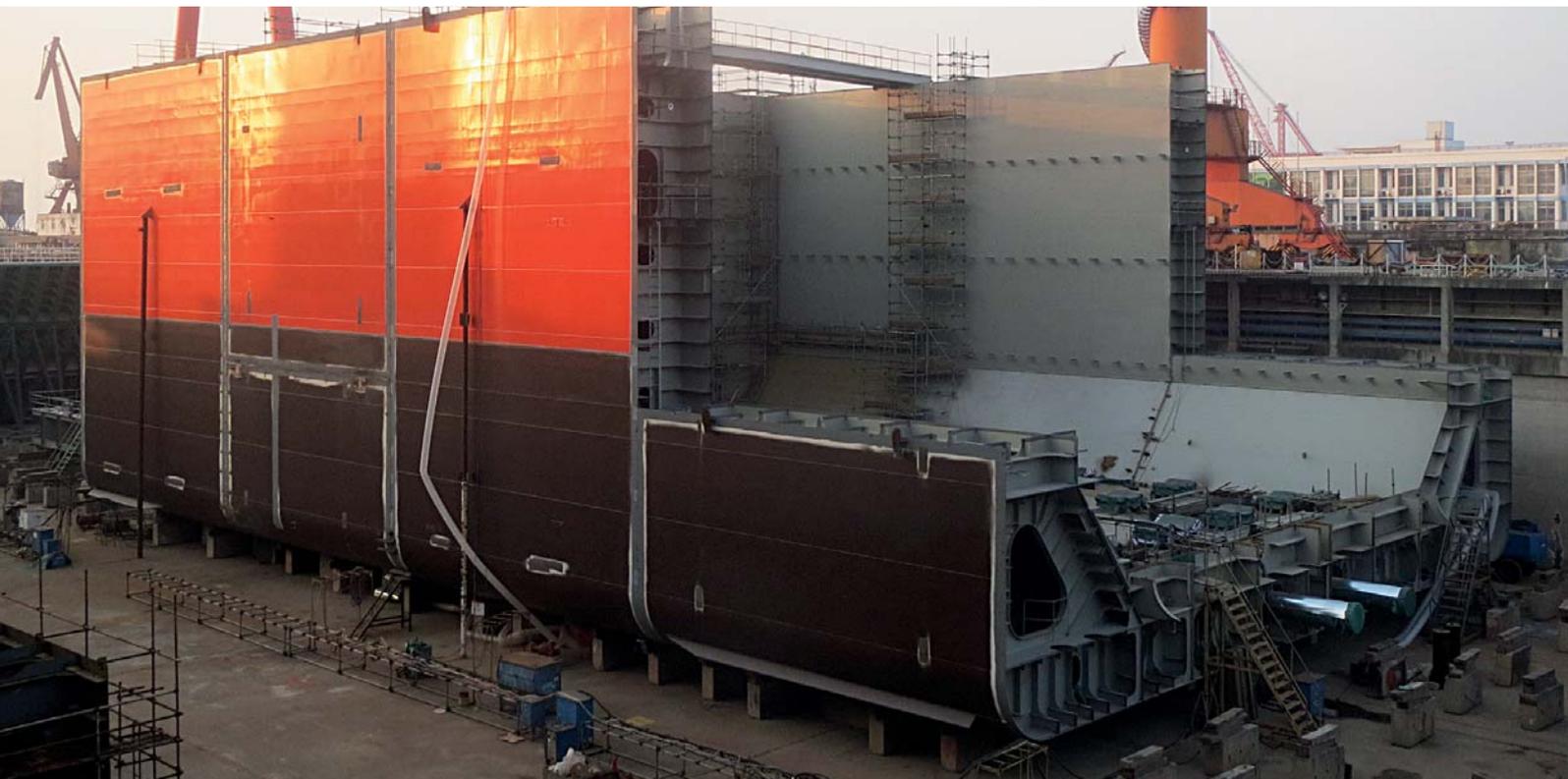


SUBSEA

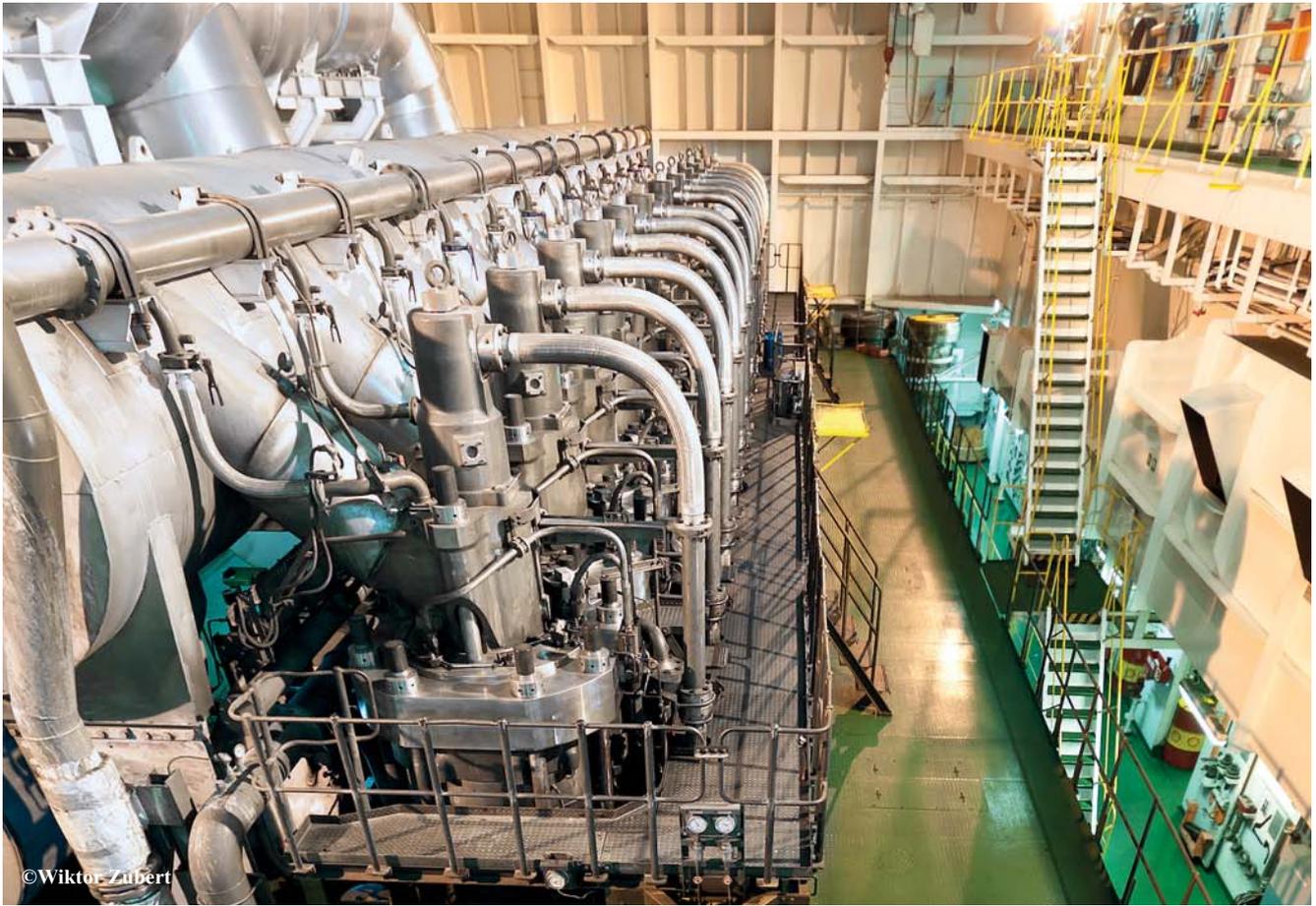
PROTECTION AND PERFORMANCE

NEWS

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The only hull performance system that gives your engine a break

Ecospeed provides your vessel with long-term protection and dramatically improves the ship's performance.

An impermeable and extremely tough coating is combined with an underwater cleaning system. This keeps the hull roughness at an optimum level and results

in a major saving in fuel.

Ecospeed gives a very thorough and lasting defense against cavitation and corrosion damage for a ship hull's entire service life. The coating comes with a ten year guarantee. No repaint will be needed during future drydockings.

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10 year warranty on Ecolock for FSRU in China

In the second half of 2015 application of Ecolock started on a newbuild Floating Storage and Regastification Unit (FSRU) in China. This is the second project carried out for EXMAR nv, after the application on the *Caribbean FLNG* in 2013.

Like the first project, the FSRU is built in blocks. These blocks are coated individually before assembly, leaving only the weld seams and the areas inaccessible due to the support blocks to be painted after the barge is assembled. The Ecolock system consists of a single, homogenous covering of the steel. Painting over weld seams after the blocks have been assembled is very easy. It leaves a smooth finished surface and the erection joint paint blends in perfectly with the coating of the rest of the hull.

As with all Ecolock applications, a trained and qualified paint inspector is on site monitoring the entire preparation and application to ensure adherence to the specifications at each step of the process and to assist with any problems that may



One of the blocks of the FSRU being transported.

arise. This is essential for a coating that is intended to last the life of the ship. Ecolock comes with a warranty as long as it is standardly applied and if the coating is maintained according to the specifications.

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.



Application of Ecolock on the blocks of the FSRU.



Finished application on one of the blocks.



Blocks of FPSO being assembled.



Coating the weld seams after the blocks have been assembled is very easy and leaves a smooth finished surface.

Application

Application of Ecolock can be done at newbuild or, to replace another coating, in drydock after the vessel has been in service. The newbuild option is ideal. In either case the surface preparation requires a profile of at least $75\mu\text{m}$ and white or near-white steel (SA 2.5 or better). Once the preparation has been carried out and inspected, Ecolock can be applied rather rapidly. No primer or other type of coating is required. Just two or more coats of Ecolock each of $500\mu\text{m}$ with an overcoat time of about three hours minimum and no maximum.

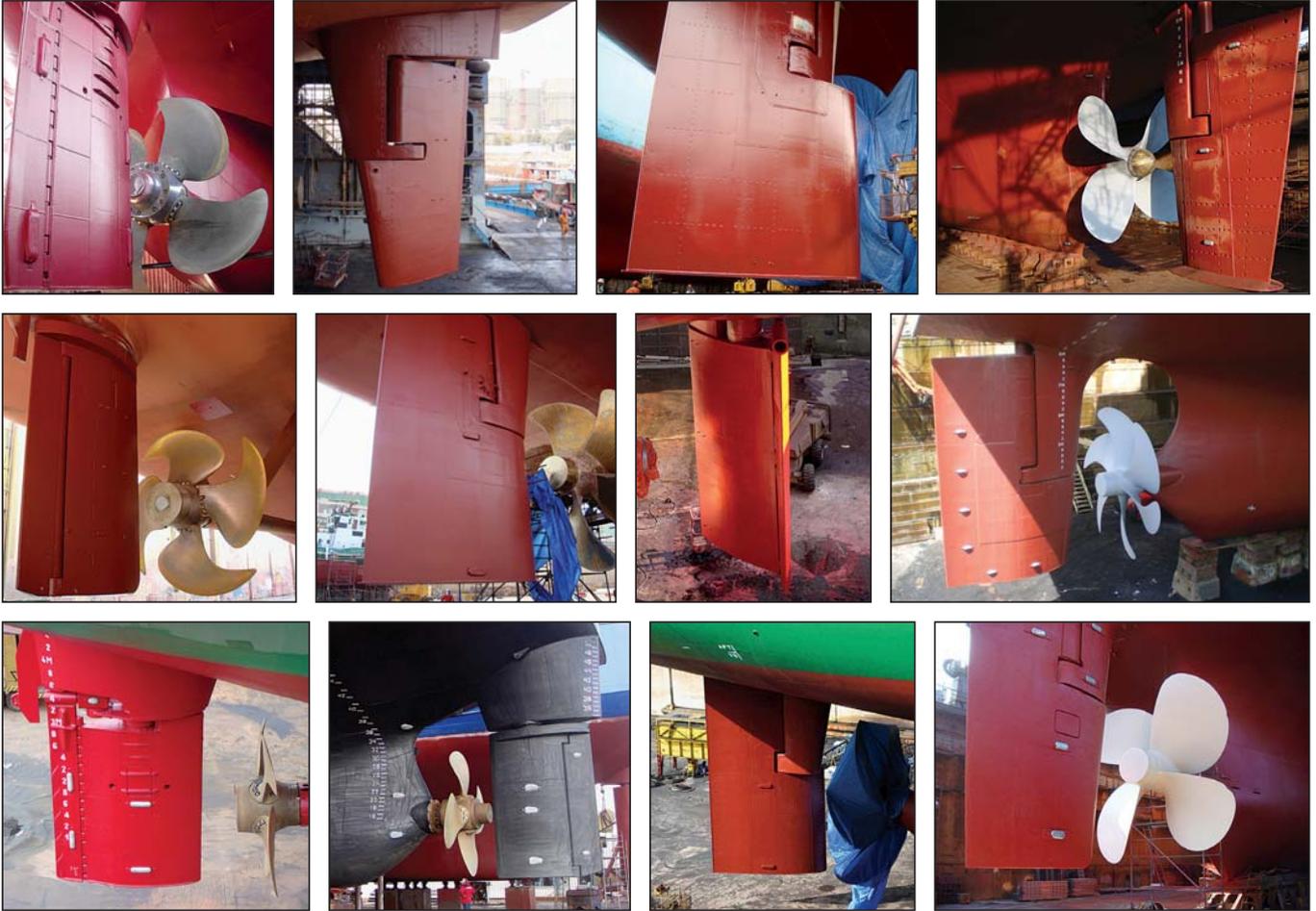
Non-toxic

Ecolock is completely non-toxic. It is a hard, impermeable coating which even the toughest barnacle will not penetrate. This is in direct contrast to antifouling or foul-release coatings. Barnacles and other fouling organisms attach and penetrate those coatings right through to the steel permitting the start and spread of corrosion. In the case of Ecolock the barnacles, coral and other fouling organisms can be removed completely by divers using special equipment, leaving no trace and restoring the coating to its original condition. And because it is non-toxic, it is safe to clean the Ecolock coated hull when needed for UWILD or simply to reduce the weight when too much fouling has accumulated. This can be done even in sensitive waters.

The application on the FPSO is scheduled to be finalized later this year with a planned delivery of the unit not much after. ■

ECOLOCK®
LIFETIME CORROSION PROTECTION

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

Ecospeed application on exhaust scrubber of roro vessel in Sweden

At the start of 2016 the inside of the scrubber of a roro vessel was coated with Ecospeed in Landskrona, Sweden. The scrubber is located in one of the ballast tanks of the vessel. A lasting, chemical resistant coating was needed that could withstand the process of filtering out the hazardous pollutants of the exhaust gasses.

Exhaust scrubbers are systems that filter out all harmful toxins from exhaust gasses of marine diesel engines. This scrubber removes nitrogen oxides, sulfur oxides, hydrocarbons, heavy metals, carbon monoxide, soot and ashes. As a result no pollutants are discharged into sea. This minimizes the environmental footprint and impact of navigation in ports and coastal areas.

Several benefits make Ecospeed the perfect choice as coating for the interior of the scrubber.

1. Ecospeed lasts the lifetime of a vessel. No repaints will need to be scheduled during future dockings of the ship. This saves on time and money.
2. Ecospeed is a TBT-free, copper-free and biocide-free solution. Independent research proved that the coating is 100% toxin-free and that there is no negative effect on the water quality or the marine environment at any point of its application or use.



The exhaust of the scrubber system seen from the outside.

3. Ecospeed has been given a B1 classification by Det Norske Veritas AS after testing the coating's suitability as a ballast tank coating. B1 is the superior grade in a six grade classification system.
4. Ecospeed is highly chemical resistant. Taking into account the nature of the process taking place inside the scrubber, this was essential for the customer.

Because of the tightening regulations on emissions in the shipping industry, the installation of an exhaust scrubbers system becomes increasingly widespread. A durable coating to protect the inside of these scrubbers is needed. Ecospeed fits in seamlessly with the environmental idea behind the systems. ■



Application of Ecospeed on interior of scrubber system.

ECOSPEED®
SHIP HULL PERFORMANCE TECHNOLOGY

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 offered separately or supplied with a complete support system including umbilical, tools and hydraulic power unit.



MC 111

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.



MC 131

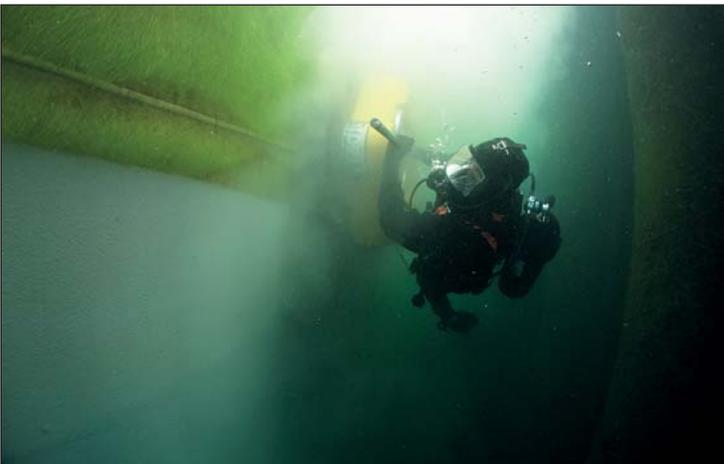
The MC131 is a compact unit designed for cleaning all kinds of marine fouling from yachts and smaller ships to offshore oil & gas platforms. The brush rotation speed is adjustable by the diver so as to achieve an optimum hourly cleaning rate.



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