

SUBSEA

PROTECTION AND PERFORMANCE



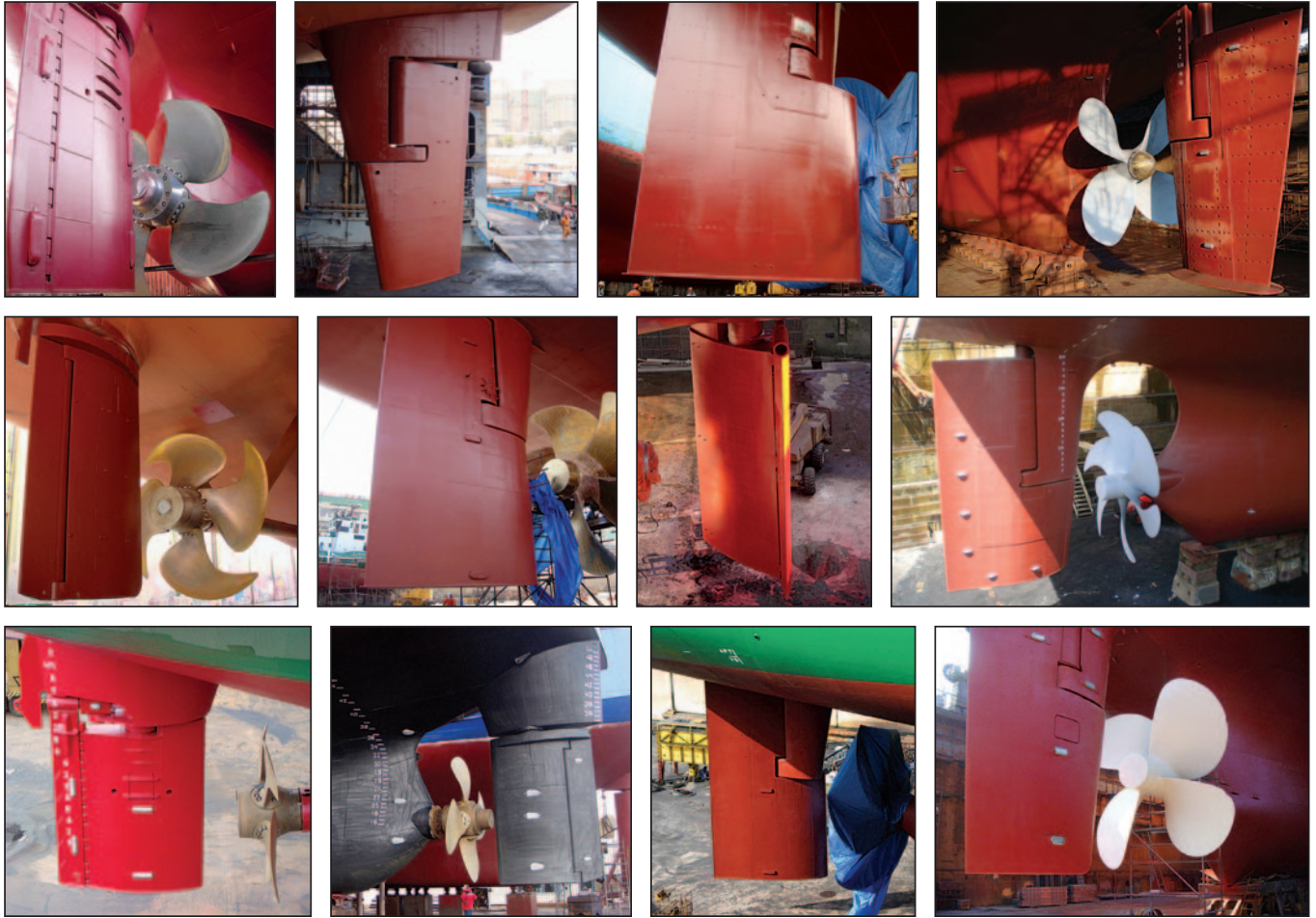
Magazine

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SAY GOODBYE TO CAVITATION DAMAGE



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 dry-dock 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.

Subsea Industries NV
+ 32 3 213 5318
info@subind.net
www.subind.net

ECOSHIELD®
ULTIMATE PROTECTION 

Editorial: Take care of your ship, take care of the environment

Taking good care of a ship and protecting the marine environment should never be two separate objectives. In fact, we believe they go hand in hand. A vessel that is properly protected, efficiently maintained and kept in optimal condition throughout its service life is not only more economical to operate, but also has a smaller environmental footprint.

At Subsea Industries, this philosophy has been at the heart of our coating technology for decades. Our goal has always been to provide shipowners with solutions that deliver lasting protection and performance without compromising the oceans in which their vessels operate.

Ecospeed is a perfect example. Unlike conventional antifouling coatings that gradually release biocides into the water and require repeated replacement, Ecospeed provides a durable, non-toxic protective layer designed to last the lifetime of the vessel. Its hard, cleanable surface helps maintain hull efficiency, while its exceptional durability removes the need for repainting, blasting and coating disposal. Vessels operating with their original Ecospeed coating after more than fifteen years show that long-term durability and environmental responsibility can reinforce each other.

The environmental benefits extend far beyond eliminating harmful substances. No repainting means fewer materials consumed and less waste generated. Keeping a hull smooth and clean also helps reduce fuel con-



sumption and the associated emissions.

The same principles apply to our Ecoshield and Ecolock coating systems, which provide long-term protection for critical underwater components and offshore structures. By preventing corrosion, erosion and cavitation damage, these technologies help extend the useful life of valuable assets while reducing the resources needed to maintain them.

The many case studies featured in previous magazines demonstrate that this is not simply a theoretical approach. You can also find these case studies, along with detailed information about our coating systems and their applications on our website at www.subind.net.

Ultimately, sustainability is not just about choosing environmentally friendly products. It is about making

decisions today that make maintenance easy and reduce waste and environmental impact for decades to come.

I invite you to discover how our coating systems can help you achieve both objectives. You can contact my team at +32 3 213 53 18 or info@subind.net to learn more.

A handwritten signature in black ink, appearing to read 'BVR' followed by a long horizontal stroke.

Subsea Industries NV
Boud Van Rompay
Founder

Ecolog in the real world

In the first article in this series, published a year ago [<https://subind.net/case-study/ecolock-protection-1/>], we covered the theory behind an ideal hull coating system for long-term protection of offshore assets. We are following up with some real-world applications.

After all, it is one thing to read about properties and specs on paper and listen to promises and assurances. It is quite another to apply the coating and have the asset sit out there for years and years, exposed to all the corrosive elements of the environment, and see that it really does last the expected time period and continues to adhere to and protect the steel from corrosion year after year without requiring maintenance or replacement.



The Sea Launch Odyssey and the command ship en route to the Equator.

Sea-Launch Odyssey: A converted semi-submersible rocket launcher

The Sea-Launch Odyssey is one of the world's largest semi-submersible,

self-propelled vessels, converted to a floating platform for launching rockets for placing satellites in orbit. It has an unusual operational cycle: lying up in port for months on end, then rapid deployment down the Equator with its control ship, launching of the rocket and return to port. During the lay-up in port, the hull would foul very badly. But the ship needed a clean hull for its run to the Equator, or the fuel bill would be astronomical. With the conventional antifouling coating the ship had, the hull could not be cleaned in port. The coating did not hold up well with this pattern.

The ship's senior superintendent Jan Bakke had worked out with class a way to extend the drydock interval to 15 years. The extended drydock interval brought with it the major challenge of properly protecting the hull and controlling biofouling over that period. "When you start cleaning the hull on an antifouling system then you set the clock for docking," says Jan. The owners also wanted an environmentally friendly coating.



The Sea Launch Odyssey semisubmersible rocket launch platform at its home port of Long Beach, California. The hull is protected with Ecolog.

To meet all those requirements – corrosion protection for at least 15 years without drydocking, the ability to withstand hull cleaning without damage to the coating, and an environmentally safe solution – the search led naturally to Ecolock.

An additional benefit was the fact that with Ecolock, cathodic protection, anodes or ICCP, can be dispensed with completely. After several missions had been completed, Jan Bakke was satisfied that all requirements had been met with Ecolock.

EXMAR *Caribbean* FLNG (later *Tango*) and *Eemshaven* FSRU

EXMAR was one of the first companies to use Ecolock on offshore assets – the *Caribbean* FLNG¹ barge and the *Eemshaven* FSRU².

The first of its type, the *Caribbean* FLNG was built in 2014. “We wanted to select a coating which can ensure that the underwater hull will



EXMAR FSRU Eemshaven in drydock seven years after Ecolock was applied to the hull, still in excellent condition.

not corrode for at least 15 years,” said Frederick Van Nuffel, EXMAR Project Manager in charge of the design, engineering and construction of the FLNG barge. In addition to the underwater hull, EXMAR discovered that Ecolock was sufficiently abrasion resistant to replace the rubber fender areas on the barge.

After nine years on station, the *Caribbean* (renamed *Tango*) FLNG was sold. It went to drydock in

Dubai. The hull coating was found to be in excellent condition.

In 2015, EXMAR built an FSRU in the same Wison shipyard in China. Again, Ecolock was chosen for the hull. Seven years later the vessel was in drydock for rechartering. The hull was washed down and found to be in perfect condition. All that was needed in the way of repair was to touch up a few mechanical damages. Now renamed the *Eemshaven*, the



EXMAR Caribbean FLNG (left) and Eemshaven FSRU (right) at the Wison shipyard in China where they were built.



EXMAR's Caribbean FLNG renamed Tango FLNG en route to Argentina to take up station, the underwater hull and the fender areas coated with Ecolock.

FSRU is on duty in Eemshaven in northern Netherlands. No recoating has been needed in 11 years.

LNG tankers converted for storage and regasification

It has become quite a common practice for LNG³ companies to buy in-service LNG carriers and convert them to static FSUs⁴ or FSRUs. The converted vessels are moored or anchored more or less permanently and form an important link in the LNG export and import process.

Several such projects have chosen Ecolock for the underwater hull and

in some cases for the entire hull up to the gunwale. There are several reasons which make this choice logical.

Ecolock provides complete corrosion protection for decades. The coating comes with a 20-year warranty if two coats are applied and a 35-year warranty if a third coat is applied. Since some of the LNG projects foresee a 25 or even 40-year lifespan without going to drydock, this duration of full corrosion protection is essential.

In many cases the newly converted FSU or FSRU has to cross oceans

under its own propulsion to reach its intended destination. If the hull is not cleaned before the ship sails, fuel efficiency on the voyage will be very low and there is a risk of transferring invasive aquatic species to its new home. With Ecolock, the coating can be cleaned in the water and any degree of fouling removed without any damage to the coating or the environment, avoiding both problems.

The coating is completely non-toxic. In the case of an LNG facility being built off the coast of British Columbia to which two of the ships coated with Ecolock are destined, the land is owned by 1st Nation Canadians who were insistent on a non-toxic hull coating so as not to risk the contamination of the local sediment by toxic coatings such as antifouling.

Ecolock can be used in lieu of cathodic protection. This means that sacrificial anodes and ICCP systems do not need to be installed or maintained where Ecolock is used for the hull coating. This has been reported by many customers and recently validated by ABS.



One of two LNG carriers converted to FSUs to be stationed offshore in British Columbia, receiving the third coat of Ecolock (green) on the underwater hull.

³ Liquefied Natural Gas

⁴ Floating Storage Units



Newly converted LNG carrier to FSU in drydock recently coated with Ecolock on the underwater hull (grey).

Ease of application and repair. Ecolock is quick and easy to apply, consisting only of two or at most three layers of the same coating applied directly to bare steel.

Overcoat time is around three hours minimum and there is no maximum, allowing for great flexibility in the yard.

+ POOL

An unusual project for which Ecolock was ideally suited is the + POOL project in New York. What began as an idea for a plus-shaped, water-filtering floating swimming pool in the Hudson River in New York City, conceived by a small group of designers, has launched an international movement to restore the utility of urban waterways.

The more than 320-ton floating steel structure features a 1,745 square foot pool consisting of a stainless-steel shell with a reinforced PVC membrane liner. The pool slopes from 4 ft to 7 ft, (with an average depth of 4.76 ft), and holds 62,126 gallons (8,305 cubic ft) of water, replenished from the surrounding river water every 1 to 2 hours.



Recently converted LNG carrier, now an FSRU stationed off the coast of Brazil. The grey underwater hull, coated with Ecolock, was cleaned on departing Singapore for excellent fuel efficiency in the crossing.

The underwater hull and exterior of + POOL are coated with two layers



Artist's rendering of the two LNG FSUs off the coast of British Columbia. Ecolock was chosen for the FSUs for many reasons, including the 35-year warranty.



+ Pool test pool just coated with Ecolock, ready to go in the water.

of Ecolock which is perfect for the project due to its long-lasting durability, its non-toxic nature, cleanability and the fact that + POOL were able to have it in the color of their choice.

Ecolock has been in use on offshore assets for 15 years with excellent results. ■



Artist's rendering of + Pool in the Hudson River.

Subsea Industries worldwide reach through our agent network

In addition to its headquarters in Antwerp, Belgium, Subsea Industries has a large network of offices and agents around the world to help ensure that our coatings and equipment are available wherever they are needed.

We have offices in the Tampa Bay Area, in Rotterdam and in Algeciras which are manned by Subsea Industries and Hydrex personnel. In order to cover the rest of the globe, we work through a number of agencies who represent our commercial interests locally. Many of these agencies have worked with Subsea Industries for decades and are very knowledgeable in our products. We value their support highly, since it would be much harder to provide the high levels of service we strive for all over the globe without well-established local support.

How we work with our agents

“It is important to know that they are commercial agents,” explains



A group of our agents from around the world on a tour of Antwerp in one of the Hydrex workboats.

Manuel Hof, Sales & Production Executive over Subsea Industries who currently oversees the agent network. “Their role is to enlighten shipowners and operators about our products with a view to generating inquiries. We consider them an extension of our sales team – they are our front office while we in Antwerp man the back office.”

In return, Subsea Industries supports the agents with any inquiries and pays them a commission on sales.

The agents stay in touch with customers and support them with further requirements, such as a new ship that needs Ecospeed for the hull, or a series of ships already in service whose rudders and thruster tunnels need protection against cavitation erosion and damage, which we handle with Ecoshield when they are in drydock. It is an ongoing collaboration between Subsea Industries and the agent in order to provide the best possible service to the customer.

One agent per territory

“Although in theory we could have more than one agent per country, for the sake of simplicity we prefer to work with one major representative in any given geographical area,” explains Manuel. Some agencies are larger companies than others and have a number of branches around their country. In Canada, for example, which is such a large territory, we are fortunate to be represented by an agency who has an office on each coast as well as a separate one in



Subsea Industries and Hydrex at the booth of N. Bogdanos Marine, our agents in Greece, at the Posidonia trade show in Athens.

central Canada. Similarly in China, our agent has offices in Shanghai and also in Dalian. So while we still follow the pattern of one agent per country or territory, we also benefit from the coverage of the more than one office.

Outside events

Not surprisingly, major shipping events are often attended by ourselves as well as the local agent. In these cases, such as Posidonia, Nor-Shipping and so on, we often participate in the local agent's booth, since they have the local contacts. We often take the opportunity to visit prospects and customers with the agents when we are in their territory. Often we can help answer questions and come up with solutions from a fresh perspective.

“When we go to an exhibition, our preference is to join our agent in their booth at the exhibition if they are participating,” Manuel explains, “because they are well known in that area, which always helps us to meet more potential customers.”

But in other cases where we have our own stand at an exhibition and the



In Canada, Subsea Industries has worked with Jastram Technologies Ltd. to provide Ecospeed for Group Océan's tugs in just the right shade of blue!

local agency does not, we invite the agent to join us so that together we can meet the local prospects and customers.

In all the cases, the combination of local knowledge and connections, and the technical knowledge and experience of our head office staff works well, to the benefit of the shipowners and operators we speak with.

More than just sales

In addition to putting potential customers in touch with us or generat-

ing sales of Subsea Industries products, our agents provide invaluable support with the delivery and servicing of our customers. For example, Carich Marine Engineering with offices in Dalian and Shanghai have represented us in China for well over 20 years. We work extensively with a number of shipyards all over the country and it's almost impossible for an outside company to do business in China without a Chinese representative. Carich helps in many different ways to make this possible.

Sometimes we have the added benefit of our agent also being a qualified paint inspector, as in the case of Per Gabrielsson of Coating Inspections & Consultants in Mynämäki, Finland. In addition to representing Subsea Industries, Per provides great technical expertise to customers. For example he was the Owner's Agent for a Finnish Owner and worked with our agent in Turkey, Orkun Çomuoğlu of Amat Engineering for an Ecospeed newbuild application at a Turkish shipyard. In that case Subsea Industries benefited from representation with the owner as well as with the shipyard. ■



One of two tugs built for Alfons Håkans at Sandra shipyard in Turkey. Our agent in Finland, Coating Inspections & Consultations recommended Ecospeed and Ecolast to the owner and our agent in Turkey, Amat Engineering assisted at the shipyard end, so this was real teamwork.

Worldwide network of agents

Canada

Jastram Technologies Ltd.
Contact: Mr. Robert Adie
canada@subind.net
+1 604 988 1111

Chile

Walbaum Representaciones Ltda.
Contact: Mr. Martin Walbaum
chile@subind.net
+56 2 2235 1020

China

Carich Marine Engineering (HK)
Co., Ltd.
Contact: Ms. Lisa Shen
dalian@subind.net
+86 411 8252 9217

Croatia

CTA-marine d.o.o
Contact: Mr. Janez Vehovec
croatia@subind.net
+385 51 215 552

Finland

Coating Inspections & Consultations
Contact: Mr. Per Gabrielsson
finland@subind.net
+358 40 510 1710

France

Equimer
Contact: Mr. Thibault de Fouchier
france@subind.net
+33 1 41 39 22 53

Greece

N.Bogdanos Marine Bureau
Contact: Mr. Adam Papapetros
greece@subind.net
+30 210 924 6956

India

Western Marine Engineering
Contact: Mr. Gurminder Josan
india@subind.net
+91 942 852 2701

Italy

Marine EQ
Contact: Mr. Dario Cacciottoli
italy@subind.net
+39 040 660550

Nigeria

Oilneering Nigeria Ltd.
Contact: Mr. Kenneth Gbenro
nigeria@subind.net
+234 0813 507 6262

Norway

GearConsult AS
Contact: Mr. Ludvig Nyquist
norway@subind.net
+47 4000 8003

Philippines

Amphibia Marine & Subsea
Services OPC
Contact: Mr. Marco Angelo Ancheta
philippines@subind.net
+63 905 141 6144

Poland

Navitech Gdynia Sp. Zo.o
Contact: Mr. Roman Pierzynski
poland@subind.net
+48 58 62 11 506

Republic of Korea

ECOTEC Co.,Ltd.
Contact: Mr. Sang-Uk Lee
korea@subind.net
+82 51 781 8306

Singapore

Palco Marine Services Pte. Ltd.
Contact: Mr. Sanjay Jose Paloccaran
singapore@subind.net
+65 9152 1010

Taiwan

LSC Multech
Contact: Mrs. Joyce Chen
taiwan@subind.net
+886 7 727 2727

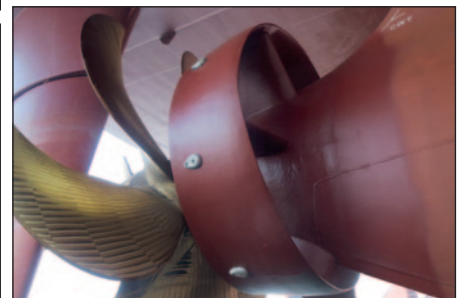
Turkey

Amat Engineering
Contact: Mr. Orkun Çomuoglu
turkey@subind.net
+90 216 493 01 66



SUBSEA

PROTECTION AND PERFORMANCE

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

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+ 32 3 213 5318
info@subind.net