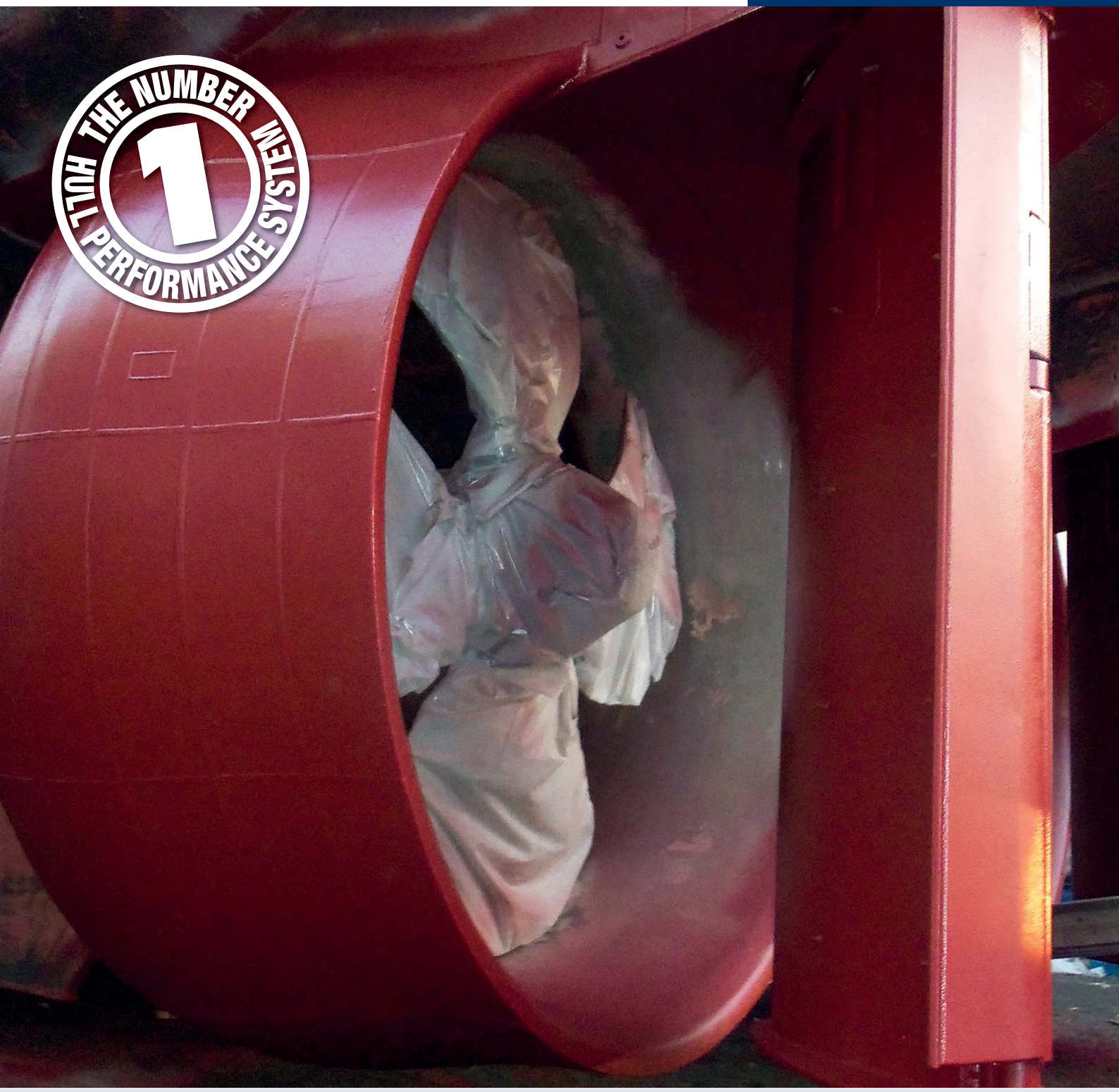
ECOSPEED®

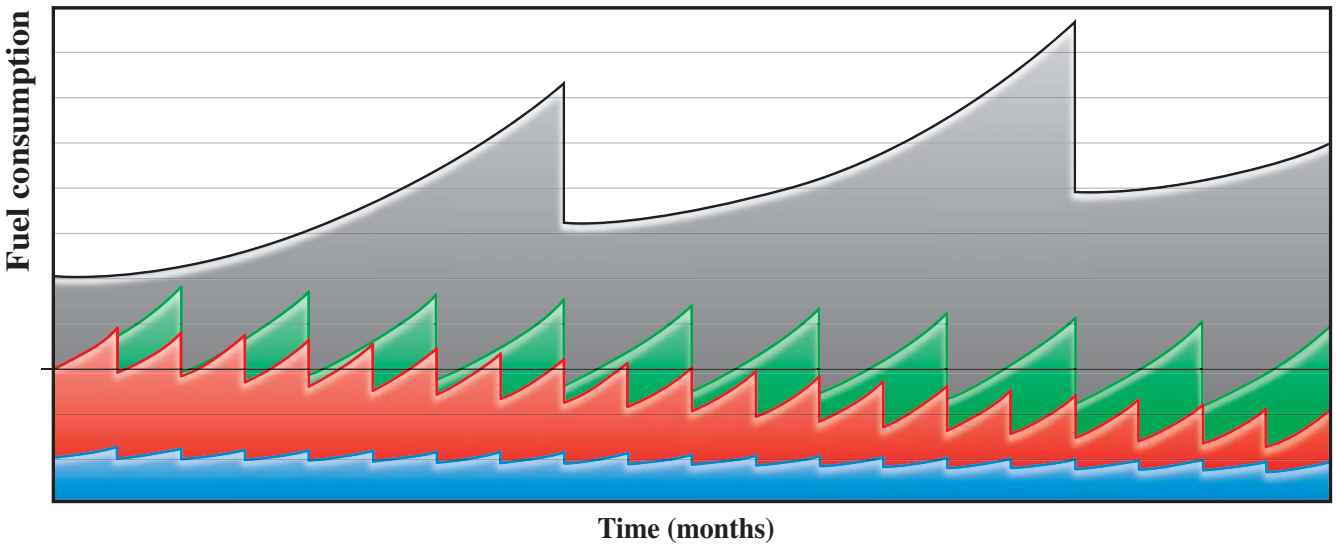
SHIP HULL PERFORMANCE TECHNOLOGY

NEWS LETTER



Millions in fuel savings

Development of additional fuel consumption over time



Ecospeed with 2 cleanings per year
Ecospeed with 4 cleanings per year
Ecospeed with optimum cleaning intervals
Active antifouling paints

Most ships sail with a chartering contract that includes a penalty clause if fixed distance/fuel consumption ratios are not met. However, this is unpredictable with regular paint systems and will also worsen over the years. The ship becomes more expensive and profits are reduced.

The protective Ecospeed ship hull performance technology however not only keeps the ship's performance stable but even improves it with repeated underwater maintenance. The coating is designed to be cleaned routinely with specially designed underwater hull cleaning tools. These simultaneously clean and improve the smoothness of the paint surface. This avoids penalties as well as producing enormous fuel savings.

One major cruise line has been quoted as saying that they are saving 10% on fuel costs with Ecospeed compared to the earlier TBT coating which they replaced. Another cruise ship found that they gained 1.5 knots over sea trials speed when they replaced their hull coating with Ecospeed.

Contact us to find out how Ecospeed can help you achieve major fuel savings.

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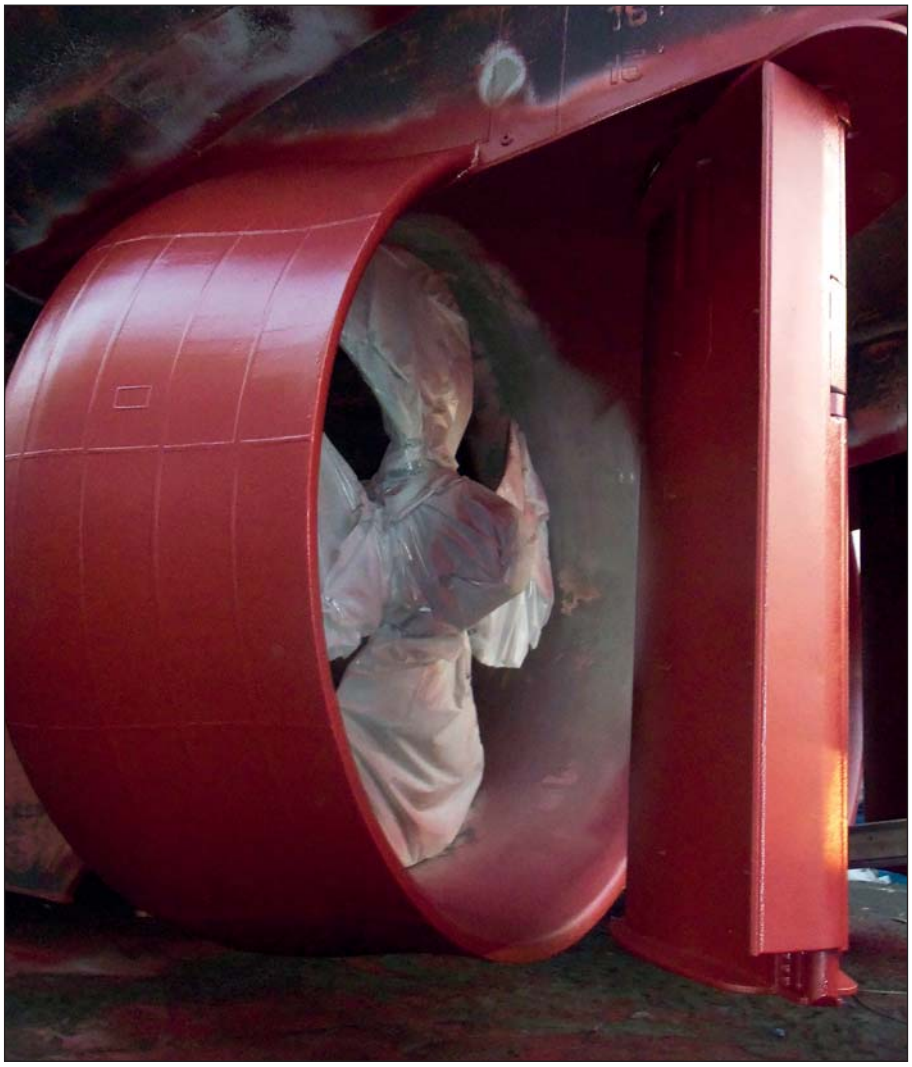
Ecoshield running gear protection brings large savings

Over the last two months the rudders of several types of vessels were given an Ecoshield protective coating at yards in China, the US and Turkey. These ships include an oil tanker, a tug boat, a general cargo vessel and several newbuild container ships. The owner of the container vessels decided to give the rudders of his new ships the best possible protection from the very start. This decision was made after he saw the excellent result achieved with Ecoshield on his other vessels.

Rudders and propeller nozzles of tug after application of first layer.



All running gear can benefit greatly from Ecoshield's lasting protection.

Before Ecoshield was launched, the problem of cavitation damage to rudders remained unsolved. Cavitation caused erosion, pitting and sometimes complete failure, necessitating very expensive repairs or replacement. The need for repair to rudders, involving welding and resurfacing in drydock has been almost universal. The cost of rudder maintenance and the safety hazards connected with worn and failing rudders are out of proportion to the relatively small surface area involved. Efforts to solve this problem have taken the form of redesigning the rudder, changing its position relative to the propeller, trying various materials including stainless steel, metal facing the surface, cathodic protection and a variety of coatings. But the problem has persisted.

Ecoshield puts an end to these problems. The coating is a specially reinforced version of the well-known Ecospeed non-toxic underwater ship

After surface preparation, Ecoshield is applied in two layers.

Application of second layer on general cargo vessel's rudder.

Ecoshield will protect rudders for the rest of their service life.

hull coating which is designed for the entire underwater hull of any ship or boat. Small but significant variations of the Ecospeed formula have been tested on rudders since 2002 with extraordinary results. Ships that were experiencing heavy cavitation damage to their rudders have seen no further cavitation damage erosion once the glassflake coating was applied. Some of them have been sailing for as long as 10 years after application with no sign that the coating will need replacement during the life of the ship.

Protection from day one

Protection of the running gear of your vessel is best begun at the newbuild phase. When a vessel comes into drydock, maintenance of its stern area, especially cavitation damage repair, can take a long time. There are strict procedures concerning blasting, painting, welding and propeller and stern tube seal work. Painting is then assigned to the end of the schedule. As a consequence it may be rushed or not done at all or else prolong the stay in drydock.

With an Ecoshield application one can avoid these problems from day one because the underwater gear will not need to be repainted during future drydockings. Ecoshield will remain intact for the lifetime of the vessel. It is guaranteed for ten

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With Ecoshield you will not have to worry about mechanical repairs like this.

Overcoating time is very short. For smaller surfaces application is usually one single day.

No repaint will be needed during future drydockings.

years. At the most, quick and easy touch-ups amounting to less than 1% of the surface area will be required. Planning the maintenance of the vessel's stern area therefore becomes much easier.

The newbuild phase is the perfect time to apply Ecoshield, as the owner of the container vessels understood. The coating can however also be used to protect vessels that have been in service for some time and are already facing cavitation and corrosion damage, like the other rudders coated over the last months.

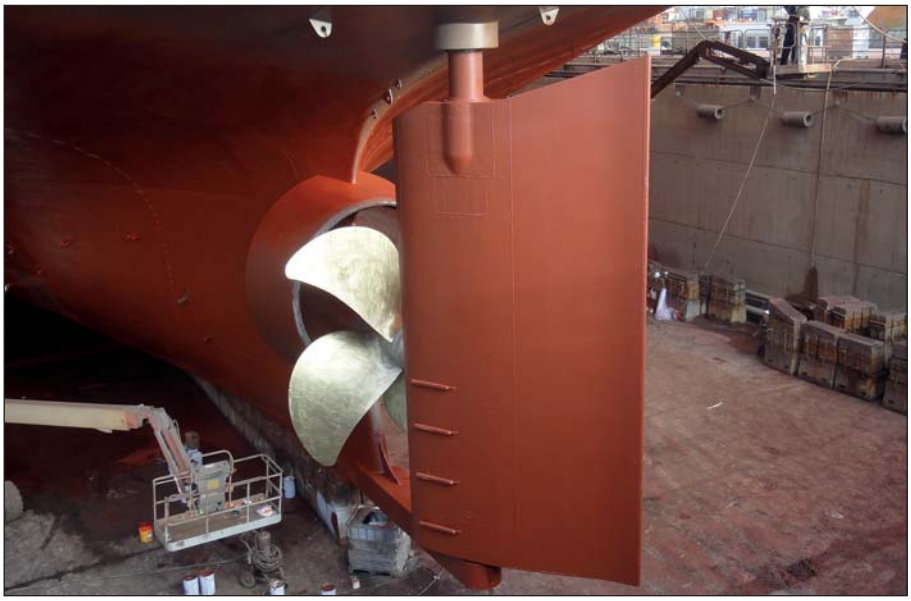
Ecoshield's flexibility makes it easy to adapt the application schedule to the rest of the activities scheduled at the shipyard or drydock in a way which does not interfere with them. Overcoating time can be as short as three hours, which means that for smaller surfaces such as rudders or bow thrusters the two coats required can usually be applied in one single day.

Lasting protection, lasting savings

With an Ecoshield application no repaint will be needed during drydocking. It is the only coating known to fully protect a rudder from all cavitation damage.

The smoothness attained by the coating also provides optimum hydrodynamic conditions. This allows rudders to operate at maximum efficiency. The ship's performance therefore remains stable. This brings tremendous savings for the owner.

Ecoshield is also ideally suited for other areas prone to cavitation erosion or other damage, such as propeller nozzles, thruster tunnels, the bulbous bow or stabilizer fins. For



The rudder and nozzle of this oil tanker will not suffer cavitation damage anymore.

Rudders can suffer from corrosion damage much worse than this if not protected properly.

this reason both the tugboat and the oil tanker had their nozzles coated.

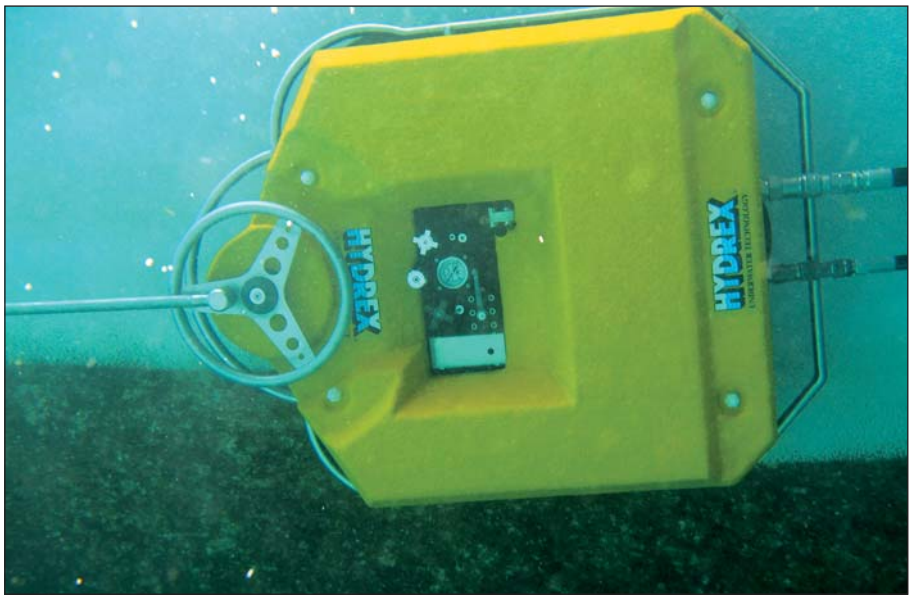
Conclusion

If one takes into account the costs of the temporary underwater repairs and the regular inspections required by a condition of class until the next drydocking, it becomes clear that the investment in a coating system that offers extra protection from day one is very easily won back. For this reason more and more owners have Ecoshield applied on the rudders and other running gear of a large part of their fleet or have it included in the rudder specs of their newbuild vessels. These owners invest in the right coating system for protection because they know the savings that will result.

A White Paper with full details about protecting rudders and running gear from cavitation damage is available in the Publications/Papers section of www.shiphullperformance.org for free download. ■

Ecospeed, the coating for ultra long lay-ups

As a consequence of the current economic climate, more and more ship owners are forced to lay one or more of their ships up for longer periods. This has, however, no adverse effect on an Ecospeed coating which can always be restored to its optimum condition, regardless of how much fouling has attached itself to the hull while the vessel has been laying idle.

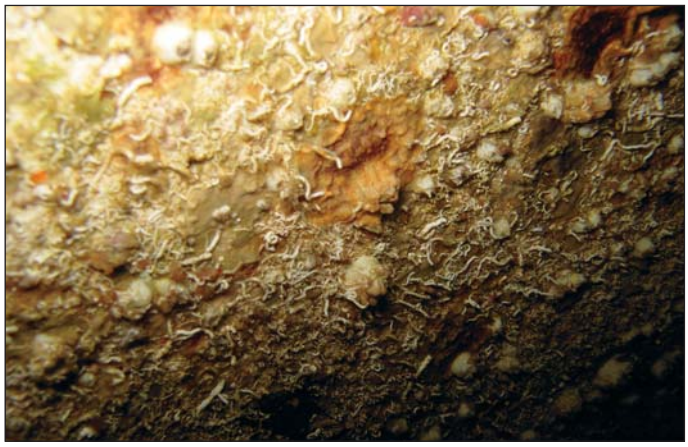


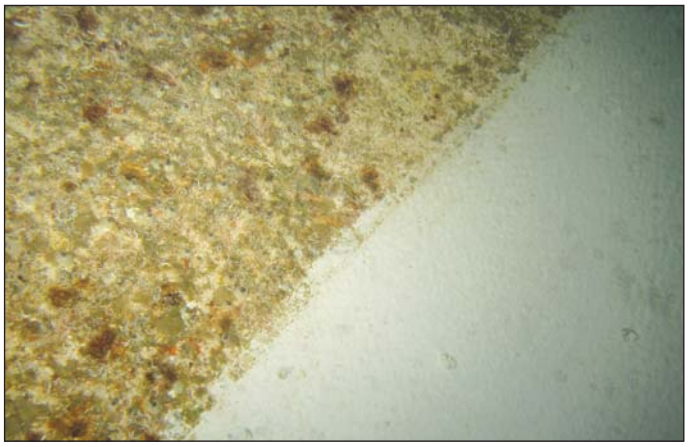
Even after long stationary periods the underwater hull of a vessel coated with Ecospeed can easily be cleaned underwater.

Ecospeed is ideally suited for ships during lay-ups because of its impermeability. This gives the coating its excellent and durable anticorrosive properties and protects the underwater hull against damage caused by any type of marine fouling. Despite the aggressive nature of certain types of fouling, no rust or damage to the steel will be present on the underwater hull of the vessel after cleaning.

This is illustrated by a cruise ship that remained stationary in the Caribbean for seven months after it was coated with Ecospeed. After this period the coating's qualities allowed a complete removal of all fouling from the underwater hull of the vessel during an underwater cleaning without causing *any* damage to the underlying paint layers.

The coating's properties totally prevent fouling penetration, making the cleaning process extremely easy. It can be performed underwater or with controlled high pressure tools in drydock and can be repeated whenever needed during the vessel's lifespan without causing damage or deterioration in quality. The coating's surface characteristics even significantly improve with each underwater hull cleaning. This unique quality gives ship owners the opportunity to have their ship operational again and its hull restored to its optimum condition whenever needed without any additional financial setback.


Thick layer of fouling on cruise ship after laying idle in the Caribbean for seven months.


Fouling removal from cruise ship without damage to the Ecospeed coating.

Save millions in drydock expenses and off-hire time

Hull of cruise ship after 5 years with Ecospeed coating with no replacement or major repair. This is the state of the hull when the ship came out of the water, without any cleaning or touch-up in drydock.

When your hull coating never needs replacing or major repair, you can save a lot of money in drydock fees, off-hire time, materials and labor.

Most hull topcoats are designed to be replaced once or twice every five years. The full hull coating scheme has to be fully replaced every 10 - 15 years down to bare steel. Over that time period, the coating degrades and becomes rougher until it's no longer worth trying to patch it up. And it costs you a fortune in fuel to compensate for the additional hull friction.

Imagine a coating that's guaranteed for 10 years and is expected to last 25 without replacement or major repair. A coating that gets smoother over time, not rougher.

Imagine coming into drydock after 3 or 5 years and finding that your hull coating only requires a few minor touch-ups and doesn't even need to be washed off.

Just think how much money you will save.

Call us today for a quote to convert your hull to Ecospeed or start off right, with Ecospeed, on a new build.

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