

# SUBSEA

PROTECTION AND PERFORMANCE



Magazine

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# Subsea Industries is looking for representative agents



**T**o support our continuous growth, we are expanding our worldwide network of Subsea Industries agents. This allows us to reach a much bigger public directly than would otherwise be possible.

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

and propeller cleaning equipment as well as a line of hard hull coating systems.

The purpose of the Ecospeed range of coatings and cleaning technology is to offer a long-lasting, non-toxic protection for all ships with a system that keeps a hull ultra-smooth and free of fouling for the service life of the vessel with minimal repair and no replacement. Instead of using chemi-

cals to kill and repel marine fouling organisms, Ecospeed uses a hard, impermeable, impenetrable coating along with manual removal of fouling at an early stage.

Contact us if you are interested in joining our network and help us build a strong relationship with our prospects and customers. We look forward to hearing from you.

## **SUBSEA INDUSTRIES**

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# Editorial

**A**n underwater ship hull coating needs to be simple to apply, it needs to stay on your ship for many years with easy maintenance and it needs to save you money. Ecospeed ticks all these boxes. Choosing Ecospeed will be the last decision you ever have to make concerning your underwater hull coating.

Applying Ecospeed is very easy and can be done very fast. The coating only requires two layers. No top-coats, no primers or any other additional layers are needed. Ecospeed also has very flexible overcoating times. The second layer can already be applied three hours after the first. As a result the application can be scheduled around other work taking place in the yard or dock.

Future dockings are also far easier to plan. Ecospeed comes with a ten-year guarantee. The coating will last the full service life of the ship without needing replacement or major repair. Only small touch-ups will be required. These can easily be done during a (short) routine drydock visit. They blend in perfectly with the existing coating. Because no repaint is needed, days and up to a week can be saved in drydock times during each visit.

Every hull coating fouls and as a result cleaning is an unavoidable reality for shipowners. For most coatings this is a problem because they cannot be cleaned without damaging them, often very severely. Ecospeed, however, was designed to be maintained regularly while keeping the coating intact for 20 years or longer.



This procedure is made easy by the coating's technical properties. Cleaning can be carried out whenever needed, at any point in its lifespan, without causing damage.

Washing Ecospeed can also be done in drydock with high pressure tools. The standard procedure for shipyards when a ship enters drydock is general cleaning of the ship hull to clear away any fouling and residues. With Ecospeed the coating is always in an *as new* and excellent condition after the high pressure washing. The surface texture is very smooth. It reveals without exception that Ecospeed does not need any additional paint layers.

Our coating gives your underwater hull the best possible hydrodynamic characteristics. What is more, Ecospeed lasts. Therefore the performance of the ship does not degrade either. Large fuel savings are the result. This brings you huge financial profits over the lifetime of the ship.

If you drop us a line, we can tell you how Ecospeed can benefit you. We will look at your specific situation and give you all the data you need. This will allow you to make an informed decision on the next underwater hull coating for your ship. You will not have to worry about this ever again if you choose Ecospeed.

Subsea Industries NV  
Boud Van Rompay  
Founder

# TundRA 3200 icebreaking tugboats now fully protected with our coating systems

**T**wo Robert Allan Ltd. designed icebreaking tugs constructed at Turkey's Sanmar Shipyards have been protected with our coating system. The underwater hulls of *Selene* and *Helios* were coated with Ecospeed, the topsides with Ecolast and the azimuth thrusters with Ecoshield.

Located in Tuzla and Altinova, Sanmar Shipyards has been producing tugboats and providing services for numerous countries around the world for four decades. The company celebrates its 45th year anniversary this year. More than 230 tugboats benefiting from all this wealth of experience are presently in operation on international seas. They build vessels at its two custom-built, state-of-the-art yards located in Turkey's shipbuilding heartland.



*Application of first Ecospeed layer on icebreaking tug Helios.*

The pair of 67 tonne bollard pull ice class ASD tugs include a number of special features to cater for arctic

conditions. They are specifically designed for the year-round service in the Baltic Sea and particularly in the Northern part of the Gulf of Bothnia which is covered with heavy ice in wintertime. They are capable of performing multiple tasks including escort, ship assist, ice-breaking and ice management and open sea towing.

## **A full range of coating systems**

Our hard-type coatings were selected amidst strong competition because of their proven performance in polar waters.

Experience has shown that **Eco-speed** stays on the hull longer and resists the ice far better than the most generally used specialized ice

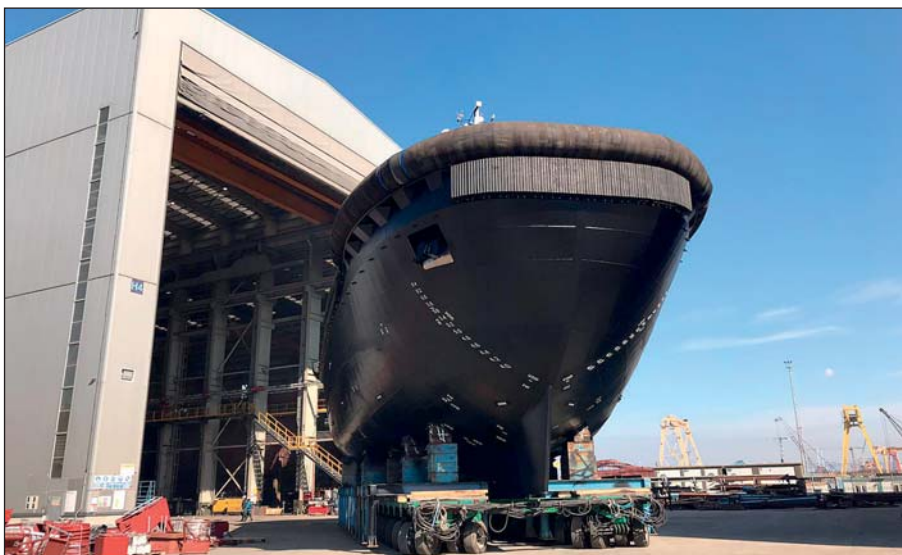


*Application of Ecolast on m/v Helios.*





*Application of the keel block areas blends in seamlessly with the rest of the coating.*



*Icebreaking tug Helios after completion*



*Ecospeed application on m/v Selene.*

coatings. Ecospeed remains bonded to the ship's plates even as they flex and bend under ice pressure and impact.

Ecospeed is a certified abrasion resistant ice coating. Owners are allowed to reduce the thickness of the steel of the ice belt if this area is coated with Ecospeed. This produces a significant financial benefit during newbuild projects and an increased cargo capacity.

An ice-going hull coating must have low friction characteristics in order to be fuel efficient. But it is not enough for the hull to be smooth and have low friction at launch. It must stay that way for the life of the vessel. Ecospeed will hold up and will not be damaged in the ice and so will remain smooth for the life of the vessel, thus saving fuel. Even if minor repairs are needed in drydock the original quality of the coating remains intact.

Because the topside of these tugs also needed extra protection against ice, **Ecolast** was applied to this area of the vessels. This coating is ultra-violet (UV) light resistant and pre-



*The topside of m/v Selene was coated with Ecolast.*





*M/V Selene after completion.*

serves 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.

The azimuth thrusters of both vessels were given a lasting protection

with our **Ecoshield** coating. This was done by the OEM prior to delivery. Ecoshield offers permanent protection against cavitation damage for rudders, bulbous bow, stabilizer fins, thruster nozzles and other underwater ship gear which needs special protection from corrosion.

## Conclusion

Many applications on ice going hulls have shown that our coatings can withstand the impact of ice for many years on end, proving their superior strength and durability.

Contact us for further information on how you can give the same complete and lasting protection as these two icebreaking tugs to your (ice-going) vessels.

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*The azimuth thrusters of both vessels were coated with Ecoshield.*



# Corrosion and cavitation solved

## 1. Corrosion

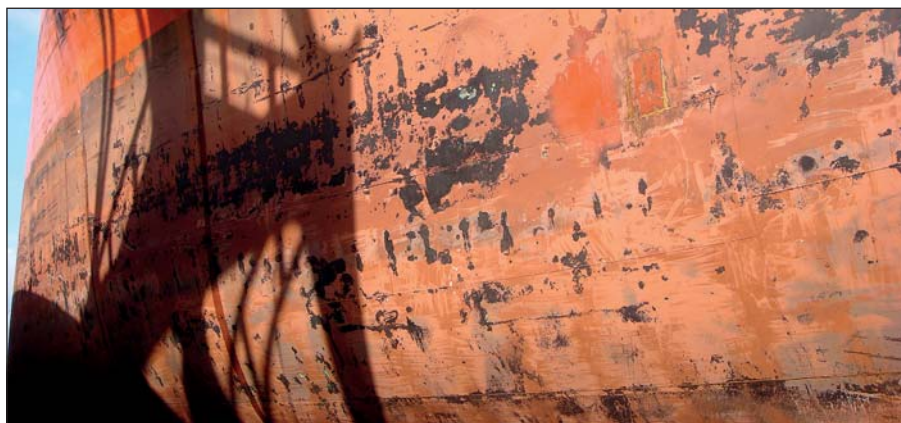
**W**e are so used to corrosion on ships that no-one raises an eyebrow at the rust-stained hulls in any port or dock. It is, apparently, considered to be the way of things.

It is true that steel will rust. But with the knowledge and resources at our disposal we have long passed the point when we should have recognized that this is a problem, and solved it.

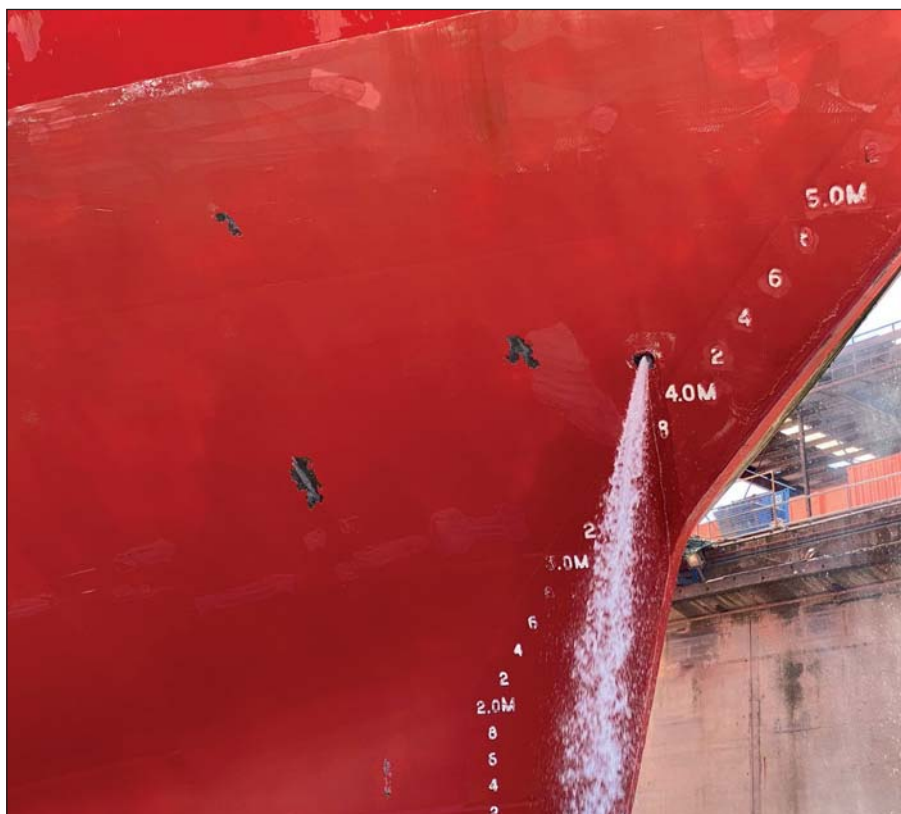
Corrosion on ships is rarely recognized as a failure of the coating, but that is precisely what it is. The first job of a hull coating is to prevent the gradual weakening and destruction of marine assets that is caused by corrosion. It remains a massive problem for shipping despite coating repairs eating up valuable days in drydock every few years. Not only that, but current coating compounds also leak a million ton of toxic material into our oceans every year.

Corrosion is not some unavoidable fact of life. The basics of the subject have been well known for centuries, but they are worth reiterating. The iron in a steel hull is, effectively, trying to return to the state in which it was taken as an oxidised ore. Three things are needed for rust to form: metal, water, and oxygen. Energy, the galvanic difference between metals, stimulates the process, and impurities in the metal, seawater, water vapor, acids, salts, carbon dioxide and stresses hasten it.

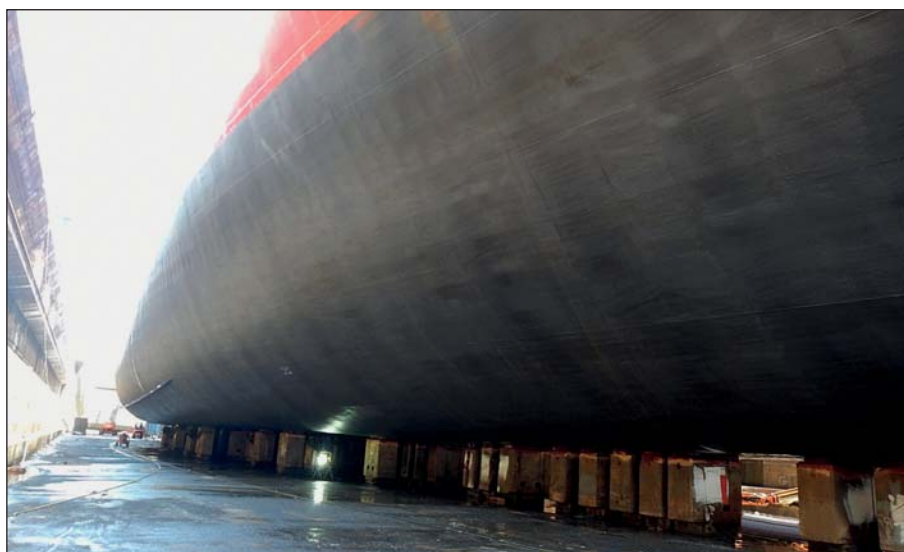
While cathodic protection slows the corrosion on a ship, total prevention



*The effect of corrosion can be devastating if the wrong protection is used for an underwater hull.*



*Bow area of RRS James Clark Ross after sailing in ice with Ecospeed for six years: no corrosion, only small mechanical damage from the anchor chain.*



*Ecospeed condition after application (top) and after sailing in icy waters for five years (bottom).*

is only achieved by preventing metal, water and oxygen from coming into contact with each other. That is the primary job of a coating. The problem is simply that most coatings fail poorly in that task.

One reason for their failure is the permeability of zinc primers, epoxies and antifouling coatings usually used. Water can get through and behind the layers of coating where it can start the corrosion process while accelerating it by causing coating delamination. This is the sequence of coating degradation which opens the door for further corrosion.

A second reason is the use of heavy metals in coating systems such as

copper. These have a high galvanic differential with the steel of the hull. In practice we see copper-based coatings degrade very quickly – their difference in potential is the highest we encounter on ships. The fact that zinc, epoxy and antifouling, all of which have different surface tensions, are used together, further aggravates the problem.

Permeability, different surface tensions, poor adhesion and heavy metals are the four main factors that lead to an inferior protection on the ship hull.

It is not difficult to see that if a coating has no heavy metal content and therefore can avoid potential differ-

ential, is impermeable to water and achieves superior adhesion, the problem is solved. If the steel hull is isolated from its surroundings, then galvanic activity and corrosion are canceled.

Our range of coating systems has achieved this.

Observation over twenty years on hundreds of ships protected with our coating systems, reveals a distinct absence of hull corrosion on any of them. We do not find corrosion on these hulls.

With our glass-flake coating systems we have the solution. Their superior adhesion, impermeability and toughness fully isolate the steel hull. Even heavy corrosive environments in port or in seawater fail to touch the anodes or the steel surface of the hull. In fact, anodes become superfluous on an Ecospeed hull.

We have seen more than 20,000 ships over the last fifty years – after some time they all have corroded, rough, degraded and inefficient hulls.

An amazing discovery we frequently make is that, on inspection of ships coated with our systems, we never see corrosion of any significance, even when there has been small impact damage. Not after two years, not after five years, not even after ten years. This proves that with an inert coating there is no influence on the steel, even when exposed to seawater.

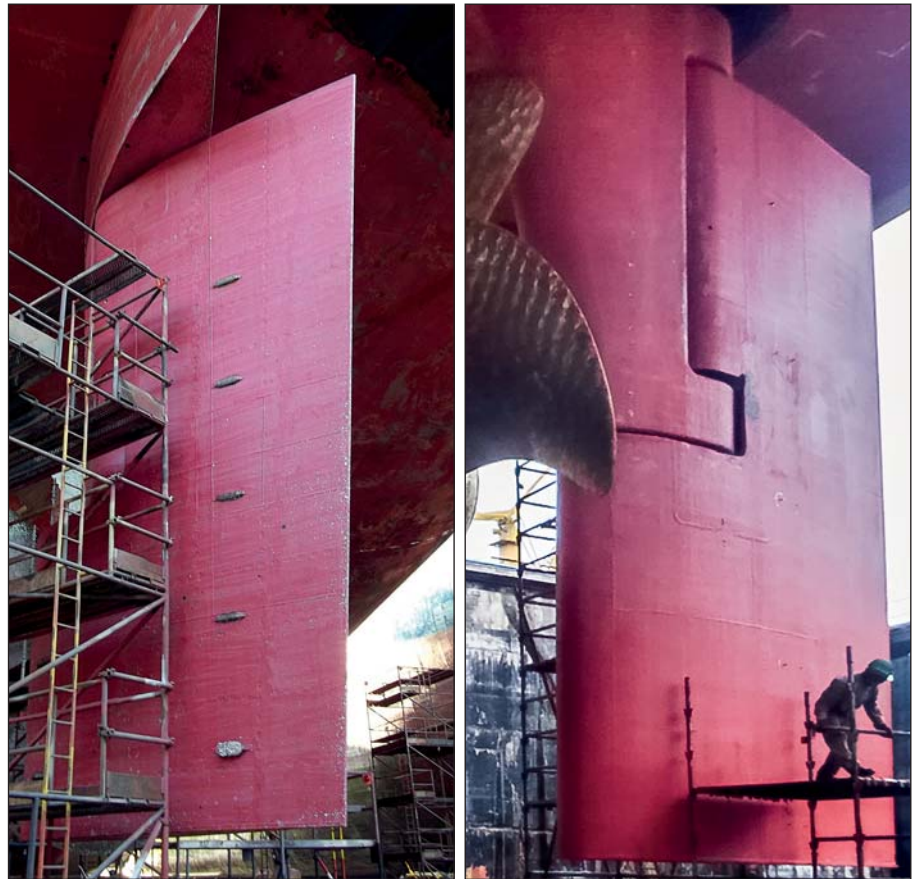
The conclusion is simple: the majority of the coating systems in general use today do not protect the hull sufficiently. They should be replaced with coatings that can do the job.



## 2. Cavitation

**A**s any shipowner knows, a ship's rudder is particularly prone to damage caused by cavitation. The problem features more prominently in high speed container carriers and other fast ships, which are more seriously affected than slower vessels. However, it is a potential problem and hazard for all ships and boats. This problem results in frequent, costly repairs to or replacement of this vital part of the ship's underwater equipment. So far, the bulk of efforts to relieve this problem have not been fully effective.

A ship's rudder, placed directly behind the propeller to give the ship maximum maneuverability, is particularly prone to erosion followed



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



*Damage like this (and much worse) occurs when running gear is not properly protected.*





*All types of running gear can benefit immensely from an Ecoshield application.*

by corrosion. The erosion in this case is caused by hydrodynamic cavitation. The forces involved are very large. It is as if the surface affected has been subjected to repeated, heavy blows from a hammer, as well as high temperatures. This causes what is known as cavitation erosion as the surface material, first paint and then steel, begins to flake away.

One need only examine a ship's rudder that has been subjected to cavitation to see that very severe damage is caused by this phenomenon. Rudders become deeply pitted; paint coatings and hard steel simply disappear; whole plates can fall off and the rudder practically disintegrates altogether, all as a result of this cavitation damage.

Rudder design has mitigated the

problem somewhat but far from solved it. Most coatings generally fail to provide adequate protection and usually erode. The use of cathodic protection systems has no effect on cavitation erosion.

The ideal approach to cavitation erosion would be a protection of the rudder which prevented any such damage from occurring. This solution does exist and is called Ecoshield.

Ecoshield is designed for use on rudders, bulbous bows, stabilizer fins,

kort nozzles and other underwater gear which requires special protection. The coating has proven 100% effective in protecting all running gear from cavitation.

Aside from some minor touch-ups, none of the rudders that were properly prepared and coated have had to be recoated, even after more than ten years. None of them have suffered from cavitation damage since the coating was applied. For those shipowners and operators who have tried this coating for their rudders, the cavitation damage problem ceased to exist.

Once applied and cured the coating forms an extremely tough and durable surface which will continue to protect the rudder for the full service life of the ship without the need for replacement.

Since the original application, over 500 rudders have been coated on a wide variety of ships: cruise ships, cargo vessels, container carriers, ro-ro cargo ships, a cable layer, a dredger, crude oil tankers, research vessels, ice-going ships and ice-breakers, tugboats, a reefer, passenger ferries, bulkers and others.

Shipowners and operators can consider the problem of cavitation damage to rudders to be solved. The solution simply remains to be implemented on all ships afloat to make this vexing problem a thing of the past. ■

**Contact us for more information on solving the corrosion  
and/or cavitation problems on your vessels.**

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# Corrosion damage very repair made ✓ easy



**S**ubsea Industries has a 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 can cause severe pitting. The steel needs to be restored to its original shape with a smooth surface prior to recoating.

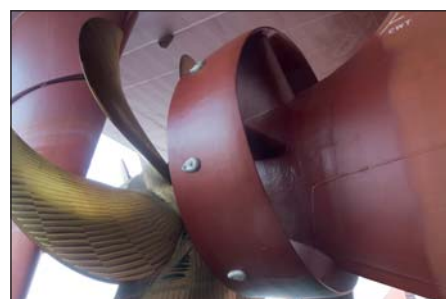
This is where Ecofix comes in. It is a superior, tested and proven filler. Because it uses the same basic resin as Ecoshield, the coating can be applied just one hour after the filler. The bonding and hardness are extraordinary. This is the effective alternative to very expensive fillers. And because it is part of the Ecospeed/Ecoshield family, it is fully compatible with our coatings.

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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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