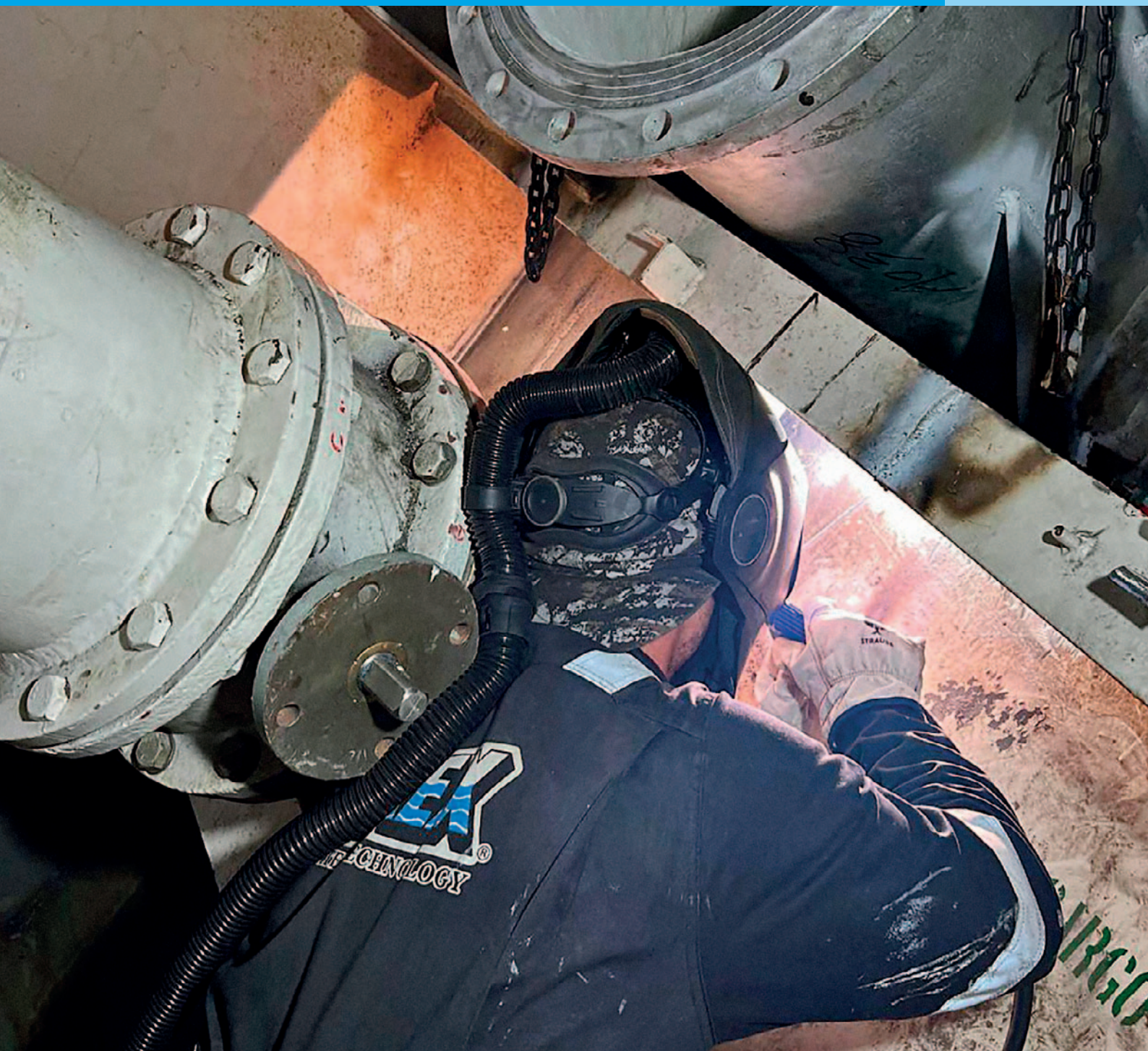




UNDERWATER TECHNOLOGY

Magazine

Number 325



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Inwater propeller repairs



When damage to propellers occurs due to impact with ice and other debris we can help you, even if the damage is quite extensive. Our teams can restore the propeller's balance and efficiency.

By taking advantage of the in-house developed cold straightening technique, damaged blades can be straight-

ened underwater, allowing the ship to return to commercial operations without the need to drydock.

If straightening is not an option, the affected area of the blade will be cropped. This is done to achieve the greatest possible efficiency. Cropping is carried out using our propeller blade cutting equipment.

Our teams can also carry out any other repair work on the propeller. Examples of this are the removal and reinstallation of entire propeller blades or replacement of the propeller seal ring.

Contact us for more information on underwater propeller repairs. We are at your disposal 24/7.



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Editorial



I founded Hydrex 50 years ago to help ship owners solve the problems they might encounter underwater with their vessels and this purpose still holds firm today. We made 'helping you' our responsibility and it is work we continue to enjoy.

Our customers deserve the best possible solution for any issue that might arise. For this reason, we have always invested in the research required to keep evolving the techniques available to our divers. As a result, we have always been at the forefront of technological developments in our field of expertise.

Because know-how alone is not enough, we have established a network of offices and service stations

around the world. This allows us to offer the best possible service in the fastest possible time on a worldwide basis.

The bottom line is very simple: When a customer calls us for assistance, he has to know that our teams can mobilize very quickly and that we can provide every single service that is required, wherever it is needed

Hydrex founder
Boud Van Rompay
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www.hydrex.be

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Underwater services and technology approved by:



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Five underwater stern tube seal repairs in one month

Recently our teams traveled across different continents and performed underwater seal replacements on five vessels in just over a month. Our diver/technicians travelled for repairs to Spain, then to Belgium, next on to Trinidad and Tobago, then to Colombia and finally back to Spain. By using our flexible mobdocks, all the repairs could be performed on-site and the ships did not have to go to drydock.

We can perform shaft seal operations on all types and sizes of shaft seals. This is illustrated by the range of ships our divers worked on: a yacht, a ferry, a roro vessel, a general cargo ship and a tanker.

On four of the five vessels oil leaks were the reason for the operation. These were caused by ropes and nets that got tangled in the stern tube seal assembly. The same procedure was followed for each repair.



Hydrex truck and equipment next to yacht in Barcelona.

Our flexible mobdock technique

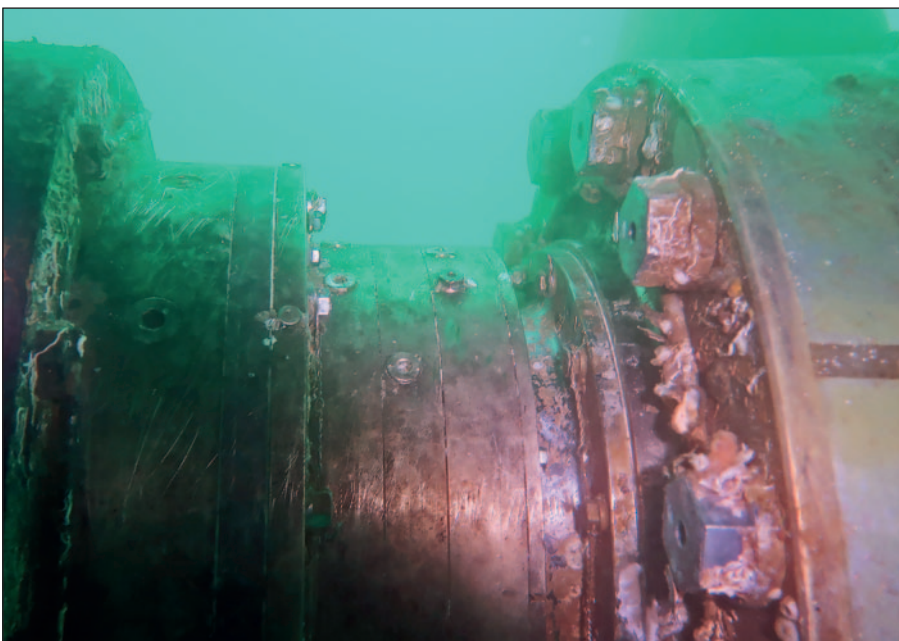
After arriving on-site, the diving team first set up a monitoring station next to the vessel. Each operation started with a thorough underwater inspection of the stern tube seal assembly, and removal of the rope guard.

Our divers then cleaned the assembly and removed any fishing lines or nets that had become entangled. They then installed the flexible mobdock creating a dry underwater environment where they could work in drydock-like conditions.

Next the split ring was removed and brought to the surface to be cleaned. The divers then removed the first seal and replaced it with a new one which was bonded. Next, they did the same for the other two seals.

Each operation was concluded with successful leakage tests, the removal of the flexible mobdock and the reinstallation of the rope guard.

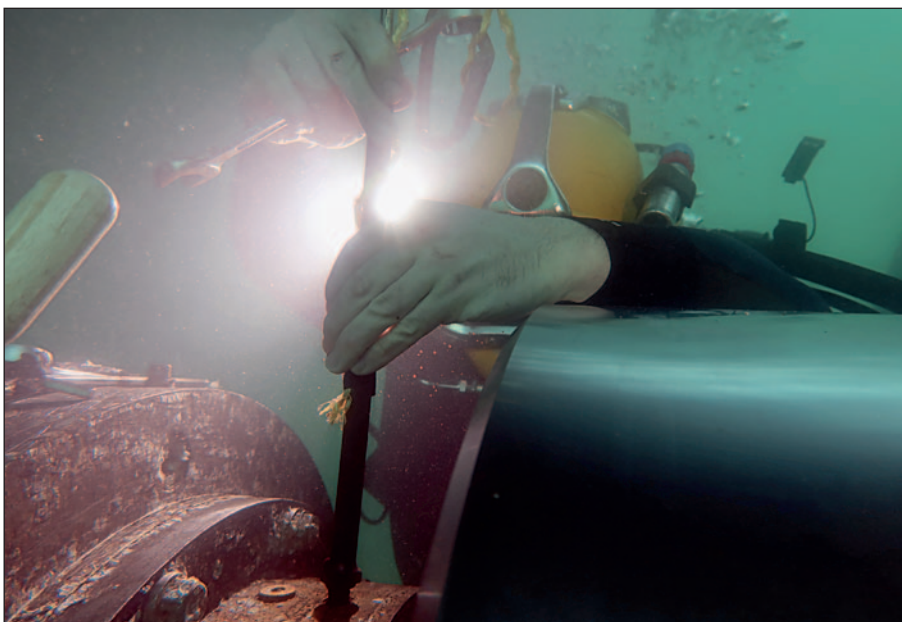
The operation on the yacht was slightly different. No oil leak was found on either of the two seal assemblies of the vessel, so only the two water seals needed to be replaced on each of the shafts. The procedure used for these repairs was the same as described above.



Seal assembly after cleaning, prior to seal replacement.



One of our divers working inside the flexible mobdock.



Hydrex diver working on the seal assembly.

Permanent in-water rudder repairs now possible without drydocking



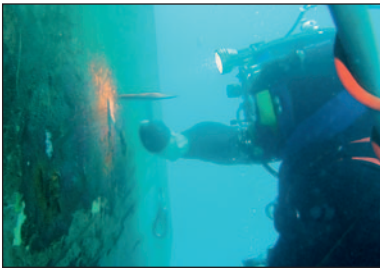
Hydrex has developed an entirely new method enabling permanent repairs of rudders without drydocking the ship. Permanent repairs were hitherto not possible and ships had to drydock in case a major defect was found. The newly designed equipment is light-weight and can be mobilized very rapidly in our special flight containers.

Major defects on rudders very often cause unscheduled drydocking of ships. The new method designed by our technical department allows engineers, welders and inspectors to perform their tasks in dry conditions. Class approved permanent repairs on-site, without moving the ship, are now possible and commercial operations can continue. Steel repairs and replacements can be performed and pintle and bushing defects can be solved without the loss of time and money associated with drydocking.

The equipment can be mobilized within hours to any port in the world and is available for rapid mobilization from the Hydrex headquarters in Antwerp.

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Hydrex under- water inspections

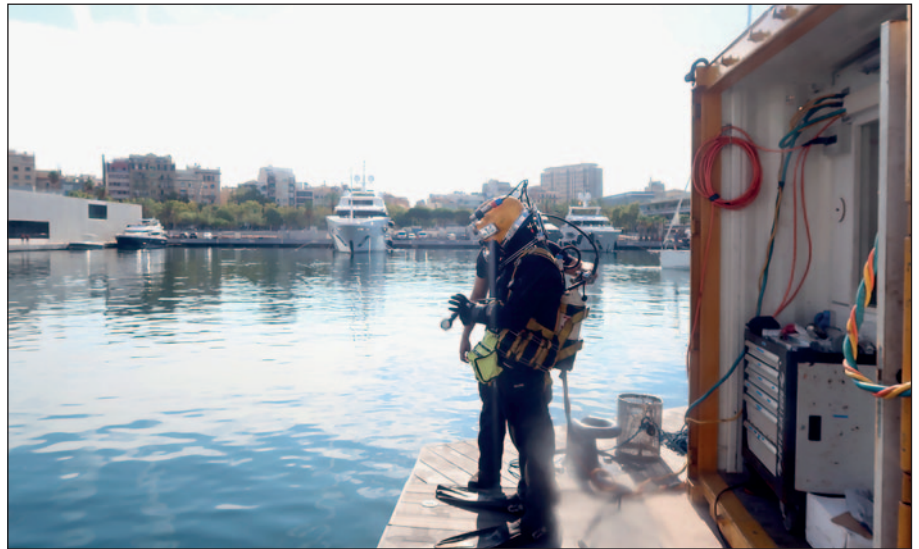


Underwater inspections are an essential aspect of ship repairs. Building upon conventional technical skills and know-how while also taking advantage of the latest technology, Hydrex offers a unique hull monitoring service to its customers. This gives ship owners total control of the underwater hull and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

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 to see if actions are required.

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.



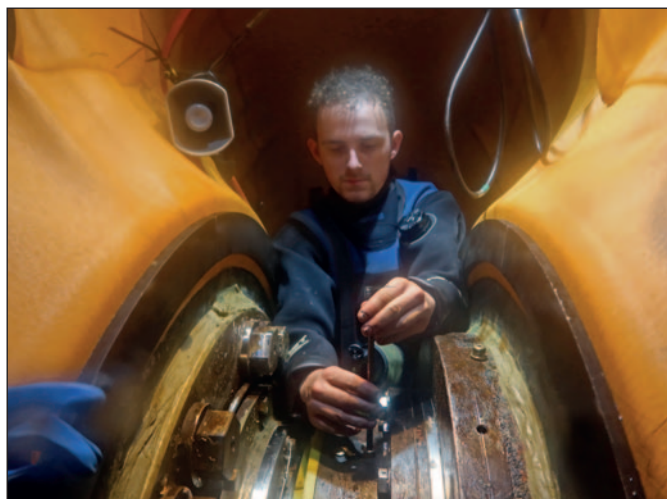
Suiting up for underwater operation in Barcelona.



Diver removing fishing net caught in seal assembly.



Welding work on the rope guard in Trinidad and Tobago.



Closing up the seal assembly inside our flexible mobdock.



Stern tube seal assembly after seal replacement.

Conclusion

Taking advantage of our flexible mobdock technique, our men were able to carry out the repairs on-site and underwater. Because all the required material is ready to be transported at all times, no time was lost making preparations.

With Hydrex organizing everything from start to finish, the owners did not have to worry about making any arrangements for the repair. After the seals had been successfully replaced, they could sail the ships to their next stop free of oil leaks. ■

Helping the customer to stay on schedule

Damaged stern tube seals will cause an increasing amount of oil leaking or water ingress as the damage worsens. By replacing the seals when the damage is first discovered, we keep the down time low. As a result, the ship can keep its schedule as seal repairs can be performed during cargo operations. We do this by creating a dry underwater working environment around the shaft.

It is not always straightforward to replace seals, because there can be quite a bit of variation in the configurations of the stern tube itself. There can also be complications with the liners, which can be worn down and show ruts. However, all this is routinely handled by our teams on the jobs.

All shaft seal repairs we offer are performed in cooperation with the

OEM. We usually supply the equipment, but the owner is free to supply his own OEM seals. We can handle all type of seals from all manufacturers.

Contact us for more information on the underwater replacement of shaft seals. We are at your disposal 24/7.



High quality in-water ship re

Permanent insert repairs

Specialist class approved insert repair work carried out on a permanent basis. Providing a real alternative to drydock.

Emergency repairs

Fast response emergency repairs worldwide.

Inwater video inspections

Professional video surveys provide a reality of the problem and enable owners and classification surveyors to directly diagnose any problems.



Echo sounder inspection and replacement

Speed log
Checks for damage, marine fouling and replacement.

Bow thruster and propellers
Permanent on-site repair, maintenance and replacement with the award winning flexible mobdock technique.

Hull cleaning on suitable coatings

Bilge keel
Check and repair broken welds, renewal of sacrificial anodes.

pair and fuel saving services

KEEPING SHIPS IN BUSINESS



Sea valves, sea chests and gratings
In-water inspection, cleaning and repair of intakes and valves, installation of new sea chests, condensers and coolers afloat.

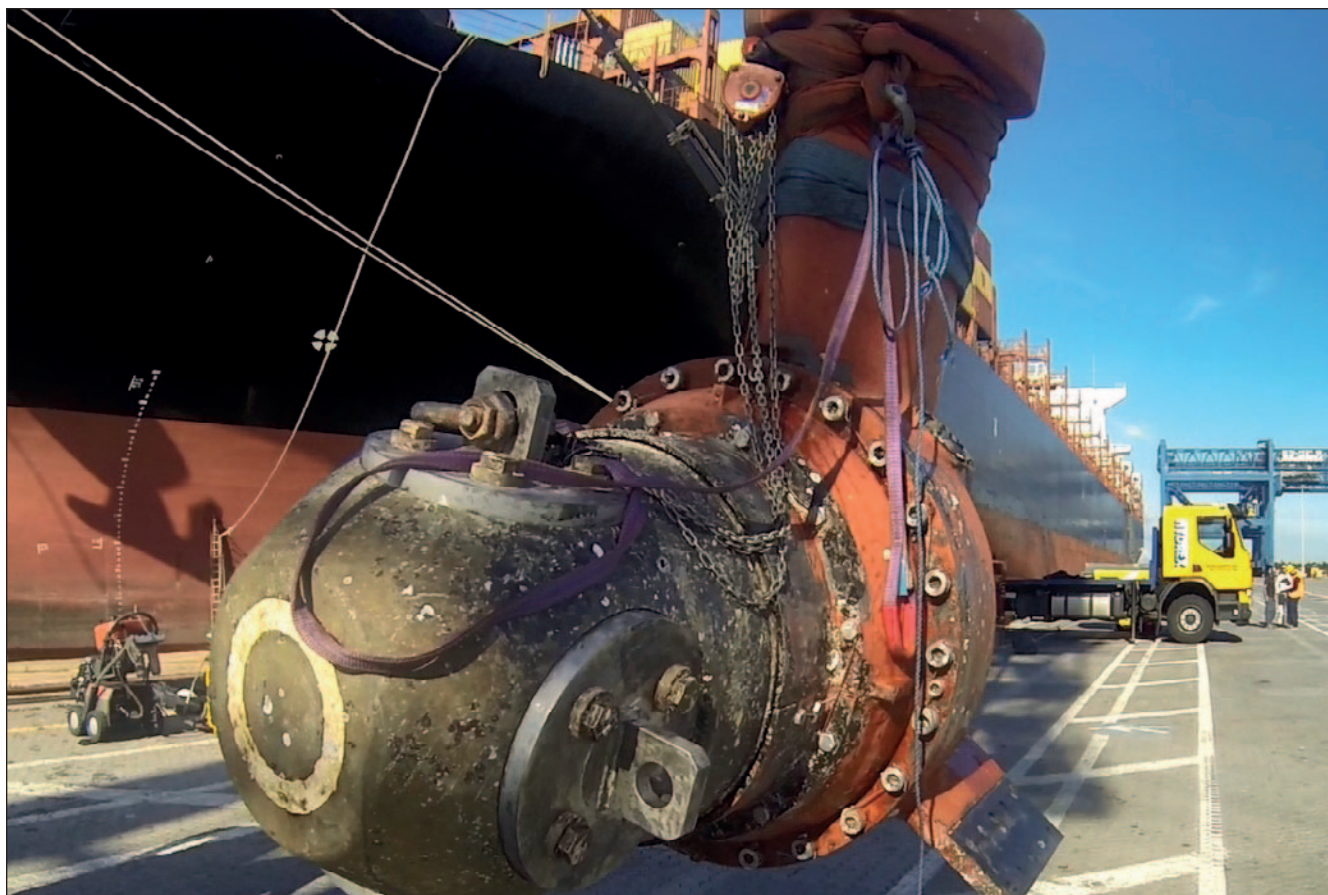
Stern tube seal replacement
Permanent inwater stern tube seal replacements and repairs with the unique Hydrex flexible mobdock technique.

Propeller operations
Propeller cleaning with special tools, on-site blade straightening and cropping. Permanent repairs to all types of propellers or installation of propeller cone fins.

Rudder repairs
Permanent on-site repairs on all types of rudders with groundbreaking new technology.

Pintle and bushing repair and replacements

In-water bow thruster repairs



Our 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 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.

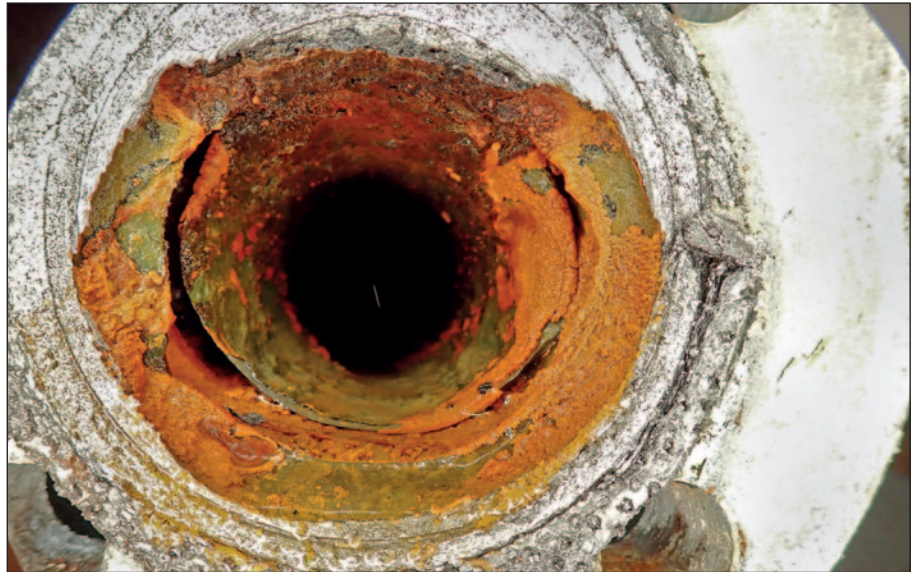
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Scrubber pipes repaired and given lasting protection

Our diver/technicians carried out scrubber overboard pipe repairs on tankers, roro ships and container vessels in Belgium, the Netherlands, and Germany. In total, ten corroded pipes were replaced on six ships while clad welding repairs were done on two vessels.

Exhaust scrubbers are systems that filter out the harmful toxic substances from exhaust gases of marine diesel engines. These can severely corrode the pipes of the



Old scrubber pipe corroded by the highly acidic effluent from the scrubber.



Removing the old scrubber pipe.

scrubber which can result in water ingress if not handled quickly enough.

In all cases the pipes were protected with Ecospeed. This product is produced by Hydrex's sister company Subsea Industries (www.subind.net). Ecospeed is highly chemically resistant. Considering the nature of the process taking place inside a scrubber, this is essential for a lasting protection of the pipe. Ecospeed can also be used to protect a newly installed scrubber system from day one.

If no welding work needs to be carried out in close proximity to the coated area, new pipes are coated with Ecospeed in advance. If this is not an option, the coating can also be applied after the new pipe is installed.

Experience and flexibility

We know how important it is for ships to keep their schedule. For this



Cutting away the brackets of the old pipe.

reason, we split up operations like this in several stages if needed. These can be carried out in different ports to fit the customer's need. Fifty years of experience allows us to arrange this without causing any hindrance for the customer.

Pipe replacements

In the first examples below, all pipes needed to be replaced completely. The new pipes were fabricated at our warehouse in Antwerp. Our divers are certified wet and dry

welders as well as technicians, which allowed us to offer each customer full repairs from start to finish.

Because of the location of the damaged parts of the pipes, welding work on the inside shell plating of the hull was needed. In order to provide access for this, the outside of the overboards could not be sealed off with a simple patch. Custom cofferdams were therefore designed and fabricated at our workshop based on the drawings sent by the customers.

The same procedure was followed on each occasion.

After arriving at the ship, our team first performed an inspection of the damaged areas on both the waterside and the onboard side of the hull. They then installed the cofferdams over the outlets of the pipes. This



Cofferdam installed over the outlet of one of the scrubber pipes.



Preparing the edge of the shell plating for a new scrubber pipe.



Preparing the new scrubber pipe for installation.

allowed our welders to safely work on the shell plating from inside the vessel.

The affected pipes were then removed and replaced with new ones. These were positioned and secured with a full penetration weld. Next, an independent inspector carried out NDT testing of the weld seams.

This was done for the pipes of four tankers, a container ship and a ro-ro vessel.

Welding repairs

The corrosion on the scrubber over-board pipes of the other two ships was less severe. It was situated on the flange weld seams. A full replacement of the pipes was not needed.

In both cases our diver/welders ground away the affected area before rebuilding it back to its original thickness with clad welding.

When the welding was complete the surface was polished and a magnetic particle inspection (MPI) was carried out by an independent inspector.

The inside of the pipes was then coated with Ecospeed to keep them safe from further corrosion.

Preventive maintenance

We offer a full package to owners that are experiencing similar damages. We replace or repair the corroded exhaust pipe while your vessel stays on schedule, and we make sure that you will not have to call us again for the same problem.

Most ships sail on a tight schedule. We know how important it is to prevent any loss of time. Our technical



All welding work is done following our class approved procedures.



Hydrex diver/welder during installation of a new scrubber pipe.

department has many years of experience in drawing up a repair plan that fits in perfectly with a vessel's schedule. Working in shifts or splitting up an operation in stages are

just a few of the many ways we can make sure that the impact of the repair is limited to the absolute minimum or avoided entirely. ■

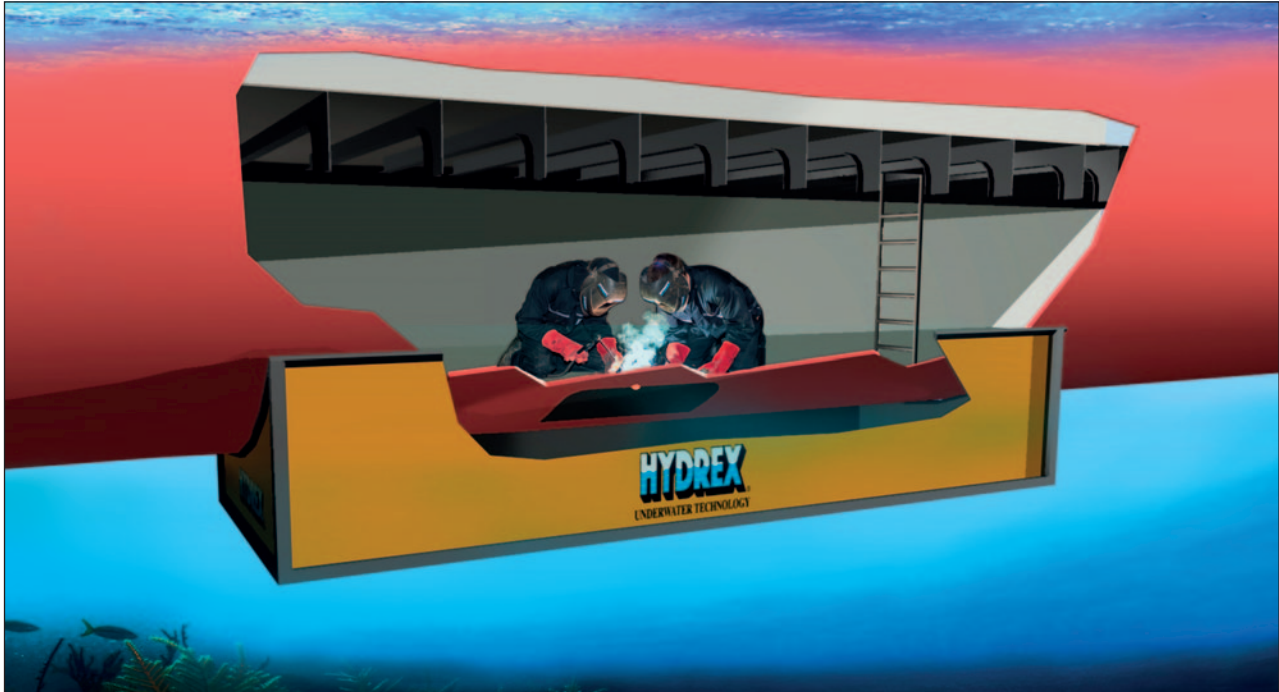


Independent inspector checking the welds.



New scrubber pipe. The inside was coated with Ecospeed.

Hydrex 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 cofferdams. 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 all 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 owners to keep to their schedule and have a permanent repair carried out during the next scheduled drydock visit.

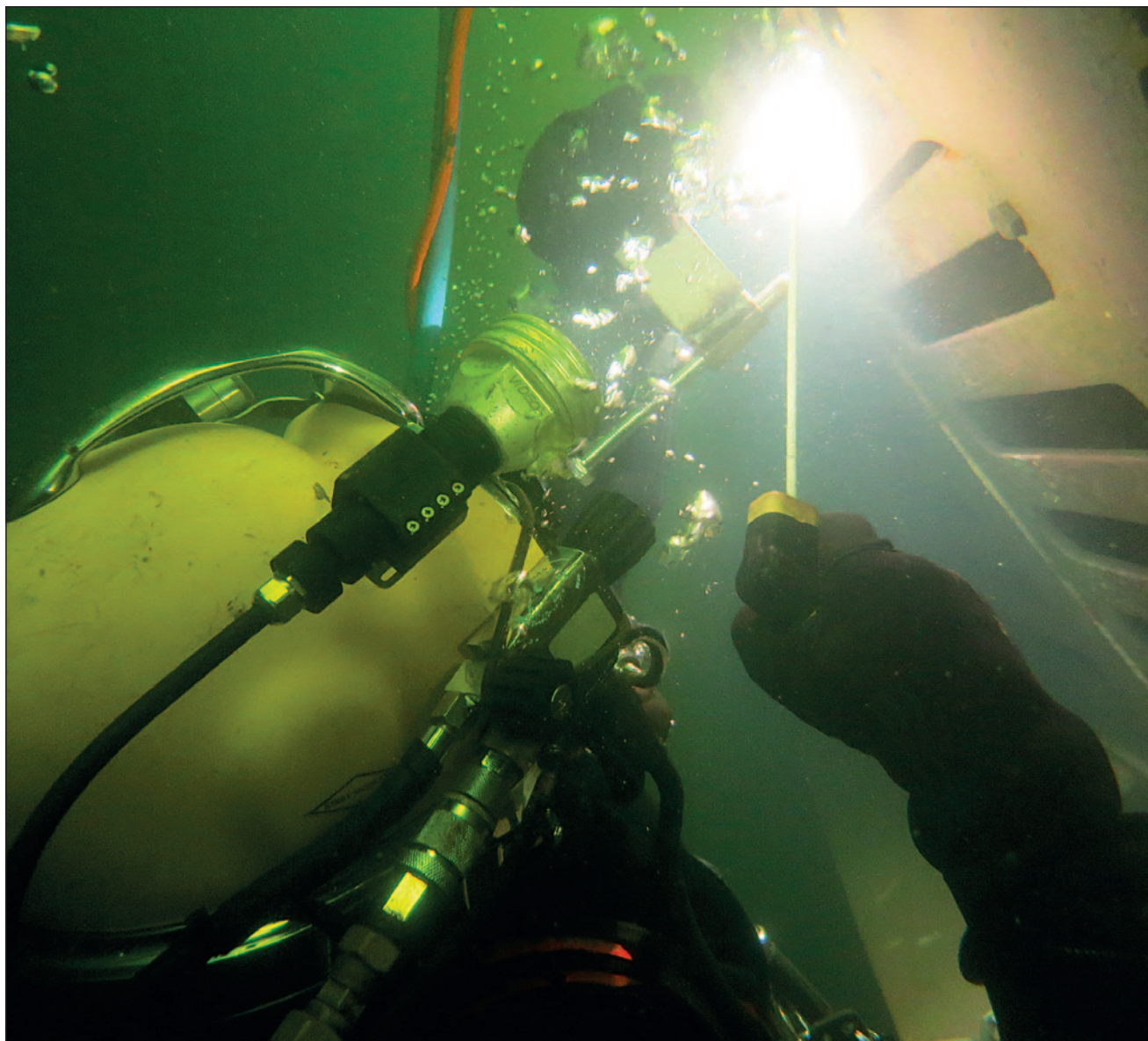
To offer the fastest possible service to customers, Hydrex offices have fast response centers where an extensive range of state-of-the-art tools and diving support equipment is available at all times for the repair teams to mobilize to your location.

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