004 docking, Ecoshield was applied experimentally on the *Elisabeth Russ*. The trial was successful beyond all expectations. When the ship next came out of the water in 2007 it could be seen that no further cavitation damage had occurred. As a result, the rudders of the remaining four roro ships were coated with Ecoshield, all with similar results.

Recent drydockings of the *Elisabeth Russ* confirms that the original Ecoshield protection applied in 2004 is still holding firm and the rudder is intact, free from any further cavitation damage.

"In general everybody is looking to be in drydock as short as possible and to get all the work done as quickly as possible," explains Ernst Russ superintendent Grzegorz Girjat. "Additional hot work on the rudder inevitably results in some collisions with other jobs. I would say for me it is quite clear. Had we not applied Ecospeed on the rudders, we would certainly have extensive work to do in drydock."

ZF Marine customers benefit with Ecoshield

ZF Marine is applying Ecoshield to the nozzles and underwater components of its azimuth thruster units supplied to vessels operating in inland waterways.

Frank van der Vegt, Area Sales Manager, Commercial Craft Thruster Systems, ZF Marine, explained: "We were looking to improve the protection of the thruster's underwater components against damages due to the debris, sand and silt common in shallow draught inland waterways, particularly the Mississippi, as well as to prevent damage due to cavitation and corrosion."

After a series of patch tests proved successful, ZF Marine began applying Ecoshield to all underwater areas of the thruster. Since then our coating has been applied to the ZF 1000hp azimuth thrusters installed on 12 tow/pushboats operating in US waters.

"We offer the Ecoshield-coated thruster as an option, but it is a very good solution for increasing the life of thruster installations aboard tugs

After a series of patch tests ZF Marine has applied the Ecoshield hard-coating to all underwater areas of its thrusters.

ZF thrusters prior to (left) and after (right) Ecoshield application.

and pushboats operating in shallow waters," said van der Vegt. "We can see a really big improvement. They are less prone to damage, reducing maintenance and operational costs. We see these benefits not only with the towboat application, but also other applications such as harbour tugs and passenger vessels."

Conclusion

Ecoshield will prevent corrosion damage from reoccurring on an existing ship or can protect the running gear of a newbuild vessel against cavitation and corrosion damage for the life of the vessel. Ecoshield is guaranteed for ten years.

Subsea Industries has more than 400 ship references for Ecoshield on rudders but is seeing a marked increase in application to thruster tunnels and gearboxes due to the operational savings it brings.

More and more owners have Ecoshield applied on the rudders and other running gear of a large part of their fleet or have it included in the rudder specs of their newbuild vessels. These owners invest in the right coating system for protection because they know the savings it will bring them. ■

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

Subsea Industries NV
Phone: + 32 3 213 5318
Fax: + 32 3 213 5321
info@subind.net
www.subind.net

Comply with environmental regulations thanks to our performance technology

Our underwater coating systems offer a TBT-free, copper-free and biocide-free solution for the protection of your vessel. Our protection and performance systems are the Best Available Technology for reduction of fuel consumption, GHG and other emissions through improved hull hydrodynamics and fouling control.

Groupe Océan's vessels operate in ecologically sensitive areas, so they needed a hull coating system that protects both the vessel and the marine environment and is impervious to ice impact.

100% non-toxic

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 massive amounts of VOC and zinc anode emission associated with conventional coating systems are reduced to almost zero.

Stringent independent tests were carried out to authenticate the non-toxicity of our coatings.

Getting rid of repeated environmental hazards

All our systems require only two coats of 500 µm each applied to bare steel, aluminum or glass-reinforced plastic (GRP). No primer, no midcoat, no tiecoat, no topcoat are needed; just two layers forming a homogeneous protective coating. They are applied once in the life of the vessel which is a major advantage compared with other coatings. If you reapply three to four layers of antifouling coating and are re-doing the above every three to five years, you inevitably come to a point where there are too many layers on the ship's hull. This will degrade the quality of the coating even more easily and rapidly because of the internal stresses being built up, resulting in a required full reblast. A big environmental hazard is created each time. Repeat applications mean repeated VOCs and repeated debris

VG-Shipping has selected Ecospeed for its environmentally-safe cargo ship newbuilds.


Our coating systems are applied in only two identical homogeneous layers.


Underwater maintenance can be carried out whenever needed and without damaging the coating.

when the conventional coatings are removed.

Easy and environmentally friendly fouling removal: solving the NIS problem

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 test 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

Fouling can be removed underwater or in drydock without damaging the coating.

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. It even significantly improves their hydrodynamic characteristics, keeping the surface hydrodynamically smooth and bringing about a major saving in fuel.

Fuel savings reduce ecological impact tremendously

The emission of greenhouse gases (GHG) such as carbon dioxide (CO2) and nitrous oxides (NOx) as well as pollutants such as sulfur oxides (SOx) and particulate matter (PM) into the earth's atmosphere by the burning of fossil fuels to

This research vessel operates in the Wadden Sea and it is essential that the ecosystem being studied is not disturbed. Our Ecospeed coating offered the perfect solution

Our Ecoshield coating is designed to protect underwater running gear against cavitation and corrosion damage.

drive ships is of increasing concern internationally.

Underwater ship hulls are subject to biofouling, as micro-organisms and vegetable and animal matter naturally attach to a ship's hull. A fouled hull carries with it a fuel penalty. The worse the fouling, the slower the ship will sail at a given RPM. More power will be required to keep the ship sailing at a given speed. This means higher fuel consumption. Depending on the degree of fouling, this can be as much as 85% more. Higher fuel consumption results in more greenhouse gases and other emissions which pollute the earth's atmosphere.

On a global scale the potential for the reduction in fuel consumption and greenhouse gas emissions is enormous. The annual fuel consumption by the world fleet is estimated at 350 million tonnes. This implies an annual CO2 output of approximately 850 million - 1.1 billion tonnes. If 80% of the world fleet would switch from biocidal antifoulings to our coating systems, this would save an estimated 28.5 million tonnes in annual fuel consumption and 90 million tonnes in annual CO2 output.

Summary

We offer a TBT-free, copper-free and biocide-free solution. No toxic substances are released at any stage of its use. The surface texture improves with repeated underwater hull maintenance. Fuel consumption as well as GHG, VOC and zinc anode emission is thereby reduced. This makes our coating systems the Best Available Technology (BAT) for companies that takes their environmental responsibility seriously. ■

Our coating systems can reduce the carbon footprint of all types of vessels, helping owners achieve their ecological goals.

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.

www.subind.net

Subsea Industries NV
Phone: + 32 3 213 5318
Fax: + 32 3 213 5321
info@subind.net

03/18