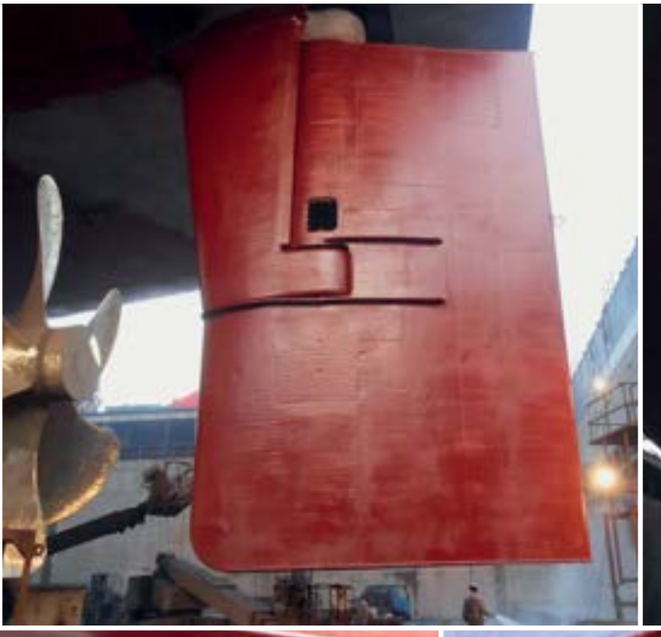
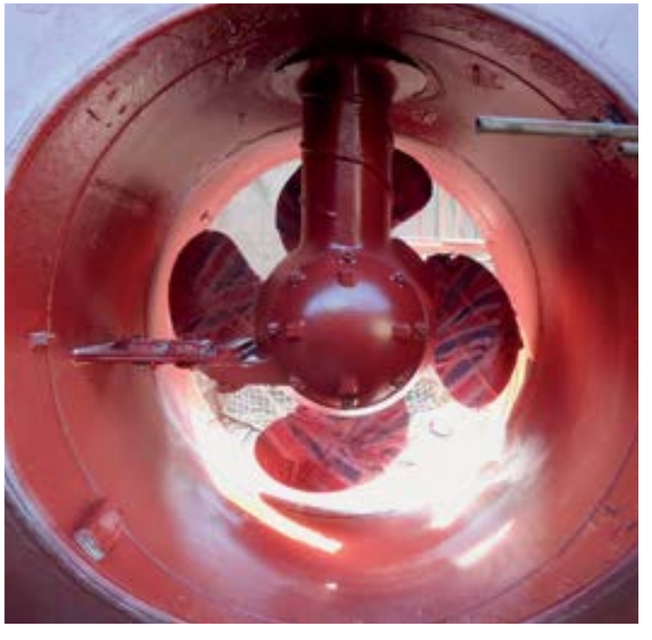
ECOSHIELD®

THE DIAMOND STANDARD IN STEEL PROTECTION







Subsea Industries, a Hydrex company, has developed the ultimate rudder protection coating, Ecoshield, for permanent protection against cavitation damage for rudders. The glassflake reinforced coating protects the rudder for the service life of the ship without need for recoating or major repair and comes with a ten-year guarantee. Ecoshield is also suitable for bulbous bow, stabilizer fins, thruster nozzles and other underwater ship gear which needs special protection from corrosion.

Until now, the problem of cavitation damage to rudders, causing erosion, pitting and sometimes complete failure, necessitating very expensive repairs or replacement, has remained unsolved. 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.

Now a very durable, tough, long-lasting glassflake resin coating is putting an end to these problems. Ecoshield is a specifically reinforced version of the well-known Ecospeed non-toxic underwater ship 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, once the glassflake coating was applied, have seen no further cavitation damage erosion for as long as 10 years after application, with no sign that the coating will need replacement during the life of the ship.

Ecoshield is designed to be applied at newbuild (best) or in drydock for ships already in service. Application is simple. It requires blasting to create a 75µm profile and a surface preparation of SA 2.5 or SP 10 and then the glassflake paint is applied in two coats to a thickness of at least 1000 µm DFT, with an overspray time of about 3 hours minimum and no maximum. The heavy glass content of Ecoshield insulates the rudder or other part, making cathodic protection systems including sacrificial anodes virtually unnecessary, as evidenced by the very little wear on the anodes when a ship's rudder, coated in this way, is inspected in dry-dock and by the fact that an impressed current can be turned right down with no ill effect.

Evidence of the success of the new product is the number of companies who began by coating one rudder experimentally and who, after seeing the results in service, have ordered this coating for the rudders on other ships with plans to convert their entire fleet. Shipowners who have previously applied Ecospeed to rudders on ships in service are specifying the coating for the rudders and other underwater gear on their newbuilds.

Ecoshield comes with a ten year guarantee. It is the only coating known to fully protect a rudder from all cavitation damage.

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

State of rudder of ro-ro ship in 5 years after it was built in 1999. The rudder was blasted and coated with Ecoshield (then Ecospeed) in 2004. Due to time constraints the pitting was not repaired before application.

The same rudder 7 years after the original Ecoshield application. No repair of the rudder has been done during that time. No recoating with Ecoshield was needed. The rudder showed no further cavitation damage in that time. (It has been repainted for cosmetic reasons only.)

"Since painting the rudder with Ecospeed (Ecoshield) in 2004 we have had no more cavitation damage. We went on to coat all four sister ships due to the excellent performance."
Grzegorz Girhat, Superintendent over 5 ro-ro ships, Ernst Russ.

Wide range of vessels given lasting Ecoshield rudder and gear protection

Recently the rudders of several types of vessels were given an Ecoshield protective coating at yards in China, the US, Poland and the UK. Among them were three container vessels, an oil tanker, a tug boat and a vehicle carrier.

Most of these ships belong to different owners, but they all experienced the same problems. Cavitation corrosion damage had appeared on the rudders of their ships. Often a rudder is not given the proper protection against cavitation and the resulting erosion and corrosion damage. In those cases the financial consequences can be extensive for the owner.

Tests in a flow channel, carried out in Grenoble, have confirmed that Ecoshield performs extremely well under severe cavitation. The coating will prevent corrosion damage from reoccurring on an existing ship or can protect the rudder(s) of a newbuild vessel against cavitation and corrosion damage from the very start for the life of the vessel. It is the only known coating that can provide this type of full protection.

Protection from day one

Protection of your rudders 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 get done at all or else prolongs 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 and is guaranteed for ten 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, but the coating can also be used to protect vessels that have been in service for some time and are already facing cavitation and corrosion damage, like the ones 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.

Ecoshield is applied in two identical layers. Rudder with first layer of Ecoshield (left) and after second coat (right). Different colors are used to make it easy to detect gaps or holidays in the second coat.

An Ecoshield application can easily be adapted to a yard's schedule.

Surface preparation of a rudder prior to application.

Conclusion

The investment in a coating system that offers full protection from day one is easily won back. This becomes very clear when one takes into account the costs of the temporary underwater repairs and the regular inspections required by a condition of class, not to mention the extra costs associated with rudder repair and recoating in drydock. For this reason a growing group of owners have Ecoshield applied on the rudders 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 long-term savings they will achieve.

Ecoshield will protect a rudder against cavitation damage.

Application can be done very fast.

No repaint will be needed during the lifetime of the vessel.

More information on the effect of cavitation and some case studies can be found in Hydrex White Paper No. 6R: Rudder cavitation damage solved, which is available for download for free at

www.shiphullperformance.org

Ecoshield in excellent condition on rudder after five years in service

Recently the container vessel *m/v Maersk Deva* came into drydock at the Santirul Naval Constanta shipyard in Constanta, Romania. The ship had been sailing with Ecoshield on her rudder for five years, but the coating was still in very good condition and did not need to be replaced.

Ecoshield was applied on the rudder in February 2009. Mr. G. Zolotas, the Fleet Technical Coordinator of Danaos Shipping Co. Ltd. Says that the "coating system has been introduced to us by your local representative some years back when we were looking for a hard coating to protect our rudders from cavitation phenomena. Our coating team consisting of highly qualified professionals with FROSIO red level certificates evaluated the coating and gave the green light for application."

Cavitation corrosion damage is a problem most ship owners come across. Often a rudder is not given the proper protection against cavitation and the resulting erosion and corrosion damage. In those cases the financial consequences can be extensive for the owner. Cavitation tests have confirmed that Ecoshield, however, performs extremely well under severe cavitation.

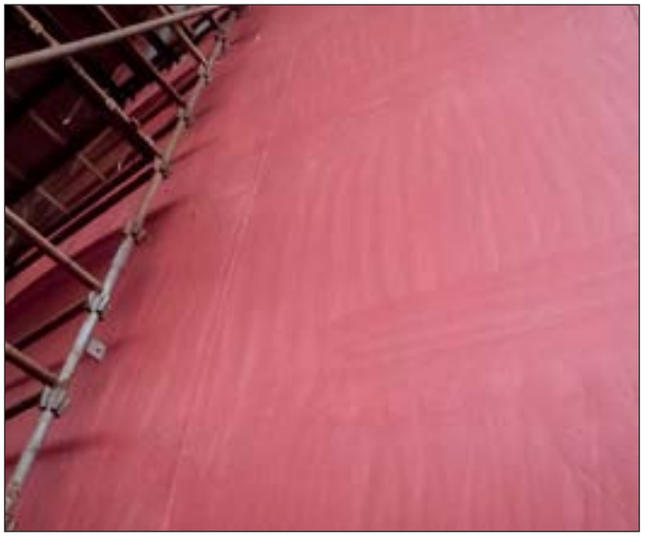
Severe cavitation damage on the rudder prior to Ecoshield application.

The rudder of m/v Deva *when the vessel came into drydock five years ago, showing multiple damages.*

Ecoshield was applied in 2009, protecting the rudder from then on.

The coating will prevent corrosion damage from reoccurring on an existing ship or can protect the rudder(s) of a newbuild vessel against cavitation and corrosion damage from the very start for the life of the vessel. It is the only known coating that can provide this type of full protection.

When *m/v Deva* came into drydock, the difference with earlier dockings was striking. “After 5 years of operation at various speeds there were minor detachments in way of high cavitation areas only and those were easily repaired,” says Mr. Zolotas.



No repaint is needed on the rudder during this or future drydockings.

Ecoshield is guaranteed for ten years As a result of the application no repainting was needed during the drydocking or will be needed during future dockings. At most, minor touch-ups may be required. Maintenance of the vessel’s stern area can therefore be planned without having to take into account any coating or hot work on the rudder.

Rudder of m/v Deva *after five years of service with Ecoshield.*

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Ecoshield wins Seatrade 2014 Innovation in Ship Operations Award

The Seatrade 2014 Innovation in Ship Operations Award was won by Subsea Industries, a Hydrex company, for its breakthrough product Ecoshield®, ultimate protection from cavitation and corrosion/erosion damage for ship hulls, rudders, and ship underwater running gear.

The Innovation in Ship Operations category was sponsored by ASRY. The three short listed entries were judged by a very distinguished and knowledgeable panel of judges:

Chairman: Mr Koji Sekimizu, Secretary-General, International Maritime Organization (IMO)

Judges:
The Rt. Hon. The Lord Clinton-Davis, PC, Former Chairman, Advisory Committee on Protection of the Sea (ACOPS)
Mr John Denholm, President, Baltic and International Maritime Council (BIMCO)
Mr Pierfrancesco Vago, Chairman, Cruise Lines International Association Europe (CLIA)
Dr John Coustas, Chairman, Hellenic Marine Environment Protection Association (HELMEPA)
Mr Roberto Cazzulo, Chairman, International Association of Classification Societies (IACS)
Mr Masamichi Morooka, Chairman, International Chamber of Shipping (ICS)
Mr John Platsidakis, Chairman, International Association of Dry Cargo Shipowners (INTERCARGO)

Seatrade AWARDS 2014
Winner of
Innovation in Ship Operations Award

Seatrade 2014 Innovation in Ship Operations award winner Subsea Industries for Ecoshield. Left to right: HE Shaikh Daij Al Khalifa, Chairman ASRY – Sponsor; David Phillips Hydrex Communications Exec; HRH The Princess Royal; Mr. Koji Sekimizu, Secretary General International Maritime Organization, Chairman of Judging Panel; Mr. Chris Hayman, Chairman Seatrade.

Seatrade 2014 Innovation in Ship Operations Award.

Capt Graham Westgarth, Chairman, International Association of Independent Tanker Owners (INTERTANKO)
Capt David Cotterell, Director, Oil Companies International Marine Forum (OCIMF)

The award was presented by Her Royal Highness The Princess Royal of Great Britain, and accepted for Subsea Industries by David Phillips, Hydrex Group Communications Executive, at the Seatrade 2014 Awards Dinner held at the Guildhall in London on April 14th, 2014.

The Seatrade 2014 Awards program described Ecoshield as follows:

ECOSHIELD® durable, cavitation-damage-proof rudder protection.

After more than 10 years of strenuous testing, Ecoshield was launched in 2013 for permanent protection against cavitation damage for rudders. The glassflake reinforced coating protects the rudder for the service life of the ship without need for recoating or major repair, and comes with a ten-year guarantee. Ecoshield is also suitable for bulbous bow, stabilizer fins, thruster nozzles and other underwater ship gear which needs special protection from corrosion.

Until now, the problem of cavitation damage to rudders, causing erosion, pitting and sometimes complete failure, necessitating very expensive repairs or replacement has remained unsolved.

Now a very durable, tough, long-lasting glassflake resin coating is putting an end to these problems. Ecoshield is a specially reinforced version of the well-known Ecospeed non-toxic underwater ship hull coating. 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, once the glassflake coating was applied, have seen no further cavitation damage erosion for as long as 10 years after application, with no sign that the coating will need replacement during the life of the ship.

Boud Van Rompay, Founder of Hydrex and its subsidiary, Subsea Industries, and the developer of Ecoshield said, “We are delighted to receive this prestigious award. We know that the judges are highly expert and discriminating and we take the award as a very valuable acknowledgement for our achievement with Ecoshield. It is a simple solution that puts an end to cavitation and corrosion damage which has plagued the shipping industry for more than a century.”

David Phillips, who accepted the award for Subsea Industries noted that in presenting the award for Ecoshield, The Princess Royal was very conscious of the severity of the problem that Ecoshield has solved and acknowledged the importance of Ecoshield in having cracked the long-term issue of cavitation and corrosion damage to hulls, rudders and underwater running gear. Her Royal Highness’s knowledge of and care for the shipping industry came through very strongly throughout the Seatrade Awards dinner.


Seatrade
AWARDS
2014

Presented to

Subsea Industries NV

to certify receipt of the
premier Seatrade Award for excellence in the category

Innovation in Ship Operations

at the 26th Seatrade Awards Ceremony Dinner,
Guildhall, City of London
14th April 2014

Signed ..... Date 14 April 2014

The 2014 panel of judges comprised:

Seatrade 2014 Innovation in Ship Operations Award Certificate.

Elsewhere in this issue of the Ecospeed Newsletter, the case study of a Danaos ship recently drydocked is a typical Ecoshield story. Five years after the coating was originally applied, the rudder shows no signs of any cavitation or corrosion damage and the coating looks as good as new. This is a clear example of why Ecoshield received the Seatrades 2014 Innovation in Ship Operations Award. Putting an end to cavitation and corrosion damage is a breakthrough in coatings and protection which will be felt and remembered throughout the shipping industry.

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For more information about Ecoshield please contact us at one of the offices below

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