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Underwater PBCF installations bring immediate fuel savings



Hydrex can install Propeller Boss Cap Fins (PBCF) underwater and on-site. As a result, ships will not have to wait for their next drydock visit to start benefitting from the fuel savings the PBCF's bring them.

The Propeller Boss Cap Fins (PBCF) is a device for propeller efficiency improvement developed by Mitsui O. S. K. Lines, Ltd. The PBCF can recover energy loss of a propeller hub vortex in the propeller's backward flow. This decreases fuel consumption by 5% when operating at the same speed, or boosts speed by 2% with the same fuel consumption.

With the current emphasis on

global environment problems, the demand for the PBCF has been continually growing and this as an energy saving device and an environment-friendly product because it realizes a 5% reduction in CO₂, NO_x and SO_x gases emission from vessels.

By performing the operation on-site and underwater a ship owner can immediately start enjoying the fuel savings the system offers. Otherwise he has to wait for the next scheduled drydocking before having the PBCF's installed. This would cost him up to two years of savings. Calculations show that he will have earned back the money of the underwater installation in about eight weeks, so the savings for the customer are enormous.

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Hydrex teams up with Wärtsilä to repair underwater stern tube seal assembly in Australia

Last month a Hydrex diver/technician team carried out underwater stern tube seal repairs on a 110-meter offshore supply vessel in Bunbury, Australia. The rope guard covering the stern tube seal assembly was missing and the seal box had come loose after a mooring rope got tangled around the assembly. An emergency on-site repair was necessary. Hydrex therefore mobilized a diver/technician team to the vessel's location and was able to carry out the entire operation on-site and underwater. This operation saved the owner an expensive and time-consuming trip to drydock.

The replacement was carried out in close cooperation with the Seals and Bearings Services division of Wärtsilä Netherlands B.V. With the establishment of Seals and Bearings Services the company can offer a complete package of products throughout the world. All Wärtsilä products comply with the major classification societies and are carefully selected to make sure that the customer is given the best available solution. Wärtsilä is specialized in providing sealing solutions for stern tubes, rudders, bulkheads, waterjets, thrusters, electric pods and special applications, such as tidal and industrial power. They also offer a vast selection of bearings for various applications including stern tubes, rudders, line shaft bearings, thrust bearings and generator bearings. The company has operations in 70 countries around the world. "The



A Hydrex team carried out underwater stern tube seal repairs on an offshore supply vessel in Australia.

cooperation with Hydrex went perfectly," says Eric Krijgsman, Sales Manager for Seals & Bearings for Wärtsilä Netherlands B.V. "Ship owners are often not in the position to go to drydock due to financial reasons or time restraints. They then ask us to perform repair or maintenance work underwater. Thanks to Hydrex we can now offer on-site solutions to our customers."

The diving team first set up a monitoring station. The operation then started with a thorough underwater inspection of the stern tube seal assembly. This revealed that a moor-

ing rope had gotten tangled around the assembly, badly damaging it. Besides the missing rope guard, the seal box assembly bolts were broken off at the base flange ring. As a result the remaining seal box rings were hanging loose on the liner. This allowed seawater to come into the stern tube.

After the inspection the divers removed the broken bolts and installed a Hydrex flexible mobdock around the stern tube seal assembly. By



Hydrex under-water inspections



Underwater inspections are an essential aspect of ship repairs. Building upon conventional technical skills and know-how while also taking advantage of the latest technology, Hydrex offers a unique hull monitoring service to its customers. This gives ship owners total control of the underwater hull and the underwater gear of their vessels. An informed decision can then be made concerning any required follow-up action. Catching problems early can save much time and money.

Hydrex diver/technicians can carry out inspections underwater and on-site very swiftly without disturbing the vessel's sailing schedule.

With fuel costs amounting to 40% of operational expenses and continuing to rise, reducing fuel consumption is a vital concern of ship owners. This is the reason why hull monitoring pays for itself. Underwater hull roughness, marine fouling, bent propellers and poor paint condition are all factors that will increase fuel usage due to the drag or inefficiency created by the damaged or affected area. The data gathered can then be used for a wide range of actions.

Our diver/technicians are trained for a wide range of operations and they can carry out the inspections in port or at anchor anywhere in the world.

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The rope guard was gone missing, as was the locking wire for the stern tube bolts.



Diver surfacing during night shift.

doing this they created a dry underwater environment so that they could work in drydock-like conditions.

The split ring was then disconnected and brought to the surface to be cleaned. After cleaning the entire assembly, the divers installed a spacer ring to create a new running

area for the seals. Next they removed the first seal and replaced it with a new one which was then bonded. This was done in cooperation with the supervising Wärtsilä specialist flown in from Sydney. The procedure was repeated with the other three seals.

The operation ended with the con-



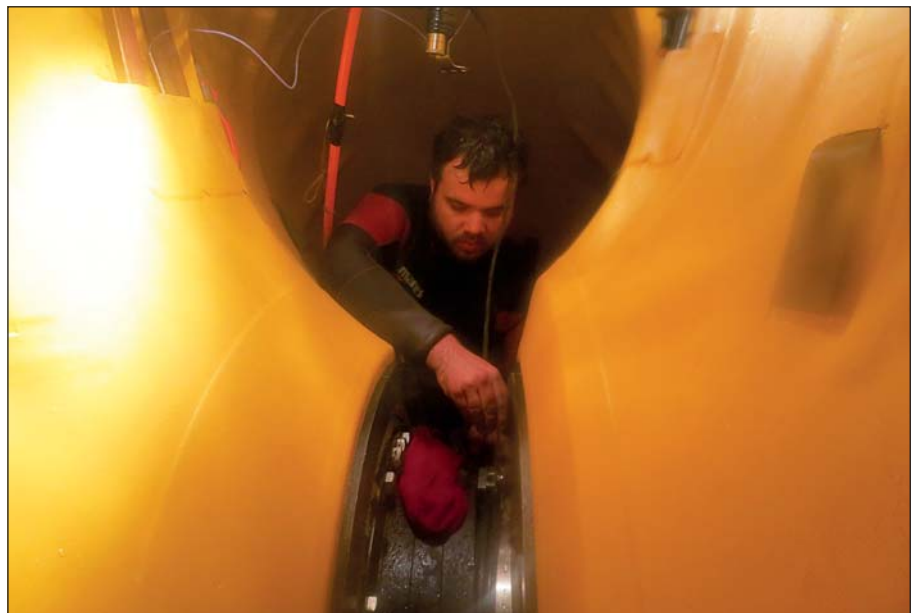
The seal box assembly bolts were broken off.

ducting of successful leakage tests, the removal of the flexible mobdock and the installation of a new rope guard.

Hydrex has carried out repairs and replacements on all types of seals on-site and underwater, for almost twenty years now. We constantly invest in the research necessary to continue to evolve repair techniques and procedures. Over the years the Hydrex R&D department has improved the flexible mobdock (mobile mini drydock) technique to make it possible for our diver/technicians to perform permanent repairs on seals, thrusters and almost any other part of the underwater vessel without the need for drydock. The latest generation of flexible mobdocks allow us to carry out on-site replacement of virtually any type of stern tube seals very quickly.

Conclusion

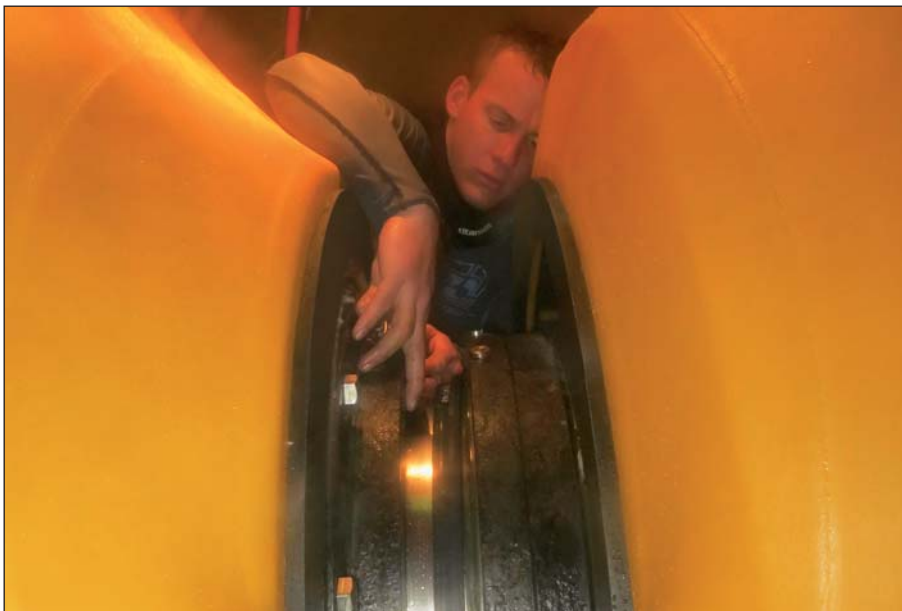
During the operation other repair and maintenance work was being carried out to the deck of the ship. This involved a large crane which extended over the water making it unsafe for diving operations to continue simultaneously. This meant that the Hydrex team had to halt the



Inside the flexible mobdock divers can work in drydock-like conditions.



Spacer ring arriving on-site.

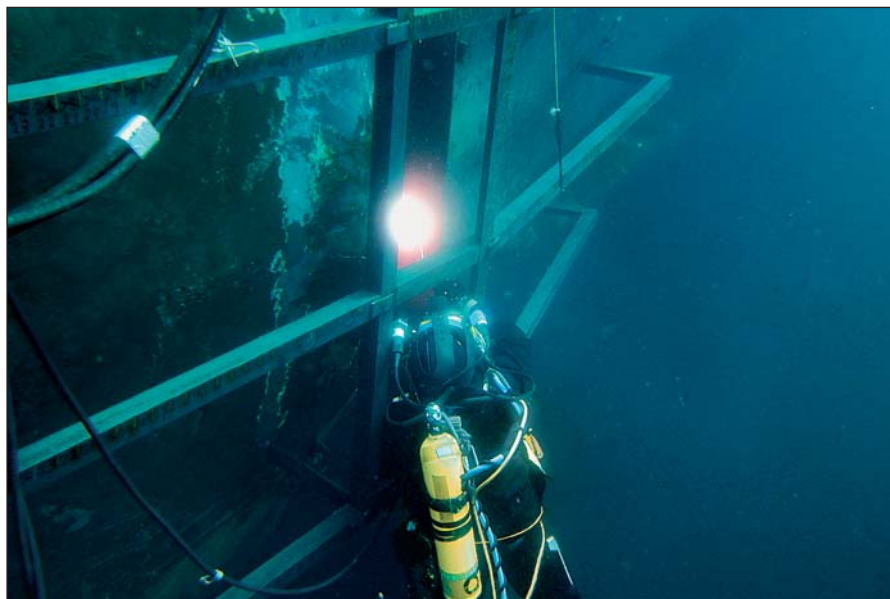


Diver/technician working on the stern tube seal assembly inside the flexible mobdock.

operation on several occasions. Hydrex divers are trained to be flexible and can handle constant changing and challenging circumstances. They worked in shifts to finish the stern tube seal repairs as quickly as possible. Despite the interruptions, the operation was carried out without any reduction of quality. According to the Vessel Manager of the offshore supply ship the combined Hydrex and Wärtsilä team "has done a good and impressive job." The owner could sail his vessel free of water ingress and without having to go to drydock. ■

Fast underwater ship hull repairs save time and money

Hydrex on-site hull repair services include the renewal of both small and large areas of damaged hull plating. These repairs can be carried out above or below water, according to the circumstances, with tailor-made mobdocks. Normal commercial activities can therefore continue without disruption. These operations follow the Hydrex procedure for welding cracks in the vessel's shell plating and they are approved by the major classification societies.



Hydrex diver/technician teams carry out these on-site hull repairs all over the world. In most cases the damaged area can be replaced with a permanent insert and no condition of class is imposed. On the rare occasions where the damage does not allow such a repair, a temporary doubler plate is installed over the affected area. This allows the own-

ers to keep to their schedule and have a permanent repair carried out during the next scheduled drydock visit.

To offer the fastest possible service to

customers, Hydrex offices have fast response centers where an extensive range of state-of-the-art tools and diving support equipment is available at all times for the repair teams.

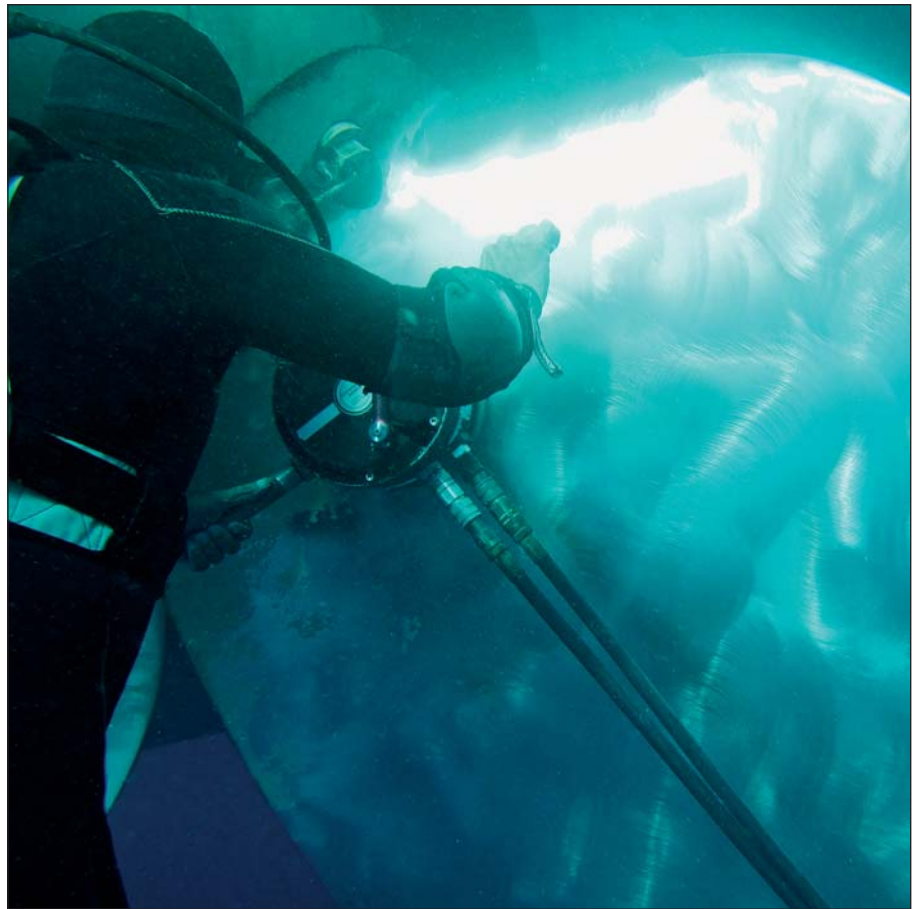
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Revolutionary new propeller cleaning technique offers large fuel savings

Hydrex has a new approach to propeller cleaning. The traditional approach in the industry is to let the propeller get good and fouled and build up a calcareous growth and maybe polish it in the water once or twice a year or in drydock. This polishing is done with a grinding disk and can be quite damaging to the propeller. By the very fact of using a grinding disk, a substantial amount of metal is removed from the propeller itself. This can alter the shape and efficiency, cause roughness and increase rather than reduce friction. It can also be a source of marine pollution which is a problem in a number of ports.

Hydrex discovered that more frequent, lighter cleaning of the propeller using a different tool to a grinding disk, and catching the propeller before a calcareous layer builds up is actually the optimum approach to propeller cleaning. If done right and done regularly it can result in 5% or even more fuel savings. Obviously for a ship that has even a medium level of fuel consumption, this savings far outweighs the cost of the propeller cleaning itself. Because the propeller is being cleaned regularly, the cleaning is relatively light and quick. No material is ground away, which is good for the propeller and the environment. The propeller is kept in an ultra-smooth condition (Rubert A or A+) and that's where the real fuel savings can be achieved. This finish can only be accomplished with in-water propeller cleaning.



If done right and done regularly propeller cleaning can result in 5% or even more fuel savings.

Fuel prices are climbing. As new low sulphur fuel requirements come into force, the prices are going to go even higher. A 5% savings of the propulsive fuel costs for the ship can make a huge difference to the bottom line.

Many of our customers who have availed themselves of this service have noticed a remarkable difference in their fuel efficiency after each cleaning.

Thanks to its network of offices and service stations, Hydrex can offer propeller cleanings on a worldwide basis. These operations are carried out using underwater equipment designed and developed in-house

specifically for propeller maintenance. Hydrex combines this service with underwater inspections where this is economically advantageous to the shipowner or operator.

We have prepared a full White Paper "Ship Propeller Maintenance: Polish or Clean?" which goes into the subject in detail. It gives the full story. You can download this White Paper at www.shiphullperformance.org.

But even without the White Paper, let us know if you would like to know more about the subject. We would be happy to give you a call to discuss details. ■



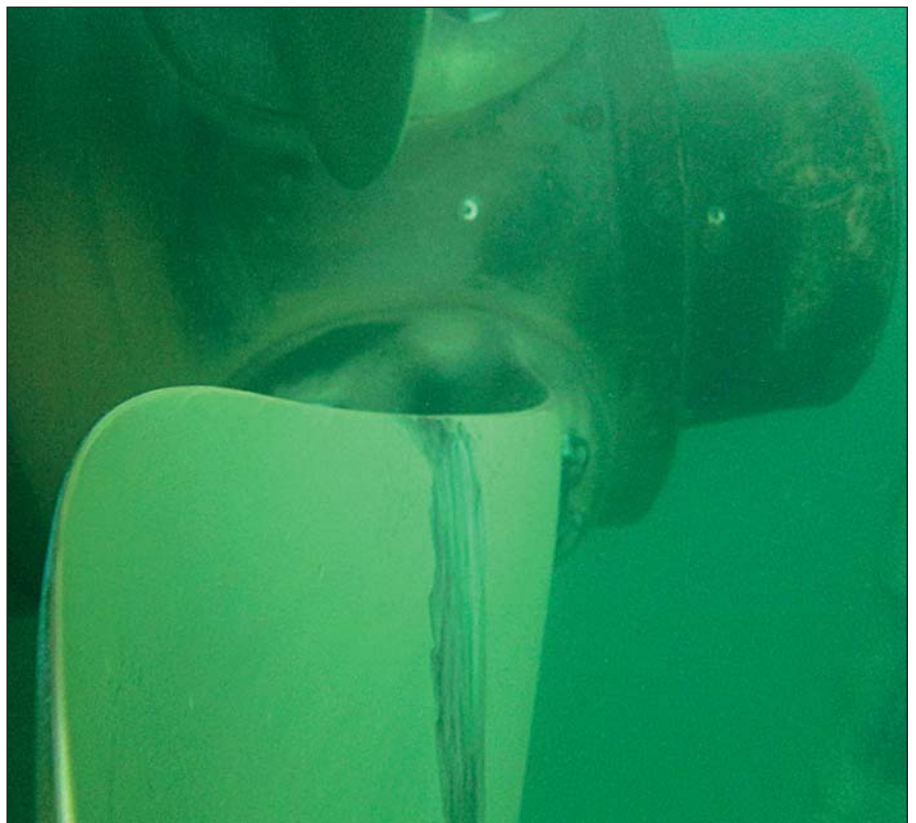
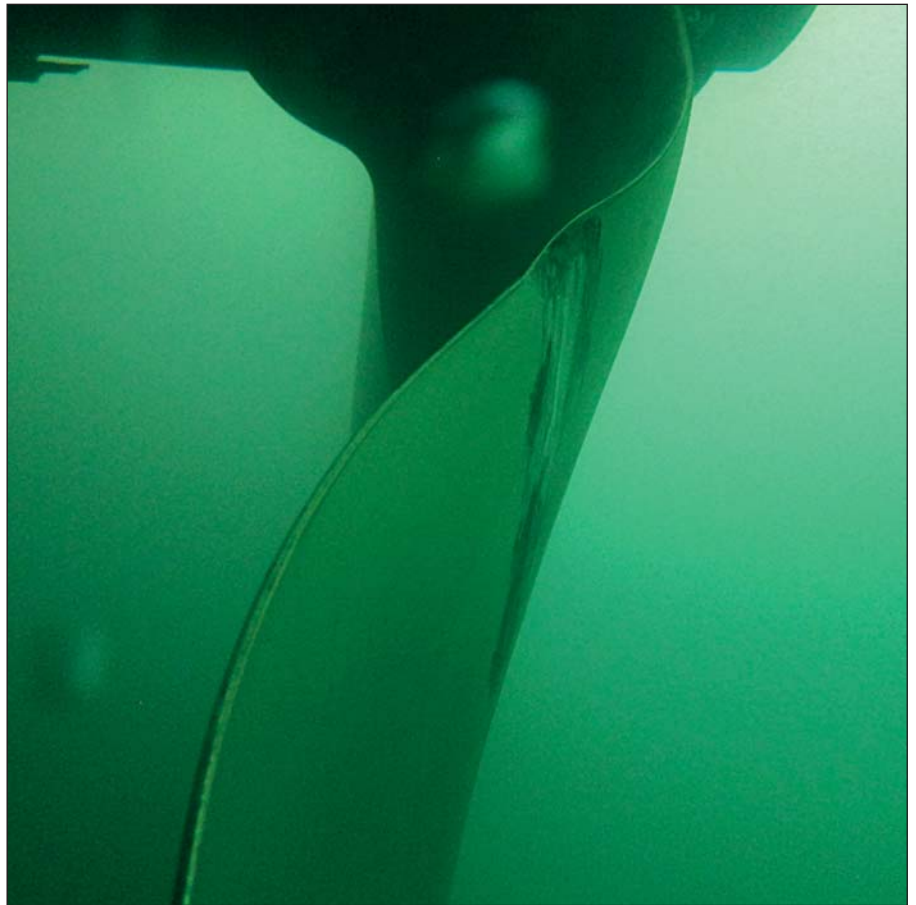
Heavy storm damages rudder of dry cargo vessel

When the rudder of a 132-meter dry cargo vessel was severely damaged during a heavy storm it came loose and was swinging dangerously from side to side during sailing, hitting the propeller of the vessel. The ship was unable to sail any further. A Hydrex diver/technician team mobilized to St. Malo, France in January to perform an emergency repair operation.

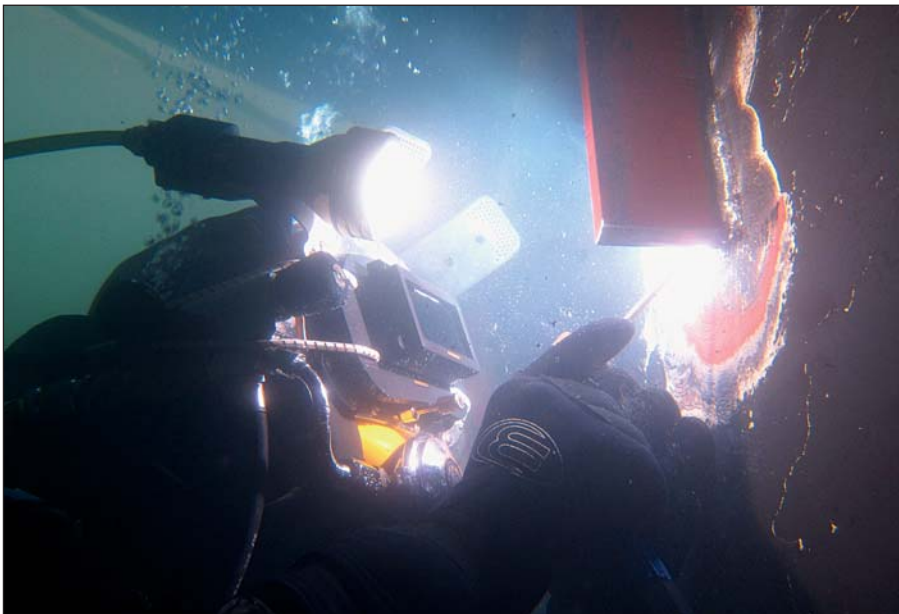
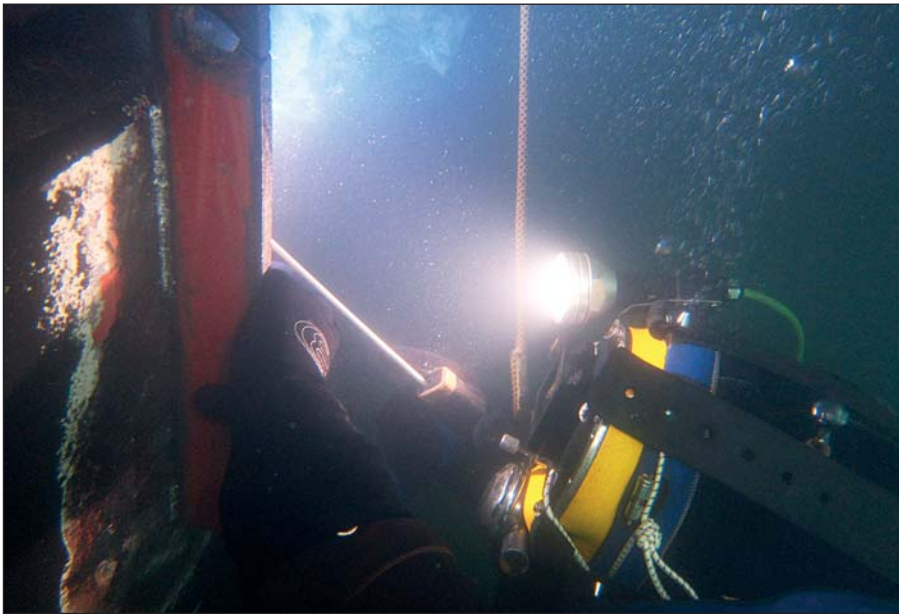
A thorough underwater inspection revealed that the rudder was positioned in the portside angle. Several bolts and rings were missing from the steering gear of the rudder. The team then pulled the rudder to a zero angle. Next they installed a temporary stiffener that would keep the rudder in position. This allowed the manufacturer to safely open up the rudder from the steering room.

It immediately became clear that the steering gear was completely broken and needed to be replaced in its entirety in drydock where the damage to the propeller would also be repaired.

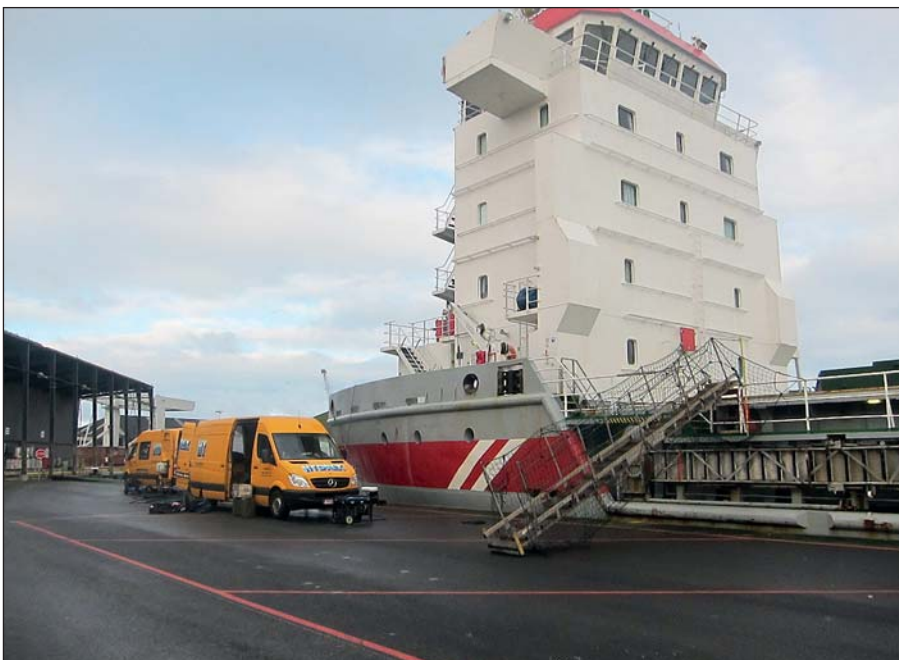
The vessel needed to be towed without the rudder moving uncontrollably and causing further damage. The Hydrex diver/technicians therefore reinforced the temporary stiffener with a full weld and installed seven additional stiffeners. The rudder was now fully secured in the neutral position. The vessel could be towed safely to drydock for further repairs.



The propeller of the vessel was hit by the loose rudder.



Hydrex divers secured the rudder with stiffeners, allowing safe towage of the vessel.



Hydrex vans next to the cargo vessel in St. Malo.

New generation cold straightening equipment

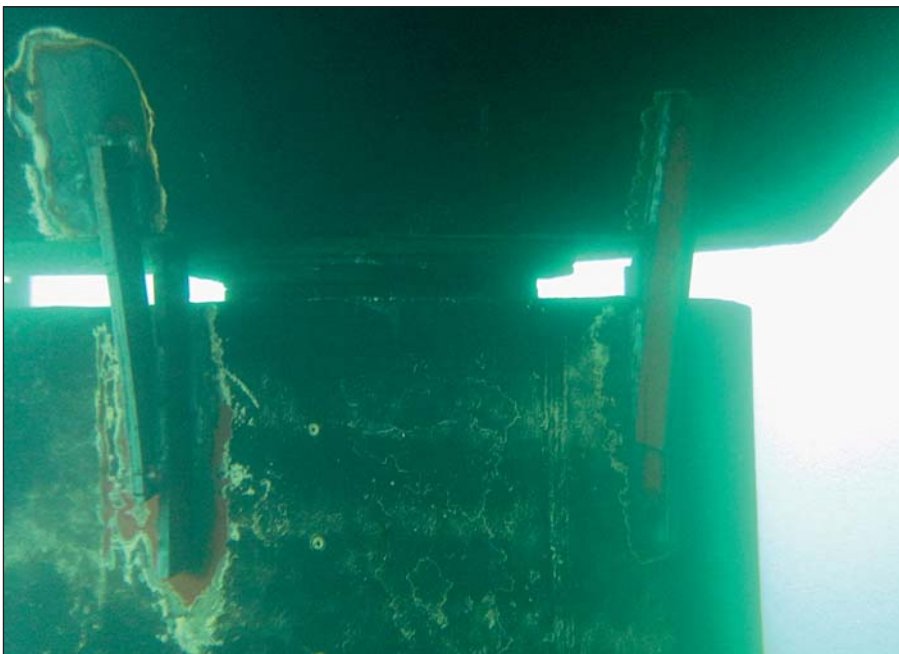
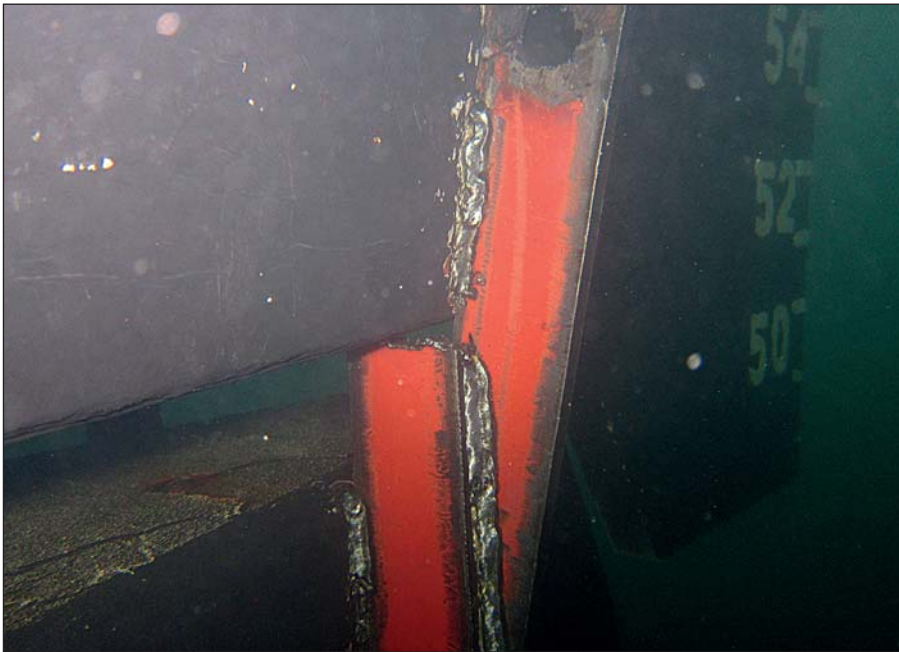
In its quest to provide cost effective services to customers, Hydrex developed procedures to address different kinds of damage to propellers. This research led to the design of the Hydrex cold straightening machines first used in 2002.



By taking advantage of this technique damaged blades can be straightened underwater, allowing the ship to return to commercial operations without the need to drydock. Blades can be brought back close to their original form, restoring the propeller's optimum efficiency.

The cold straightening machines have been in use for quite some time now but the Hydrex research department has been looking into ways to expand the technique even further to improve our services. A new version of the straightening machine was recently put into practice. It is compatible with the existing models and is used to restore more severely bent propeller blades to their original condition.

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Eight stiffeners were welded to prevent the rudder from moving uncontrollably during its trip to drydock.

Permanent on-site repairs with new technology

Because of the extent of the damage to the steering gear, drydocking was the only option for this ship. In most cases, however, in-house developed rudder repair techniques allow Hydrex to perform permanent repairs while the vessel remains at anchorage. Cargo operations can continue uninterrupted, saving the owner precious time and money.

The equipment can be mobilized within hours to any port in the world. This allows Hydrex to offer this service on a worldwide basis. The technique allows engineers, welders and inspectors to perform their tasks in dry conditions with the vessel still afloat. Class approved permanent repairs in-situ are possible. Steel repairs and replacements can be performed and pintle and bushing defects can be remedied without the loss of time and money associated with drydocking. ■

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Swift on-site bow thruster operations



The Hydrex lightweight flexible mobdocks are designed to be easily transported around the world and are used to close off the thruster tunnel on both sides, allowing divers to perform repairs and other operations in a dry environment around the bow thruster unit.

This technique enables them to

reinstall the propeller blades of an overhauled thruster inside the thruster tunnel after the unit has been secured or replace the blades or seals and perform repair work on a specific part without removing the unit.

Since the development of this flexible mobdock technique, numerous thruster repairs have

been carried out by Hydrex diver/technicians around the world.

There is no need to send the vessel to drydock as all operations can be carried out in port or while the vessel is stationary at sea. Normal commercial activities can therefore continue without disruption.

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Keeping ships in business

Hydrex offers turnkey underwater repair solutions to ship-owners wherever and whenever they are needed. Hydrex's multi-disciplinary team will help you find the best solution for any problem encountered with your ship below the water line. We will immediately mobilize our diver/technicians to carry out necessary repair work without the need to drydock.

Hydrex has a long track record of

performing complex permanent underwater repairs to thrusters, propellers, rudders, stern tube seals and damaged or corroded hulls. By creating drydock-like conditions around the affected area, our diver/technicians can carry out these operations in port or at anchor.

All the projects we undertake are engineered and carried out in close cooperation with the customer and any third party suppliers, relieving

the customer of all the hassle of coordination, planning and supervision.

Headquartered in the Belgian port of Antwerp, we have offices in Tampa (U.S.A) and Algeciras (Spain).

All Hydrex offices have fully operational fast response centers where an extensive range of state-of-the-art equipment is available at all times.



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