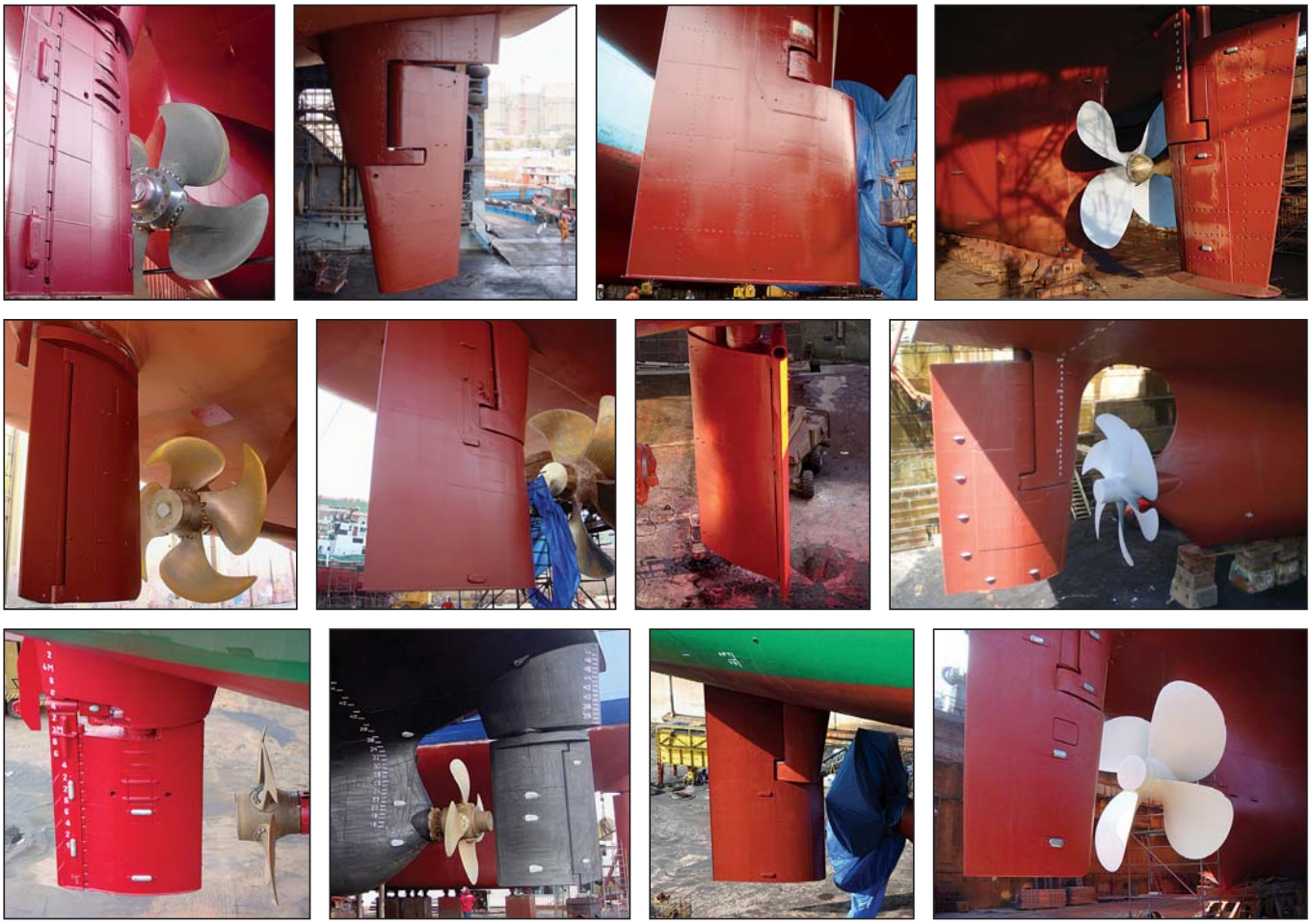
SUBSEA

PROTECTION AND PERFORMANCE

Magazine

The only coating that offers lasting rudder 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

Editorial

As you can read in the article on this page, we have exciting news. Our Ecospeed coating system will be applied on the newbuild research vessel RRS *Sir David Attenborough*.

The vessel is being built at the Cammell Laird shipyard in Liverpool and is scheduled to launch in 2019. It will be operated by British Antarctic Survey (BAS) and will replace RRS *Ernest Shackleton*.

The excellent results on that vessel and on sister vessel RRS *James Clark Ross* made the decision to use Ecospeed an easy one.

We are delighted to have been selected for this new polar research vessel. The hard coating completely mitigates against the leaching of chemicals into the marine environment and this, along with other 'green' technologies will make *Sir David Attenborough* one of the most environmentally-safe ships afloat.

Subsea Industries NV
Boud Van Rompay
Founder

Ecospeed gets contract for RRS Sir David Attenborough

Ecospeed will now be applied to Sir David Attenborough *(artist impression courtesy of BAS/Cammell Laird).*

Subsea Industries' Ecospeed hull protection system has been selected for *RRS Sir David Attenborough*, the polar research ship under construction at the Cammell Laird shipyard in Birkenhead, Liverpool, UK.

The £150 million contract to build the vessel, which Cammell Laid won against stiff international competition in 2015, represents the biggest commercial shipbuilding contract in Britain for 30 years. The ship has been commissioned by the National Environment Research Council (NERC) and will be operated by British Antarctic Survey (BAS).

The 15,000gt research vessel, scheduled for operational duties in 2019, will be one of the most advanced polar research vessels in the world. Two nine-cylinder and two six-cylinder Bergen B33:45 engines in diesel electric configuration will provide power to propulsion motors

Following the performance on Ernest Shackleton *(pictured here), Ecospeed was applied to the hull of sistership* James Clark Ross.

In six seasons operating RRS Ernest Shackleton *with Ecospeed coating, BAS had to touch up Ecospeed only in areas of mechanical damage and carry out minor repairs around the bow.*

driving 4.5m diameter controllable pitch propellers. The 128m long vessel will be capable of 60 days at sea without re-supply, covering a range of 18,898 nautical miles at 13 knots.

BAS and NERC deliver and enable world-leading interdisciplinary research in the polar regions. Through its extensive logistic capability and know-how BAS facilitates access for the British and international science community to the UK polar research operation.

The shipbuilder awarded a coatings contract to Subsea Industries, a pioneer in non-toxic hard-coatings, based on the unrivalled performance of its Ecospeed hull coating system on the Royal Research Ships *Ernest Shackleton* and *James Clark Ross*.

Application of Ecospeed on RRS James Clark Ross *in 2015.*

"*Sir David Attenborough* required a fully ice-strengthened coating for operations in Antarctica as well as providing effective antifouling between the polar regions, without being harmful to the environment," said Rob White, Senior Marine Engineer at British Antarctic Survey. "Ecospeed fulfils that requirement."

In six seasons operating RRS *Ernest Shackleton* with Ecospeed coating, BAS had to touch up Ecospeed only in areas of mechanical damage and carry out minor repairs around the bow, the most susceptible area to ice impact. Following the performance on *Ernest Shackleton*, the hard coating was applied in 2015 to the hull of sister ship, RRS *James Clark Ross*. Results were again exemplary.

"After two seasons there was only minor hull growth, which was removed with a hull power wash," said White. "When operating in the Southern Ocean, there is very little biofouling and during the rest of the year any growth that does accumulate is easily dealt with. This ensures a clean efficient hull and reduces the transportation of invasive aquatic species across different regions."

As a government funded organisation, BAS had to find a coating solution for *Sir David Attenborough* that was effective, easy to maintain and could provide savings across its operating budget. A pre-requisite was an environmentally-sound hull coating that would reduce fuel consumption without detriment to performance in ice.

"Our docking schedules are alternate years so the coating had to be maintainable in-water as well as in drydock," White said. "With Ecospeed there are no special docking requirements or specialist equip-

ment, which means that any remedial work can be part of the vessel's normal refit schedule. The coating's simple application and maintenance procedures also help drive down the vessel's through-life costs."

Manuel Hof, Production Executive and NACE Coating Inspector, Subsea Industries, explained: "The coating is proven to reduce fuel consumption so the vessel is not burning as much fuel, thus reducing ship exhaust emissions and *Sir David Attenborough*'s carbon footprint. It also correlates directly to lower operational costs."

Rob White went on to reveal that other hull coatings had been previously applied to both *Ernest Shackleton* and *James Clark Ross*, but these conventional coatings required additional anti-fouling treatments to prevent the build-up of hull growth.

"These coatings were expensive and did not last long in ice," he said. "But since using Ecospeed and following the recommended annual maintenance, the requirement for additional hull treatments has been removed. It also eliminates the pollution of polar waters with heavy metals and hull contamination during research activities, which is extremely important to the scientific work NERC and BAS carry out. The vessel's presence cannot interfere with the local environment."

Indeed, the deposit of metallic elements and chemicals in the polar environments is addressed in the recently introduced IMO Polar Code, with Guideline G-23 stating that "no pollutants should be carried directly against the shell in hull areas at significant risk of ice impact".

Surface preparation prior to Ecospeed application.

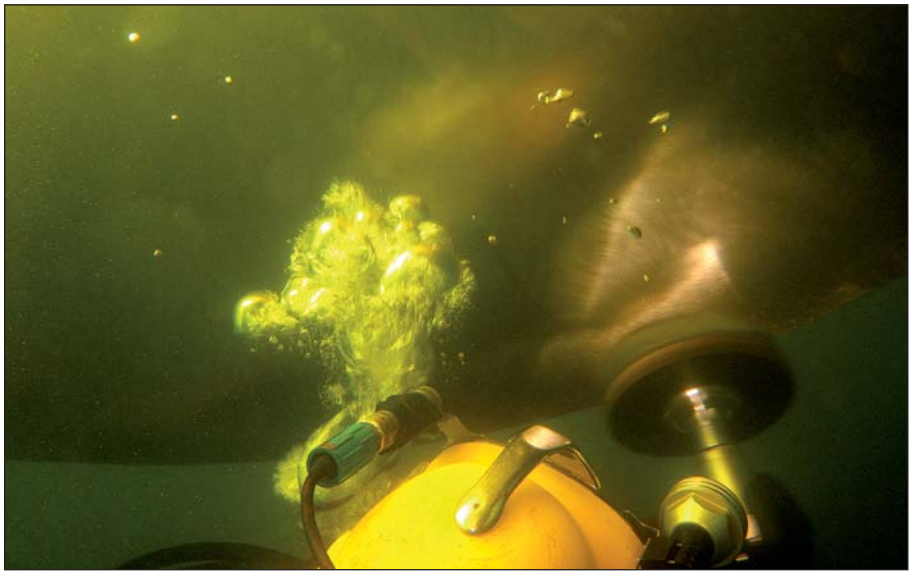
The entire underwater hull of RRS James Clark Ross is protected with Ecospeed.

While this guideline does not specifically legislate against the use of traditional "soft" coatings for polar shipping, Rob White believes a tough, durable and long-lasting coating is required for hull plating integrity. "Ecospeed bonds very well to the bare steel on application and provides a tough effective barrier against the sea and ice," he said.

"From the experience we have gained through using Ecospeed on *Ernest Shackleton* and *James Clark Ross* we were adamant that the hull coating for the newbuild should also be Ecospeed. Through-life costs, ease of maintenance and the environmental benefits help reduce operational costs and makes *Sir David Attenborough* a better research ship for polar science," said White. ■

Unique range of underwater cleaning equipment

In harsh underwater environments it is essential to have sturdy and reliable equipment. The unique design of our underwater cleaning machines provides the efficiency and durability required in such conditions. All our systems are carefully designed with operational safety as a prime consideration. A range of systems is available for various applications. All our cleaning units are sold separately or supplied with a complete support system including umbilical, tools and hydraulic power unit.



MC111.

MC111

The MC111 is our smallest model specially designed for cleaning and polishing ship hulls, propellers and thrusters. The MC111 is very handy and can be easily taken into difficult corners and niches while still obtaining the desired results.

MC131

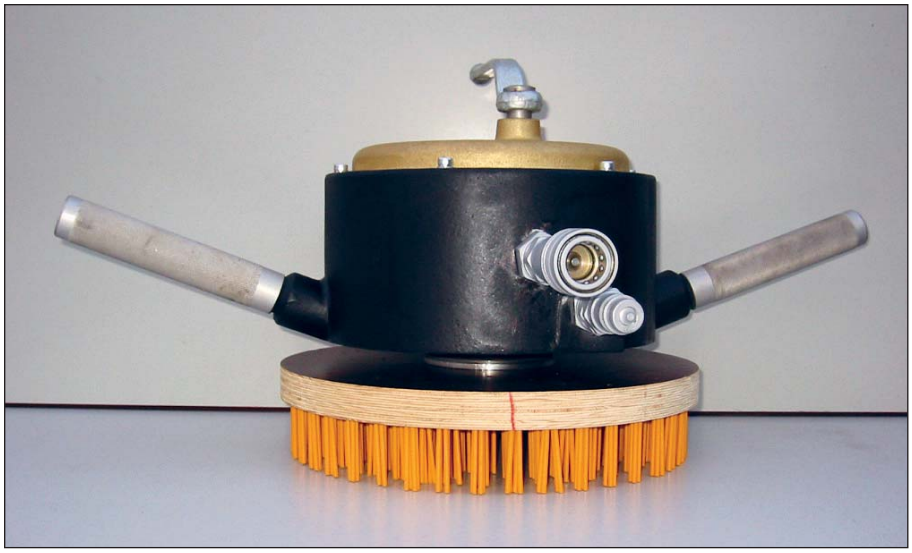
The MC131 is a compact unit designed for cleaning all kinds of marine fouling from yachts and smaller ships to offshore oil & gas platforms. The brush rotation speed is adjustable by the diver so as to achieve an optimum hourly cleaning rate.

MC212

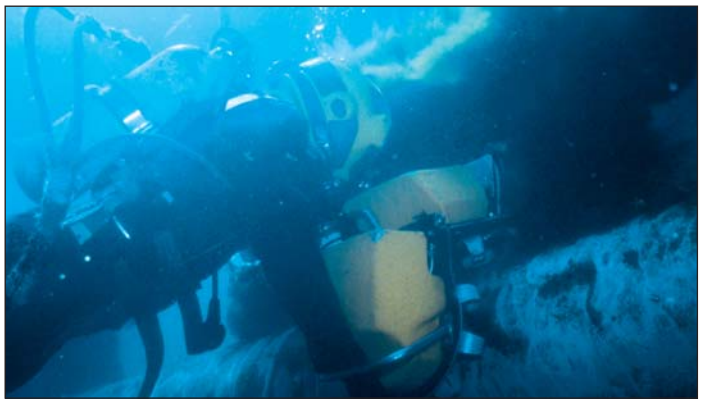
The MC212 has an enviable track record, with over 20 years of service. It is the most efficient cleaning machine currently available and is highly regarded by the industry internationally. The MC212 is designed for cleaning light, medium and heavy marine fouling from ship hulls, offshore oil & gas platforms (concrete or steel), jetties, piles, intakes and internal pipelines. The equipment has a self-balancing feature, which allows the operator to use the tool safely and effortlessly for long periods.

MC313

The unique patented design of the MC313 underwater hull cleaning unit will stand up to the most difficult underwater cleaning conditions encountered on various types of ships. The downward pressure of the brushes can easily be adjusted throughout the operation and the heads are self-adjusting to the contours of the hull. This, coupled with



MC131.



MC212.

a powerful four-wheel drive system, are major technological breakthroughs in subsea cleaning.

Different types of fouling can be treated with the appropriate pressure and tools so damage is prevented to the underlying paint layers. The MC313 has a very efficient cleaning record. It is designed for larger ship hulls or other large, reasonably flat surfaces. ■

MC313.

Ecofix: Corrosion damage repair

Subsea Industries has launched 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.

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

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 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. ■

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.

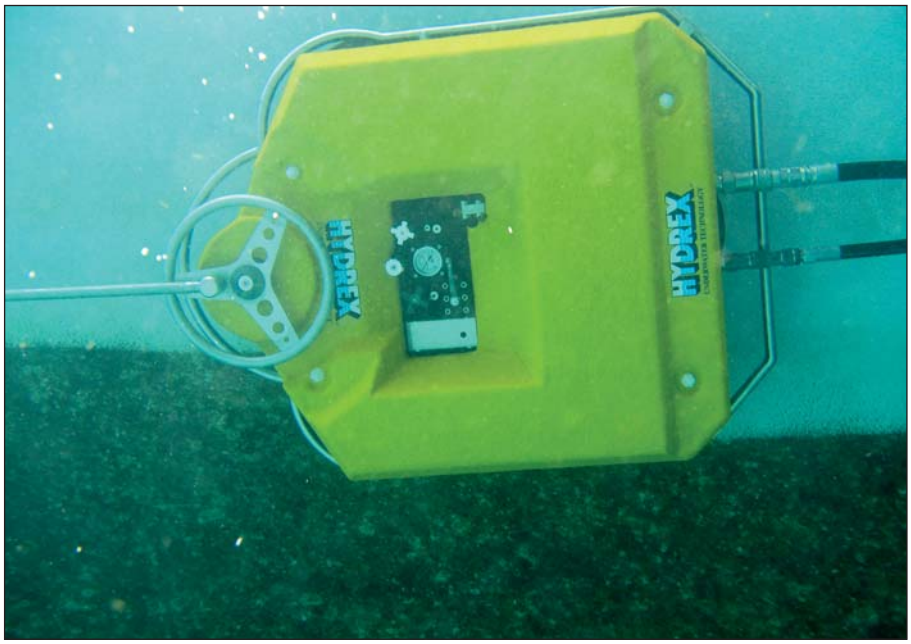
ECOLAST®
LONG TERM UV RESISTANT

Hull biofouling environmentally more damaging than ballasting

Subsea Industries' coatings can be cleaned underwater without impacting the environment.

The entry into force of the Ballast Water Convention this September will not prevent the transfer of invasive aquatic species (IAS) unless there is mandatory legislation in place to prevent biofouling on ships' hulls.

Commenting on a presentation delivered at the World Ocean Council's Sustainable Ocean Summit in December, in which IMO Marine Environmental Division's Technical Officer Dr Theofanis Karyannis revealed that hull biofouling could be more damaging than ballast water transfer, Subsea Industries' Chairman Boud Van Rompay said: "The transfer of IAS in ballast water has been addressed with the ratification of the BWM Convention, but currently there is no legislation to prevent the transfer of IAS on ships' hulls though fouling, only guidelines."



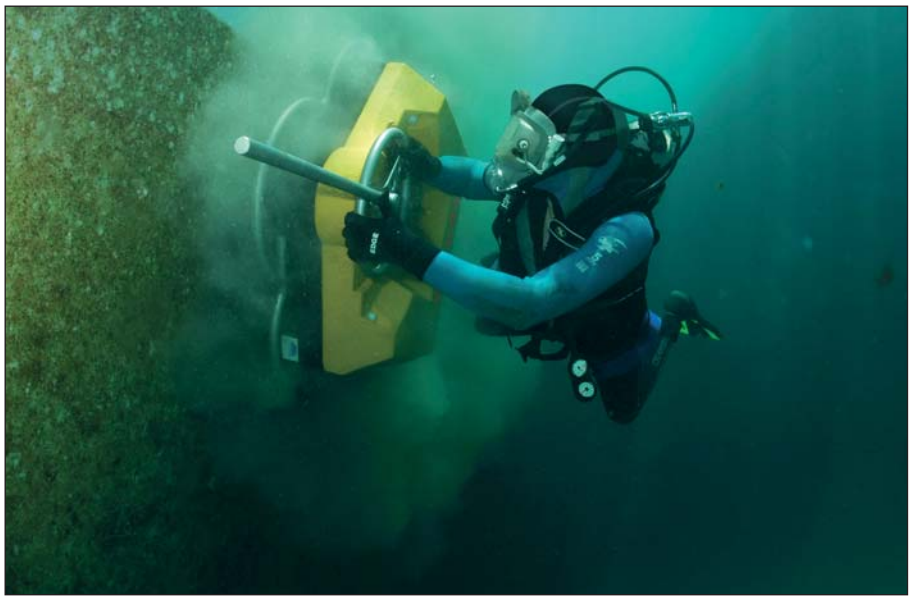
Unlike biocidal coatings, the in-water cleaning of hard inert coatings is permitted in most of the world's ports and harbours.

Indeed, while there is ongoing evaluation of the Biofouling Guidelines set out in MEPC.1/Circ.811, there has been little support from IMO Member States for a new mandatory instrument to reduce the impact of bioufouling. Aside from the guidelines, the issue of biofouling is thought not to be on the agenda of the MEPC or any other IMO body.

There has been a number of studies comparing the transfer of IAS through ballast with that transferred by hull fouling, with some studies concluding that hull fouling is more environmentally damaging than IAS relocated through ballasting operations.

In his paper *Building Partnerships to Address the Global Impacts from Aquatic Biofouling*, Dr Karyannis revealed a number of areas where hull biofouling was the primary factor for IAS.

In New Zealand, for example, biofouling was found to be responsible for 69% of IAS as opposed to just 3% from ballast water. In Port Phillip Bay, Australia, 78% of IAS reported was from ships' hulls with 20% from ballast water. In the North Sea it was



The line of hard coatings produced by Subsea Industries is 100% environmentally safe.

Studies have concluded that hull fouling is more environmentally damaging than IAS relocated through ballasting operations.

The only real answer to preventing the spread of IAS is by ensuring that ships sail with a clean hull from their point of origin.

57% over 38% and in US waters, hull biofouling accounted for 36% of IAS compared to 20% from ballast water.

"The IAS threat is increasing especially because antifouling systems in use since the ban on tributyltin (TBT) are less effective in eliminating hull fouling," said Van Rompay. "Some species have developed a resistance to copper biocides and are thriving in ports and harbours where copper and organotin residues are high."

According to Van Rompay, frequent in-water hull cleaning of a hard, inert coating is the key to preventing IAS translocation, since the removal of micro- and macro-fouling acquired locally poses no risk whatsoever.

However, there is a dichotomy in that the in-water cleaning of biocidal antifouling systems is banned in many ports and harbours around the world as the chemicals in these coatings pose an environmental hazard of their own. Cleaning macro-fouling from these hulls also damages the coatings.

"The only real answer to preventing the spread of IAS is by ensuring that ships sail with a clean hull from their point of origin. Only a non-toxic hard-type coating and regular in-water cleaning can achieve this. Indeed, many ports and harbours permit the in-water cleaning of this type of coating system. Effective biofouling control is also the most efficient way of reducing fuel consumption and greenhouse gas emissions," Van Rompay said. ■

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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