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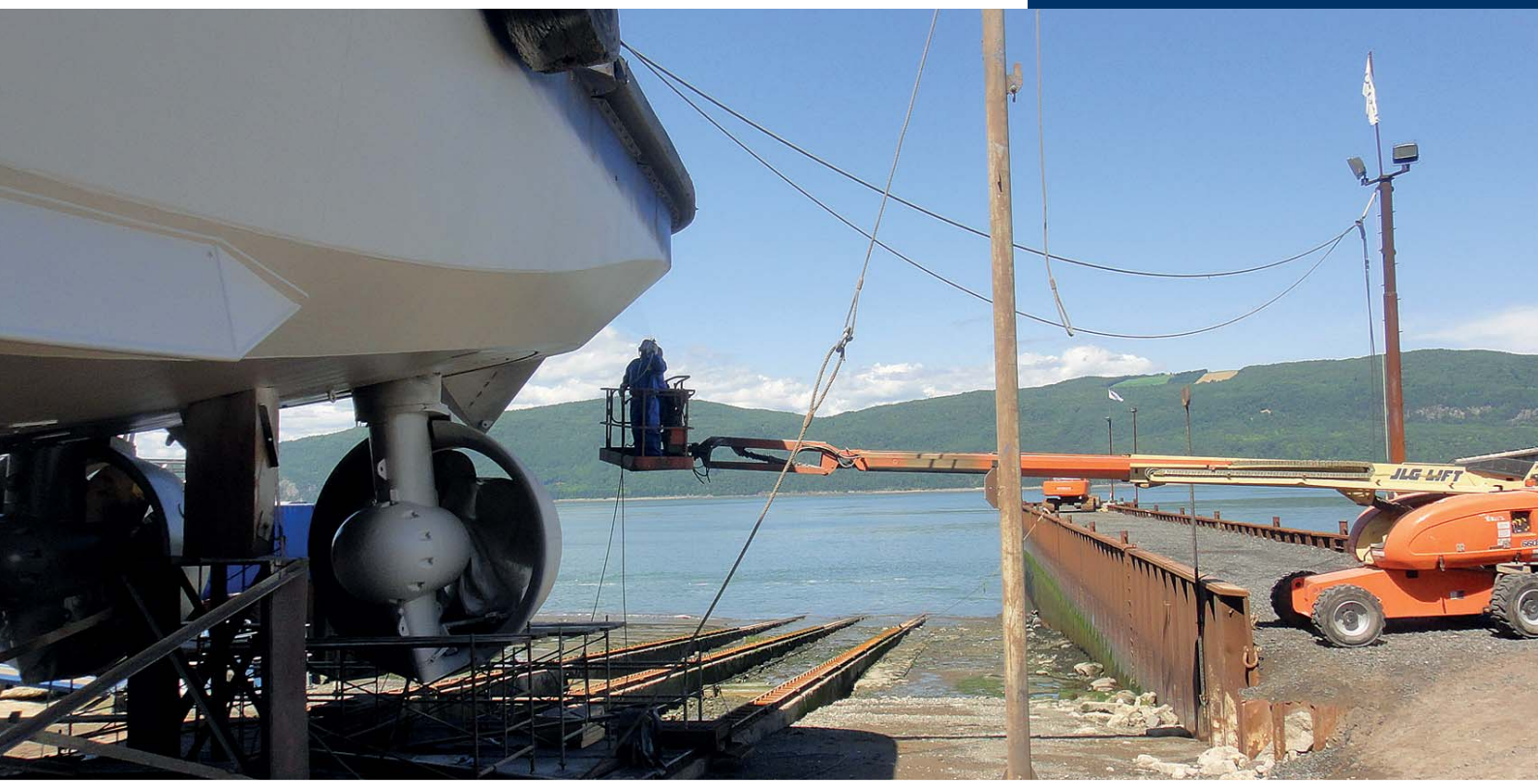
SHIP HULL PERFORMANCE TECHNOLOGY

NEWS

LETTER



Total Protection

The rudder of MV Elisabeth Russ before Ecospeed was applied in 2004, showing heavy cavitation damage.

The rudder of MV Elisabeth Russ in drydock in 2011. No further cavitation damage has occurred in the intervening 7 years.

Ships have been sailing for up to nine years (and counting) with Ecospeed without having to replace the coating on their rudders or having to opt for important and costly steel repairs.

Ecospeed can be applied on a rudder at a very low cost, especially compared with the large drydock costs. It will give a rudder supreme protection against cavitation and corrosion damage for the rest of the vessel's service life.

Ecospeed is a really fast and easy way of keeping a rudder's performance at maximum efficiency at all times.

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Ice Class Firefighter tug boat given Ecospeed protection in Canada

Last August, the 31-meter tug boat *Ocean Raymond Lemay* was coated with Ecospeed on the Isle-aux-Coudres in Quebec, Canada. The vessel is owned by Ocean Group Inc., who, among many other services, offers efficient and safe harbor towing services in the ports of Quebec, Montreal, Toronto and a number of smaller harbors.

Firefighting Ice Class tug after grit blasting, prior to Ecospeed application.

M/V *Ocean Raymond Lemay* is both an Ice Class and a Firefighting Class vessel, which means she can be used in a wide range of operations. Besides various harbour maneuvers such as moving a ship from one place to another by hauling it with its towing lines, the vessel is used during emergencies or to provide prevention services. The ship is also used to open up the frozen passageways in ports during the winter season.

Ecospeed is a once in a lifetime application, no repaint will be needed during future drydockings.

During such operations, M/V *Ocean Raymond Lemay* has to use her weight to ram into thick ice and force a passage. She is constantly hit by chunks of ice which may be 50 centimeters or more in thickness. Not only is the ice highly abrasive, there is the additional factor that the steel of the hull flexes under the impact. When the metal sheets that form the hull flex and bend under the impact, the paint that is supposed to protect them does one of two things: it either is flexible and adheres so well to the metal that it is virtually part of the steel itself and thus survives, or it is less flexible than the hull and cannot flex

with the steel, in which case the paint gradually, or not so gradually, is forced away from the hull and rubbed away under the impact. It is a problem which is unique to ships faced with ice impact.

Ecospeed demonstrates excellent attachment to the hull and successful resistance to extremely icy conditions. The coating has proven its ability to withstand the harshest winter conditions on numerous occasions.

Due to its unique composition, Ecospeed is not only the best protection available for underwater hulls of vessels, but also for the rudder or any other part prone to cavitation damage. The coating can keep the underwater part of any vessel safe for the entire length of its sailing life. ■

After application of the two layers the tug boat is protected against harsh conditions.

An Ecospeed application is adapted to the yard's schedule.

Customers return for more rudder Ecospeed applications

Last month the rudders of three types of vessels, belonging to different owners were coated with the Ecospeed glassflake surface treated composite (STC). The application was carried out on a container vessel, an LPG tanker and a car ferry at two different shipyards in Shanghai, China and at a yard in Ruwi, Oman.

If a rudder is not given the proper protection against cavitation and the resulting erosion and corrosion damage, the financial consequences can be substantial for the owner. Two of the owners are returning customers. They had experienced firsthand the devastating effect of cavitation on rudders coated with a traditional coating system. For this reason they have decided to use Ecospeed to ensure lasting protection against cavitation damage for the rudders of their vessels for the remainder of their service life.

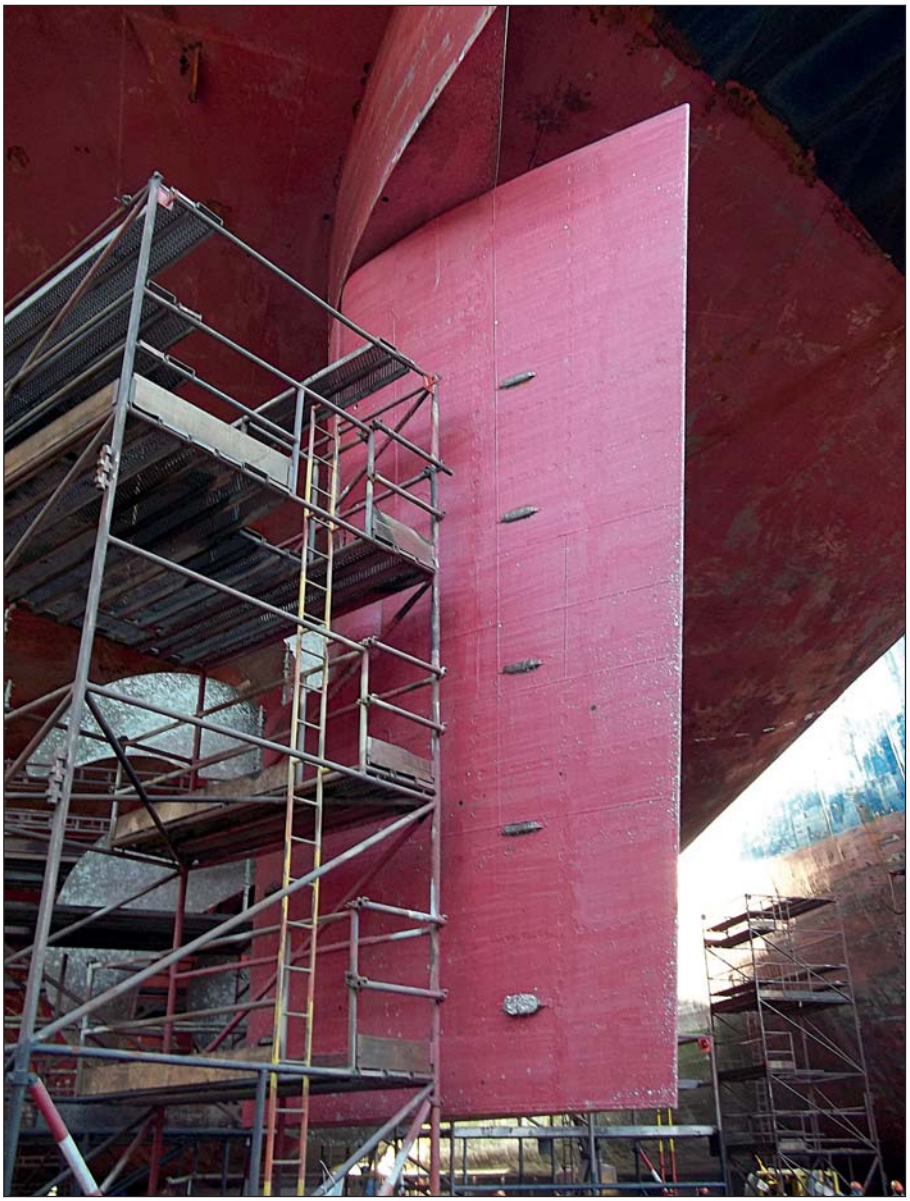
An Ecospeed application is easily adapted to the schedule of a yard.

Ecospeed will protect a rudder for the rest of the vessel's service life.

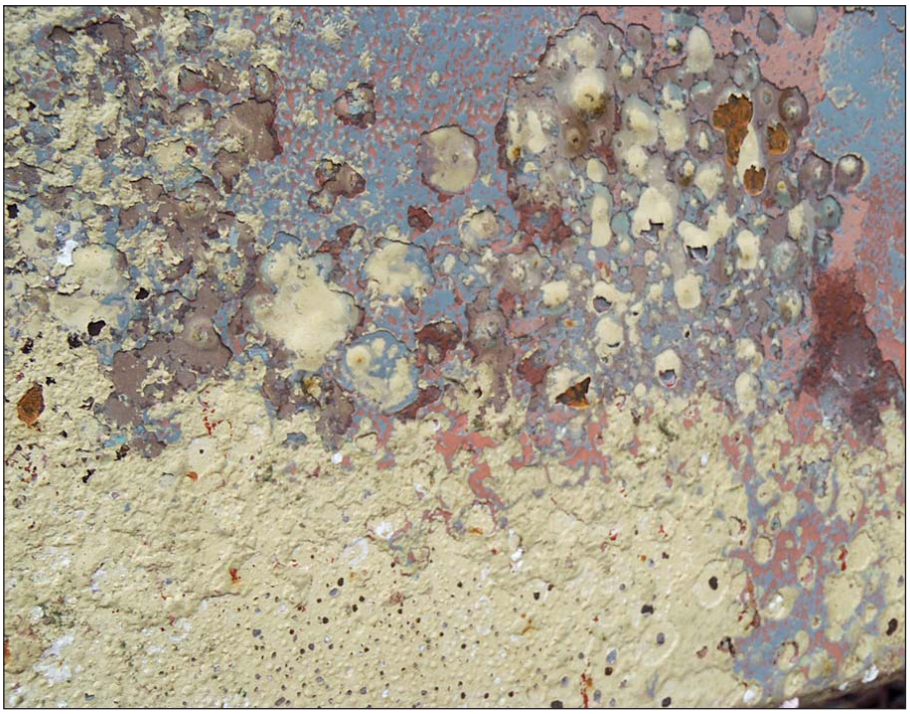
Ecospeed is applied in only two, identical layers.

No repaint will have to be scheduled during future drydockings.

Tests in a flow channel, carried out in Grenoble, have confirmed that Ecospeed performs extremely well under severe cavitation. This has been backed up by many success stories. The rudder of the 195-meter container vessel, *Marie Delmas*, for instance, was still in excellent condition when the ship came into drydock after sailing for five years with Ecospeed. The roro vessel *Elisabeth Russ* had been in the water for an even longer period of seven years when she came into drydock last year. This docking confirmed that the original Ecospeed protection applied in 2004 is still holding firm



The rudder of Marie Delmas after sailing with Ecospeed for five years.



Condition of the old coating prior to Ecospeed application.

An Ecospeed treatment consist of grit blasting and application of two identical coats.

and that rudder had experienced no further cavitation damage since the original Ecospeed application.

By removing the existing paint layers and applying Ecospeed on the rudder we can break the never ending cycle of painting, suffering damage, having to perform extensive repairs or even replacement in drydock followed by a full repainting, again and again.

With an Ecospeed application no repaint will be needed during drydocking. Ecospeed is guaranteed for ten years. At most, minor touch-ups will be needed. Planning the maintenance of the vessel's stern area therefore becomes much easier. The smoothness attained by the coating also provides optimum hydrodynamic conditions for rudders to operate at maximum efficiency. The ship's performance remains stable and the owner's investment is secured. ■

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The Polar Code

A vital measure needed to protect the planet's polar regions from harmful environmental effects and ensure safety at sea as shipping traffic increases

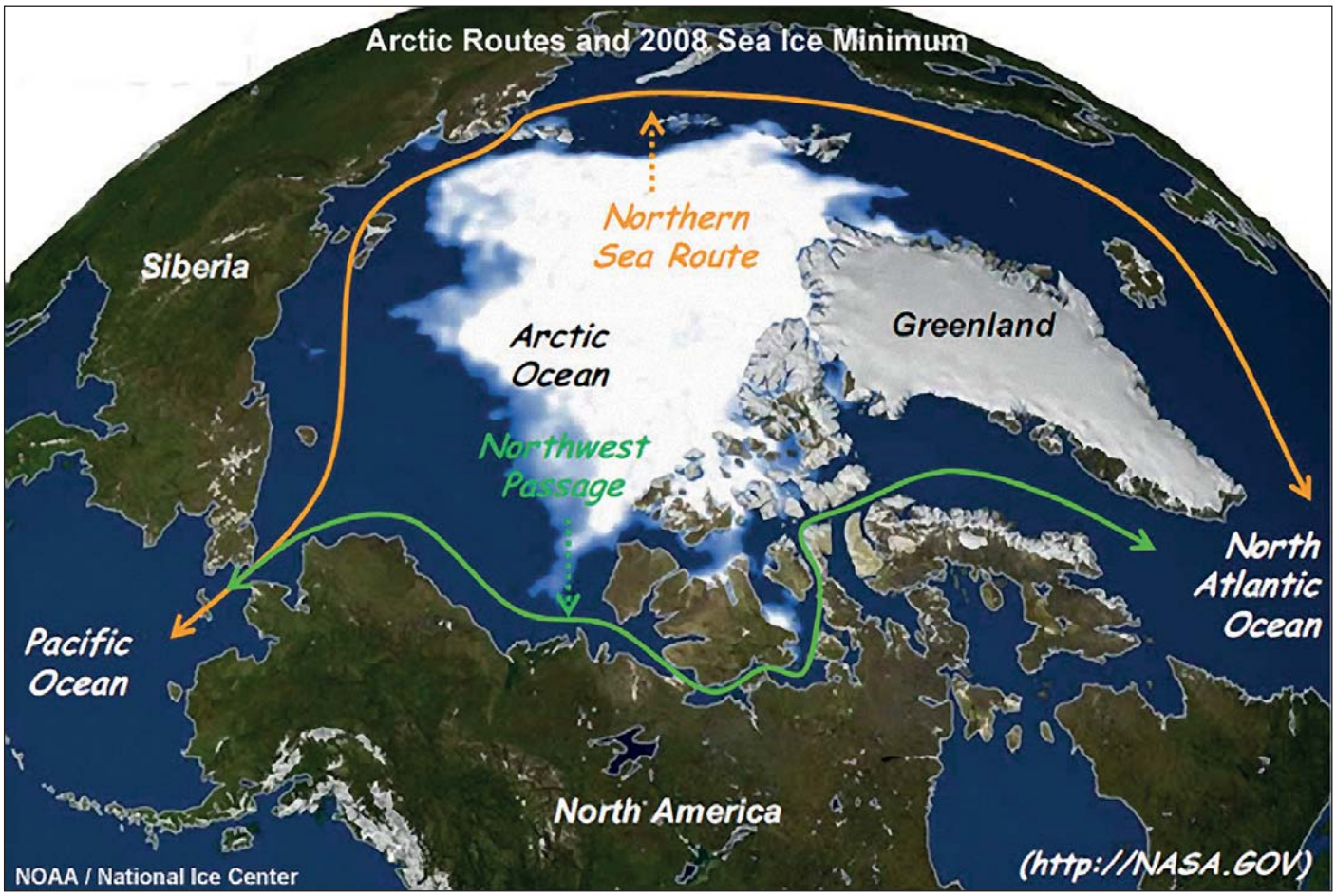
Due to greater human activity, the poles are under increasing threat. Those who are genuinely concerned with the sustainability of the planet would like to see this human activity managed to allow the poles to remain as unharmed as possible. These areas are also particularly sensitive to pollution. The ice in the polar zones also creates a hazardous and harsh environment for ships which heightens the possibility of wrecks, spills and other forms of environmental damage.

The decrease of polar ice as the planet warms has opened up the Arctic region to a tremendous increase in shipping traffic. That increase now threatens to cause a proportionately greater environmental impact in the Arctic regions.

Many feel the answer includes a strict, mandatory Polar Code enacted at IMO level and covering safety and the environment. The drafting and adoption of such a mandatory Polar Code is proving to be frustratingly slow – too slow to keep up with the potential harm it is designed to prevent. The IMO Subcommittee on Ship Design and Equipment (DE) at DE 56 in February 2012 postponed action on the environmental section of the Polar Code for another year.

The development of special provisions for shipping operating in polar regions can be traced back to the early 1990s. In 2002 the IMO approved its voluntary "Guidelines for Ships Operating in Arctic Ice-Covered Waters," MSC/Circ.1065/MEPC/Circ.399. The Antarctic was included in the voluntary guidelines

The decrease of ice has opened up shipping lanes in the Arctic.



Map showing Arctic shipping routes.

in 2010. For years Member States of the IMO with particular interests in the safety and environmental aspects of shipping in polar waters have been urging the development of a mandatory code covering these aspects. In 2009, the IMO's Maritime Safety Committee assigned the task of coordinating the development of a mandatory Polar Code to the Design and Equipment Subcommittee.

The most recent action on the subject occurred at DE 56 in February 2012. Unfortunately, the outcome of the meeting was a further delay in work on the environmental section of the Polar Code.

Why the hurry?

A number of factors combine to make adoption of a strict, mandatory Polar Code a necessity and something that needs to be completed and put into effect sooner rather than later.

Diminution of Arctic sea ice.
The change in the world's climate is particularly noticeable in the Arctic, with temperatures rising almost twice as quickly as those in the rest of the world. Every year some 37,500 square kilometers of ice are lost. Thickness and extent are on the decline.

Projections for the disappearance of ice from the Arctic Ocean have changed drastically over the last few years. It is now expected that ice will be gone from the area in the summer months as soon as 2030-40.

Arctic shipping lanes – an economically inviting alternative
Recently, large areas of ice have been disappearing during the Arctic summer. This has resulted in an opening up of the shipping lanes in the region. In 2008 for the first time both the Northwest Passage through the Canadian Arctic, and the Northern Sea Route in the Russian Arctic were both in operation. The Arctic route can significantly reduce sailing distances by as much as 25 - 40% compared to routes via the Suez Canal or Panama Canal, depending on destinations.

Currently some 3,000 vessels operate in the Arctic Ocean making about 15,000 voyages per year. These figures are predicted to increase considerably in the 10 - 20 years.

Discovery of major natural resources
Large deposits of oil and natural gas are known to exist in the Arctic region. Other natural resources such

as coal and various minerals abound in the area. This has prompted new interest in the zone which portends a substantial increase in shipping for the purpose of exploration, exploitation and transport.

Cruise ships

The tourist industry has also greatly increased in the Arctic and promises to expand further. An increase in marine tourism means an increase in cruise ships in Arctic waters. Large cruise ships tend to use heavy fuel oil which has a greater impact in terms of emissions and black carbon than lighter fuel oils. These vessels are also not usually designed or strengthened for ice, yet they may make trips into Arctic waters, tending to go as near to the shore as they can, and this poses risks.

These various factors all combine to make quite real the predictions of greatly increased shipping in Arctic waters in the near future.

Safety and the environment

The predicted increase in shipping activity in polar regions raises issues to do with safety and the environment.

From a safety point of view, ships traveling in these zones are subjected to extremely harsh conditions. If not specially reinforced and equipped and their crews suitably trained, the chances of disaster are higher than in other regions. Ice is a great hazard, as history has shown. These risks are exacerbated by a greatly reduced infrastructure for rescue and help than in more traveled zones. Navigating polar waters offers unique challenges. Rescue in Arctic conditions is also a much more difficult and dangerous proposition. Spill response is limited. Mechanical clean-up after a spill in ice-covered water is almost impossible. Various other means of clean-up are greatly hampered by the conditions.

Environmentally, there are a number of aspects which make the polar regions particularly sensitive to pollution and environmental damage. The areas are much more pristine than more populated and traveled parts of the world. The non-indigenous species count is relatively low and new invasions would be particularly harmful. Black carbon, a component of the particulate matter (PM) emitted as a result of the partial combustion of various fuels, is considered responsible for 50 percent of Arctic warming. Harmful air emissions in general have a particularly harmful effect on polar regions.

The toxic leachates from biocidal antifouling hull paint on ships are a threat to all the oceans but particularly to the polar regions which are still relatively unpolluted. Copper, heavy metals and a number of co-biocides are highly toxic and have varying permanence in the water column or sediment, thus posing a threat to the food chain and ultimately human health. Being fairly fragile, these paints are rapidly stripped off by the ice, leaving their full toxic footprint in the polar environment.

Another environmental hazard to polar waters is posed by the translocation of invasive, non-indigenous aquatic species in the form of hull-borne fouling organisms.

Distillate fuels, non-toxic hull coatings and fuel efficiency will all play a major part in keeping the polar environment as clean as possible despite an increase in ship traffic.

The Polar Code

The idea of a strict mandatory code for shipping in polar regions, agreed and enacted at IMO level should have general appeal to the shipping industry as well as to the various governments and NGOs who have a strong interest in protecting the environment. Failure to generate and enact such a code in a timely manner at IMO level is likely to result in individual States enforcing their own regulations for shipping operating in their waters. These will undoubtedly vary from one State to another, making compliance unnecessarily complicated. A strong, uniform code enforced throughout the polar regions will in the end reduce confusion and help to bring about safe and sound maritime operations for all with due regard for these sensitive environmental zones.

The points which the Polar Code should address include the following:

1. Ice strengthening of vessels to minimize disasters, including hull integrity, watertightness and general vessel fitness for sailing in polar conditions.
2. Additional safety equipment required to cope with the harsh environment and reduced rescue infrastructure.
3. Special local navigational considerations applicable to polar regions. Sufficient, accurate hydro-geographic information is required as a basic component to successful and safe sailing in these waters.
4. Crewing of vessels and training of crews to prepare them for polar conditions.
5. The mandatory use of distillate fuel and the banning of the use of heavy fuel oil.
6. Stringent provision for the pre-

vention of spillage or leakage of oil and other noxious liquids.
7. Avoidance of discharge of sewage and grey water.
8. Stringent regulations regarding the discharge of garbage.
9. Measures to reduce the emission of black carbon, NOx, SOx and other air emissions, over and above those in force or being considered in non-polar regions. Reduction of fuel consumption and the type of fuel burned are key points.
10. Reduction of underwater noise.
11. Immediate enforcement of the Ballast Water Management Convention which has not yet entered into force.
12. A ban on the use of toxic antifouling systems which leach biocides or emit other highly toxic substances into the water.
13. A cleaning regime which ensures that ships sailing in polar waters are cleaned of biofouling before voyaging into these areas in order to prevent the invasion of non-indigenous species.

The Code will have different regulations for different classes of ship (depending on the degree of ice they have to deal with). These basic classes have not yet been agreed.

Comprehensive approach – safety and environment together

It can be seen that the safety and environmental measures which the Polar Code must address need to be considered all together. Otherwise safety measures and environmental measures may not work in harmony or, worse, may conflict and cancel each other out. For example, a measure taken to reduce fuel consumption may result in more underwater noise unless both factors are considered together. Or an antifouling system claiming to reduce fuel consumption may result in the discharge of a great deal of highly toxic material into polar waters. The ideal hull coating system for polar regions would be one which was not toxic, which would stand up to the harsh polar conditions and not be scraped off by contact with ice, and which also lent itself to easy removal of biofouling before any vessel ventured into polar waters. A holistic approach would take all these points into consideration.

The Polar Code will set something of a precedent for IMO regulatory instruments in that it will cover a number of disciplines and areas of interest under one code. This is particularly important in polar regions where safety and environmental concerns must be considered in harmony. It may also set a pattern for similar IMO initiatives in the future.

Sooner rather than later

As outlined above, the various factors which make the Polar Code desirable and necessary have already come into being, yet the Code is not complete. Failure to enact and ratify a strong Polar Code in a timely manner will most like result in a fragmentary, State by State regulatory framework which will prove much more burdensome to the shipping industry than a single international code covering all the major points in a uniform manner.

The drivers for increased traffic in these regions are not being postponed in order to cooperate with the slow progress of the Polar Code. This is why the arbitrary postponement at DE 56 of the Code, the intention to develop the safety measures in the Code separately from the environmental measures and the lack of urgency with which the Code was treated at DE 56 were particularly frustrating and disappointing to those who can clearly see the need for a strong, harmonious Polar Code ratified before the shipping traffic in the polar regions builds up significantly.

Following a unilateral decision by the DE Chair that no decision about the environmental aspects of the Code would be taken until DE 57 in early 2013, it appears there will be no comprehensive approach as requested by many of the DE 56 delegates and no official further consideration of the environmental aspects until February 2013.

In addition to the Polar Code, other measures will be needed to protect these environments, including marine spatial planning in order to look at the larger ecosystem picture. The Polar Code will cover the shipping aspect but there are other factors such as how shipping affects oil and gas, how it affects fisheries, cumulative effects and the overall environmental picture. These points will need to be considered and environmental impact assessments undertaken.

The delays in the completion of the Polar Code need be set aside, the urgency due to the situation recognized and the whole process moved forward rapidly with due regard to the need for a holistic approach.

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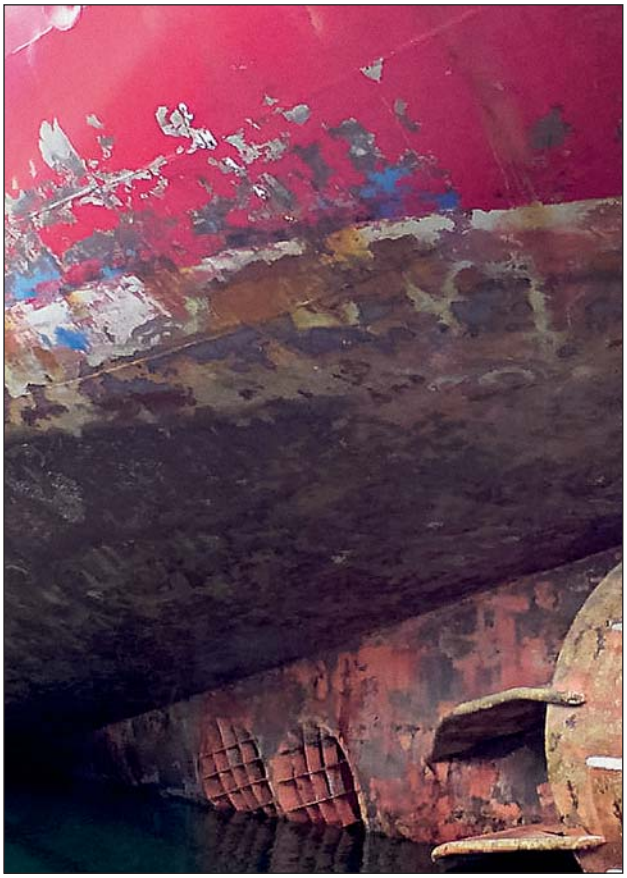
Condition after years of use



After two years then

After two years now

Ecospeed is an environmentally safe underwater ship hull coating system which provides the vessel with long-term protection and dramatically improves the ship's performance. The coating gives a very thorough and lasting defense against cavitation and corrosion damage for a ship hull's entire service life.

Ecospeed provides the underwater vessel 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.

Ecospeed comes with a 10 year guarantee and is expected to last the lifetime of the vessel. This is in strong contrast to traditional anti-fouling paints where a new application is necessary during each drydocking. With an Ecospeed application no repaint will be needed. At most, minor touch-ups will be needed. Planning the maintenance of the vessel therefore becomes much easier.

ECOSPEED®

SHIP HULL PERFORMANCE TECHNOLOGY

Supreme Rudder Protection

Ecospeed 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 Ecospeed 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 Ecospeed application no full repaint will be needed during drydocking. Ecospeed is guaranteed for ten years. At the most, minor touch-ups will be required.

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