



**Ecoshield permanently protects rudders and running gear from cavitation erosion and corrosion**



# ECOLOCK® ultra long-lasting protection for offshore hulls



**E**colock 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.

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# Ecoshield permanently protects rudders and running gear from cavitation erosion and corrosion

**C**avitation damage, erosion and corrosion can wreak havoc on rudders, propellers, Kort nozzles, thruster tunnels, energy saving devices and other running gear.

Traditional protective coatings, even when bolstered by sacrificial anodes, may hold up for a while, but it is not long before the cavitation destroys the coating, exposing the steel, and pitting and corrosion appear.

In extreme cases the whole rudder can disappear. Usually rudders, thruster tunnels, nozzles and other running gear become badly pitted and require repair, either underwater with the ship afloat, or at the next drydocking. This can be very expensive and cause delays.



*Cavitation from a propeller.  
Photo: U.S. Navy, Public domain, via Wikimedia Commons.*

This damage to the vessel's rudder and running gear has become a way

of life for many shipowners and shipyards, with no permanent solution in sight.



*Cavitation often causes a problem inside thruster tunnels. Ecoshield is the best solution to this.*

In-water welding repairs are costly. Time in drydock is extended with each day the ship is laid up, costing the owner/operator not only the drydock fees but the greater expense of having the ship out of active service.

This situation with rudders and running gear has continued since propellers and metal rudders were first introduced. The rudder in particular, because of its position directly behind the propeller, has been prone to the damage caused by cavitation. This is also the case for the inside of thruster tunnels where the propeller of the thruster is constantly creating cavitation.





*Lack of proper protection of the rudder can lead to serious damage and sometimes the need for emergency repairs out of drydock.*

Many solutions have been tried but with little success. A real solution to cavitation damage would save shipowners/operators a great deal of money, time and worry.

### Meet Ecoshield...

What has been missing generally in the solutions that have been attempted, is the ability to entirely isolate and insulate the steel or other substrate from the forces that cause so much damage. Conventional hull paint simply will not do this. The parts of the underwater ship that are particularly subject to cavitation damage and corrosion need special treatment.

What has been lacking is a thick,

glass-reinforced composite that forms an impenetrable barrier to the forces of cavitation, erosion and corrosion. This ensures that the substrate cannot be reached, let alone damaged.

The barrier used must be able to flex as the substrate flexes. The high content of large aspect ratio glass platelets is what provides the impenetrable barrier. The resin bonds them very strongly to each other and to the substrate. This, along with some secret ingredients, is Ecoshield.

Over a thousand applications on ships' rudders, Kort nozzles, thruster tunnels, energy saving devices, stabilizer fins, bulbous bows, boot tops and other parts of the underwater

ship are a testimony to the long-lasting protection provided by Ecoshield.

### ... and Ecofix

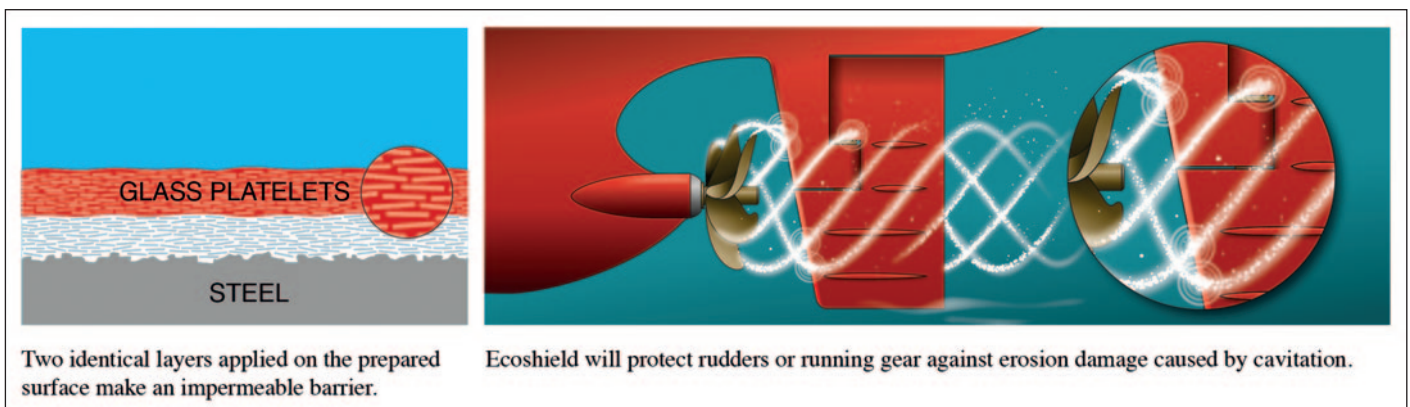
Ecofix is a compatible filler that can be used in combination with Ecoshield, the ultimate rudder protection coating. When a rudder or other piece of underwater ship gear has not been properly protected, the surface will become corroded. Cavitation damage can cause severe pitting. The steel needs to be restored to its original shape with a smooth surface prior to recoating. Ecofix can replace costly and time-consuming welding repair in many cases.

Ecofix has the same basic chemical composition as Ecoshield, so the two form an invincible pair for rudder repair and protection.

### Use and application

#### 1. Newbuild

- Ideally applied at newbuild so that the rudder and other running gear remain in pristine condition for the life of the vessel. Easier to apply during construction, avoiding the time pressure of drydock.
- Can and should also be applied at next drydocking on rudders and running gear that are already in service.



Two identical layers applied on the prepared surface make an impermeable barrier.

Ecoshield will protect rudders or running gear against erosion damage caused by cavitation.

*Ecoshield illustrated.*

- Stays on for the life of the vessel without need to repaint.
- If mechanical damage occurs (anchor chain or collision) the bonding is so strong that under-creep will not occur.
- At most, minor touch-ups will be required during routine drydocking.
- Surface must be grit-blasted to produce a profile of at least 75µm and SA 2 ½ cleanliness.
- Slots welds can be filled with Ecofix prior to Ecoshield application.
- Airless spray, single feed. Requires no special equipment or conditions.

## 2. Drydock

- Same surface preparation as in newbuild application.
- Rudder or other running gear already damaged and pitted can be filled with Ecofix, a compatible, permanent filler. Ecofix can replace welding repair in many cases.
- Applied directly to prepared steel, no primer. Final DFT usually 1000µm but can be 1500µm depending on requirements (500µm per coat with a 3-hour overcoat time).
- The Ecoshield bonds perfectly to the Ecofix as the basic chemistry is the same.
- The result is a new, indestructible surface for the steel, other metal or GRP.
- Many users have found that sacrificial anodes are no longer required.
- Ecoshield comes with a 10-year warranty.

## Results

“After high pressure washing in drydock we saw that no repair of the Ecoshield was needed on rudders



*A. The rudder of a large container ship after 5 years of sailing with only conventional hull coating for protection.*



*B. The same rudder after 10 years of sailing with Ecoshield. The coating has not been replaced. Seen here after being washed off in drydock.*

that were coated 9 or 10 years ago... Compared with conventional coatings, we save somewhere between one and three days in drydock per ship... We are planning to apply Ecoshield on the rudder blade, bow thruster tunnel, energy saver and also the scrubber outlet on all our upcoming newbuilds.”

Coating Performance Specialist, SEASPAN (one of the many major shipping lines who have discovered

Ecoshield and are applying it to rudders and running gear of ship after ship in their fleet).

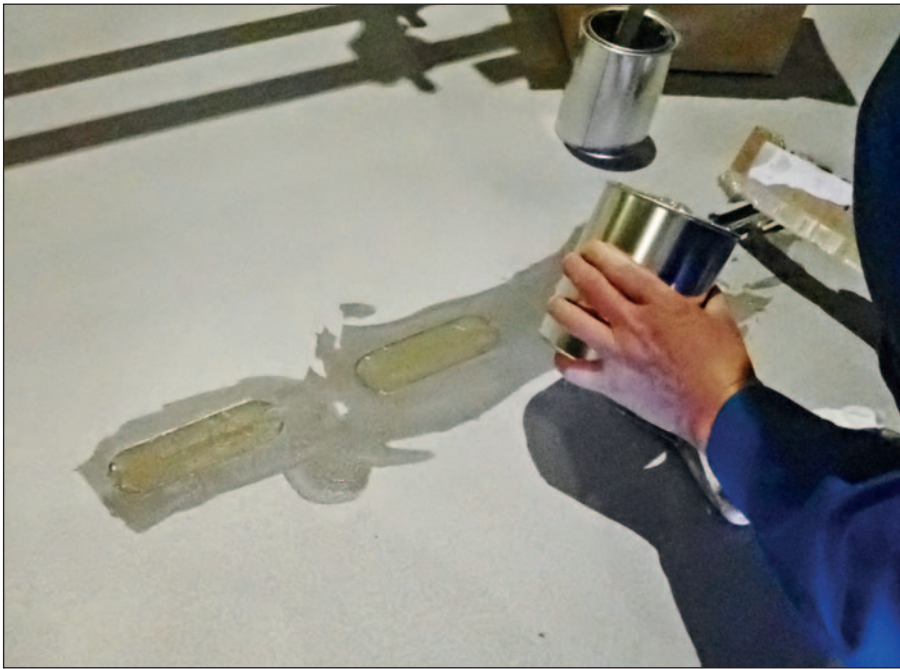
## An independent coating inspector

“In SCICON worldwide’s 25+ years of inspecting a wide range of ship coating projects as an independent coating inspection and consulting company, we can honestly say that we have never come across a prod-



*Ecofix is a filler which is compatible with Ecoshield and used to repair pitted surfaces prior to Ecoshield application. Overcoat time is 1 hour.*





*Ecofix can be used to fill slot welds at the new build stage so that the rudder has a smooth surface.*

uct equal to Ecoshield. Not only does the 1000 µm of glass-platelet reinforced coating provide for excellent barrier corrosion protection, but more importantly (and that's where we have seen many 'similar glass-flake' coatings fail) outstanding resistance against long term cavitation and mechanical impact (ice, debris, etc...). In that respect, Eco-

shield really is in a class of its own." Gunnar Ackx, Managing Director [www.sciconworldwide.com](http://www.sciconworldwide.com) NACE Level III Certified Coating Inspector

### **A thruster OEM**

"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 and pushboats operating in shallow waters. We can see a really big improvement. Thrusters 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 harbor tugs and passenger vessels."

Frank van der Vegt, Area Sales Manager ZF Marine Krimpen

### **Superintendent of a ro-ro fleet**

"None of the rudders have sustained any further cavitation damage [they were coated starting in 2004]. They have been touched up where the paint was chipped or scraped, but the cavitation damage to the rudders ended with the first application of Ecoshield. In general everybody is looking to be in drydock as short as possible and to get all the work done as quickly as possible. 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 Ecoshield on the rudders, we would certainly have extensive work to do in drydock. Even replacing the doubler plates is a lot of work."

Superintendent, Ernst Russ

### **Conclusion**

Ecoshield is a very simple, tried and tested solution to the age-old problem of how to protect the rudder, propeller and other running gear of a ship from the destructive effects of cavitation. ■



*Ecoshield being used at the newbuild stage to provide lifelong protection to a rudder.*





*Well over 1000 Ecoshield applications to rudders and running gear testify to the coating's effectiveness in protecting these underwater ship parts from cavitation erosion.*



# SUBSEA

PROTECTION AND PERFORMANCE



**S**ubsea 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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