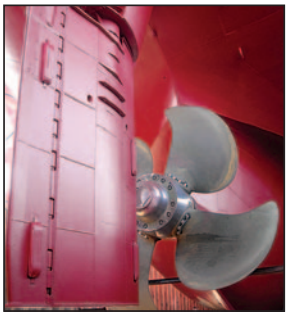
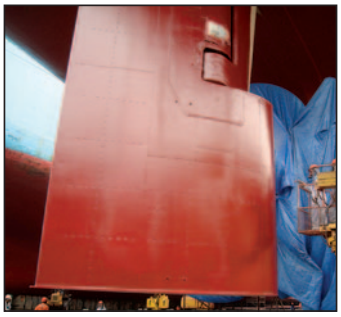
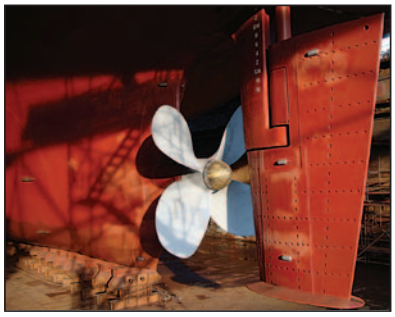
SUBSEA
PROTECTION AND PERFORMANCE

Magazine 242

Group Ocean ice-going tugs rely on Ecospeed Ice for full, lasting hull protection

LASTING 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®
ULTIMATE PROTECTION

Editorial

Welcome to the new issue of our Subsea Magazine. In it you can read a case study showcasing one of the many excellent results obtained with Ecospeed Ice. We have been coating ice-going ships for almost 20 years. The technical, ecological and economic results we have witnessed are nothing less than spectacular.

The first thing you look for in an ice-going coating is its ability to protect the hull from the ice. The reason why Ecospeed Ice is such a success is because of the adhesion to the steel. In itself the coating is not flexible, but due to its superior adhesion the coating flexes with the steel.

There is no disbondment, no detachment and no delamination caused by ice impact. As a result, the coating system leaves no paint behind. This offers a big ecological benefit for our customers.

There is no spreading of anti-fouling toxic particles and heavy metals, because they are simply not used in our coating. Ships can safely be taken to the polar regions without having a damaging effect on the environment or contaminating the ice.

Just recently, icebreaker *Laura Bassi* carrying scientists researching in the Antarctic has sailed further south than any ship has done before. The vessel has been protected with Ecospeed Ice since 2009, when the ship was still called *RRS Ernest Shackleton*. Even after 15 years there is no need to replace the coating, a feat unheard of before we launched our coating system.

Because Ecospeed Ice (like our other coating systems) does not have to be recoated, ice-breaking vessels save an enormous amount of time in drydock. Instead of twelve days they only have to spend four or five days in dock because only small touch-ups are required. These are very easy to do, even in bad weather, and any repair done to the coating will blend in perfectly and have the same qualities and strength as the original layers. This is even the case if they have been applied 10 or 15 years before.

The smoothness of the coating also provides for easier breaking of the ice. We have had reports from the crew of the *Umiak 1*, the world's most powerful ice-breaking cargo ship now coated with Ecospeed Ice, that they notice the ship moves through the ice more easily than it did with the previous coating.

The coating has been recognized as an ice-abrasion resistant coating PC6 to PC7 by Lloyd's Register. Using Ecospeed Ice allows the plate thickness to be reduced. Ships can be built with less material which reduces cost and weight. The coating is also very quick and easy to apply, requiring no special equipment or conditions.

We have well over a hundred applications on ice-going ships. Over a period of close to twenty years these have shown that Ecospeed Ice can withstand the impact of ice for many years: not one or two years, but twenty years and longer.

Subsea Industries NV
Boud Van Rompay
Founder

Group Ocean ice-going tugs rely on Ecospeed Ice for full, lasting hull protection

Group Ocean have been applying Ecospeed Ice on all their ice going tugs since January 2012. "What we were looking for was a 25-year corrosion protection system for our ice-going tugs," says Patrick Chabot, Director of Fleet Planning and Renewal at Group Ocean in Québec, Canada. "We do not want to do any corrosion/erosion steel work," he adds. "I believe we have now found that 25-year solution."

The Ocean TundRA 100 *(right) in the Ocean Isle-aux-Coudres shipyard in Quebec, just painted with Ecospeed Ice in 2013.*

Group Ocean, a leader in the Canadian maritime industry

Gordon Bain, Founder and Chairman of Group Ocean's Board of Directors recalls, "When I founded Aqua-Marine in 1972, I had a dream: to provide integrated marine services. The commitment, ingenuity and trust of the teams that supported me in this journey, along with our clients' trust, have allowed us to become a leader in the maritime industry."

Ocean Raymond Lemay *in January 2012, the first Ocean tug to be coated with Ecospeed Ice.*

The company originally specialized in underwater work. In 1987 it evolved into Ocean Construction Inc. and acquired Québec Tugs, Ltd. Through a series of subsequent acquisitions and expansion moves, including the outright purchase of the Isle-aux-Coudres shipyard in 1997 which was then renamed Ocean Industries Inc., Ocean has become one of the main suppliers of integrated marine services in Canada and a leader in the Canadian marine industry. Just as its founder had dreamed it would.

Since then the expansion and acquisitions have continued. In 2017, Ocean acquired three tugs from Svitzer in Canada. In 2018, the company expanded into Western Canada and the Caribbean. In 2019, Ocean was awarded its largest shipbuilding contract to date: four large tugs for Canadian National Defense. In

Applicator checking the wet film thickness on the Ocean Raymond Lemay.

In 2013, the Ocean Bertrand Jeansonne's *hull was coated with Ecospeed Ice.*

2021, Ocean Group acquired Samson Tugboats in Vancouver.

In 2022, Ocean Group acquired Shipyard Verreault in Quebec. Founded in 1956 by Captain Borromée Verreault, this shipyard specializes in ship repair and transformation, and plays a leading role in the Quebec and Canadian maritime industry. With this acquisition, Ocean Group increased its capacity and expertise to meet the needs of its customers. The acquisition brought with it two Verreault shipyard tugs that currently provide services at the Les Méchins and Matane docks.

Tugboats and ice

Over the years, Ocean has built up a fleet of tugboats, many of which are ice-strengthened and equipped to operate in the severest winter conditions. In 2005 a fleet renewal program was begun with the christening of the *Ocean K. Rusby*, a new state-of-the-art tug powered by Z-drive propellers. This was the first of eight new tugs.

Ocean has built the most powerful tugs in Canada, designed by Robert Allan Ltd., naval architects and marine engineers. Canada has a vast Arctic frontier, an east coast subject to extreme winter conditions, and the Great Lakes which experience severe ice conditions every winter. For decades, Robert Allan Ltd. has worked with clients operating in these cold weather regions and has learned many of the secrets of designing ice-capable tugs. These not only meet the class rules for hull strength, but incorporate many of the critical lessons learned to make these boats safe and practical to operate in this extreme climate. Every one of these vessels is uniquely designed for a specific set of operating conditions. The Ocean ice-going tugs are all ice-class 1 AS FS.

Hull coating

The Ocean tugboats are generally built for service in harsh, icy conditions. The coating used on the hull is very important for a number of reasons. Group Ocean experimented with several options before finding the right one.

"Before we found Ecospeed Ice in 2011, we had been using an epoxy paint from one of the major paint manufacturers," says Patrick Chabot. "It doesn't work. The ice is very damaging to the paint, even an epoxy paint. Before that we had some vessels with one of the more generally used ice-abrasion resistant hull coatings," Patrick continues. "The application of that coating is so expensive, and you need a special pump with twin hot feeds, and summer conditions. Most of our docking

Ocean's ice-going ferry, the Lomer-Gouin*, which has had Ecospeed Ice on the hull since 2013.*

happens at the end of summer or in the winter and it is very hard to achieve the needed temperature control. That's one of the reasons we moved away from that coating to Ecospeed Ice. We are very satisfied with the application of Ecospeed which can be accomplished with normal spray equipment and is much more tolerant of the conditions in which we have to operate."

Ecospeed Ice is a glass platelet reinforced coating which has been granted ice-class classification PC 6 to PC 7 by Lloyds Register. The use of the coating permits the reduction in thickness of the steel plates of an icebreaker or ice going ship by 0.5 - 2mm according to the relevant Rules.

The Ocean Raymond Lemay *in action in Quebec. Ecospeed Ice protects the hull for the life of the tug.*

In 2011, the subject of coatings came up at the Ocean yard. "We did not want to go with normal epoxies because they just don't stay on," recalls Patrick. "We decided to look for a new paint program. Everyone was OK with the specialized ice coating we had tried, but the application was too difficult. We decided to look for something else. That was when we got in touch with Subsea Industries. We tested two different coatings. One was Ecospeed Ice. The other was an ultra-high build, high volume solids, two component catalyzed epoxy recommended by the same paint manufacturer as had supplied our earlier coatings. They did not want to give up without a fight! After a year we were more impressed with Ecospeed Ice. The two boats work in the same area, so we had a very good comparison. After one year in the ice the epoxy paint did not stay on at all. Most of the forward section and forward

The Ocean Sept-Isles *in drydock three years after Ecospeed Ice was applied.*

bottom section had no paint left on at all. All the paint was removed by the ice. With Ecospeed the forward plates were all fine and we had no problems except with some of the weld seams which started to show some signs of wear after some time. We are now addressing this with stripe coating on application."

The Ecospeed Ice applied in 2012 is still in excellent condition. Olivier Garon, Director of Fleet Maintenance sees each tug when it comes into drydock. "I am very impressed with the hull condition," he notes. "When they're in drydock, I can see right away which vessels were painted with Ecospeed and which were not. The difference is very noticeable. There are maybe just a few little touch-ups to do, probably resulting from mechanical damage rather than from the ice, most likely anchor chain or something like that. The application has been done per instructions, so it lasts. I'm really impressed."

In the late 1980s Aqua-Marine acquired Quebec Tugs Ltd. and became Ocean Construction.

Bruno Beaulieu, Ocean's Technical Director also notes, "We have the natural antifouling system which is called winter conditions in ice, which cleans the hull very thoroughly during the winter. But with Ecospeed we do not see very much fouling, even in summer." Ecospeed Ice is a totally inert, hard coating which does not contain biocides of any kind or leach any toxic substances. The fouling resistant properties stem entirely from the smoothness, impermeability and impenetrability of the coating. If fouling does accumulate, it is very easy to clean off without any harm to the coating or the environment.

Since the first tug, the *Ocean Raymond Lemay* was coated with Ecospeed Ice in January 2012, Ocean has gone on to apply the same coating to an additional 11 tugs and the passenger ferry *Lomer-Gouin*, the most recent being in 2018. Not only has the underwater hull been coated but, because the results looked so good, the boot-top and topsides have also been coated with Ecospeed Ice with excellent results.

Benefits

When asked to describe the main advantages of Ecospeed Ice for Ocean, Patrick Chabot said, "For our conditions, the ease of application is one of the key points. We do not have a closed facility for painting so it's hard to achieve the special conditions required for some coat-

Patrick Chabot, Director of Fleet Planning and Renewal for Group Ocean discovered Ecospeed Ice in 2011.

ings. For us, that's a big winner. Wear resistance is a very good gain because this is what we were looking for. I like the fact that the equipment for painting is really simple – just a good pump. Costs are minimal. And we can choose the color we want! We can do Ocean blue. We are a very satisfied customer because we achieved all our goals. The only remaining issue is a small adjustment to handle the seams, the Z-drive and Kort nozzles and we are going to use Ecoshield for them." They are looking into the very real possibility of the manufacturer of the Z-drives used on the tugs supplying them ready-coated with Ecoshield which would be a great improvement over regular epoxy.

Bruno Beaulieu adds, "You don't need heated shelters because you have a bigger window for application." Ecospeed Ice can be applied in temperatures ranging from 0° C (32° F) to 60° C (140° F) which is quite a wide tolerance.

Reduced costs

Patrick also notes the reduced life-cycle costs. "The initial application is quite expensive [Ecospeed Ice is applied to a thickness of 1000 µm or 40 mil, which is thicker than many epoxy coatings which are not designed to last very long in the ice] but the gain in longevity and the steel you don't have to replace compensates for that completely." The use of Ecospeed Ice greatly reduces time in drydock since repainting is not required, and then of course there is the cost of the replacement paint itself and its application which is not required in the case of Ecospeed Ice.

Goal achieved

"What we were looking at was to get a 25-year corrosion protection system. I believe we now will achieve that thanks to Ecospeed Ice." ■

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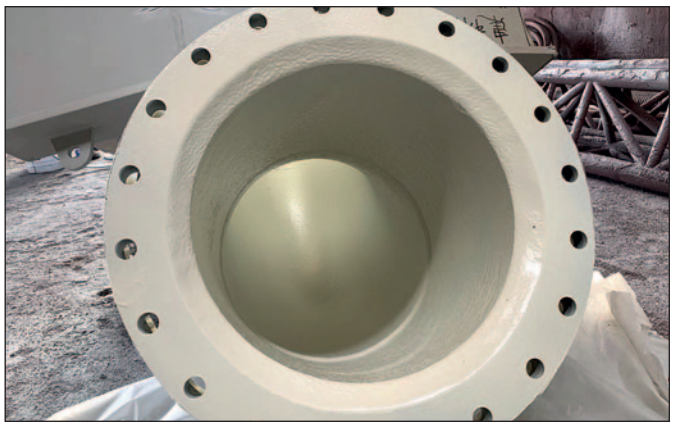
Ocean Henry Bain *tug with Ecospeed Ice on the hull for full protection against the very harsh conditions of the St. Lawrence river and the Great Lakes.*

Lasting scrubber protection

Ecospeed fits in seamlessly with the environmental idea behind scrubber systems. It is a lasting, chemically resistant coating that will withstand the hazardous pollutants and will prevent corrosion damage and the resulting consequences. Ecospeed will protects the exterior outlets as well as the interiors of scrubbers for the lifetime of the vessel.

Outlets

Overboard pipes



Holding tanks

The actual scrubber

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ECOSPEED®
SHIP HULL PERFORMANCE TECHNOLOGY

Ecospeed defined

The purpose of Ecospeed is to offer a long-lasting, non-toxic protection for all ship hulls and to provide a system that keeps a hull very smooth and free of fouling for the service life of the vessel with minimal repair and no replacement. Instead of using chemicals to try to kill and repel marine fouling organisms, Ecospeed uses a hard, impermeable, impenetrable coating along with manual removal of fouling at an early stage.

Ecospeed offers a cost-effective and environmentally-acceptable approach to hull protection and anti-fouling.

The technology can be broken down into three parts:

1. Coating

Ecospeed is a glassflake reinforced resin coating that is impermeable, impenetrable, long-lasting, inert and non-toxic. The coating is applied in two coats each of 500 µm dry film thickness (DFT) to a properly prepared hull, either at new build or in drydock for an in-service vessel. It works equally well on steel, aluminum or GRP. A minimum of about 3 hours is required in between coats and there is no maximum overcoat time. This coating has extraordinary adhesion and bonding qualities. It is very tough and resistant to abrasion. It is also flexible and remains firmly bonded to the plates even when these flex considerably.

2. Fast and easy cleaning

Underwater maintenance of Ecospeed is carried out with specially designed underwater hull cleaning tools that simultaneously remove all fouling and optimize the smoothness of the paint surface. It allows divers to clean the flat areas as well as the harder to reach parts of the hull without damaging the coating. One of the many unique characteristics is that with repeated underwater hull cleaning the coating's surface improves. Cleaning can be carried out whenever needed, at any point in its lifespan.

Ecospeed can also be cleaned in drydock with high pressure tools. With Ecospeed the coating is always in a brand-new, excellent condition after a high pressure washing and no material is lost. Only the fouling is removed. The coating stays on the ship instead of dispersing in the water and contaminating the shipyard and the surrounding waters.

By optimizing hull surface friction and using the best possible surface hydrodynamic characteristics, fuel savings over the lifetime of the ship are most often found to be in the 20-40 % range. In contrast with AF compounds that rapidly degrade over time, our coating lasts. Therefore the performance of the ship does not degrade either.

3. Minor touch-ups in drydock

The coating is expected to last the full service life of the ship without need for replacement or any major repair. Mechanical damage such as that caused by collision or anchor chain abrasion, or by welding on the hull can easily be touched up during routine drydocking. Because the coating consists of a single, homogenous layer, any repair or touch-up easily blends in without any difficulty. The integrity of the hull coating is maintained despite such repairs. Because no repaint is needed, several days and up to a week can be saved in drydock times during each visit.

The coating alone provides superior hull protection, but it is the full Ecospeed technology that results in the major fuel savings. ■

Corrosion damage very repair made √easy

Subsea Industries has a product for filling and building up a corroded and pitted steel surface to its original form prior to recoating with Ecoshield. Ecofix is as tough as the steel itself, machinable, and can be used to repair most pitting or corrosion damage on rudders, stabilizer fins, thrusters and other underwater gear.

Ecofix is 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 can cause severe pitting. The steel needs to be restored to its original shape with a smooth surface prior to recoating.

This is where Ecofix comes in. It is a superior, tested and proven filler. Because it uses the same basic resin as Ecoshield, the coating can be applied just one hour after the filler. The bonding and hardness are extraordinary. This is the effective alternative to very expensive fillers. And because it is part of the Ecospeed/Ecoshield family, it is fully compatible with our coatings.

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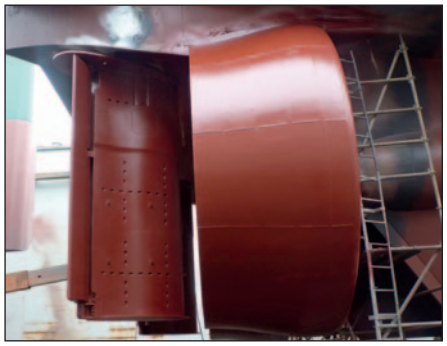
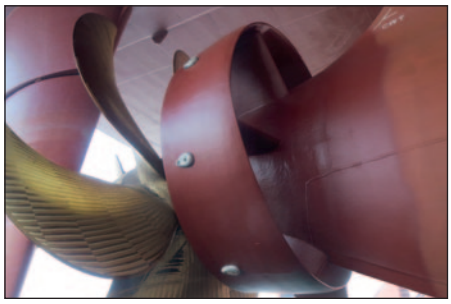
ECOFIX®
CORROSION REPAIR

SUBSEA

PROTECTION AND PERFORMANCE





Subsea 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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03/23