

HYDREX[®]

UNDERWATER TECHNOLOGY

Magazine

Number 335



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Scrubber pipe repairs and lasting protection



Exhaust scrubbers filter out all harmful toxins from exhaust gases of marine diesel engines. These hazardous pollutants can severely corrode the pipes of the scrubber. Using the experience we have accumulated over the years allows us to assist you at moment's notice if this happens.

We offer a full package to owners that are experiencing similar damage. Not only can we replace the corroded exhaust pipe while your vessel stays on schedule, but we can make sure that you will not have to call us again in a few months time for the same problem. This is done by coating the pipes

with a highly corrosion resistant coating called Ecospeed.

Contact us for more information on scrubber pipe replacements or other underwater repairs. We are at your disposal 24/7.

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UNDERWATER TECHNOLOGY

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Editorial

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Welcome to the last Hydrex magazine of 2024. The past year was a very special one for us as it marked the 50th anniversary of Hydrex.

Throughout the year we have celebrated this occasion with a series of articles in which we looked back on some of the most important and spectacular operations our teams have performed across the world since 1974.

In July we dedicated an entire issue to Hydrex's history, going over the most important events of the company's development from a small diving firm with a home office into the global underwater repair and maintenance company it is today.

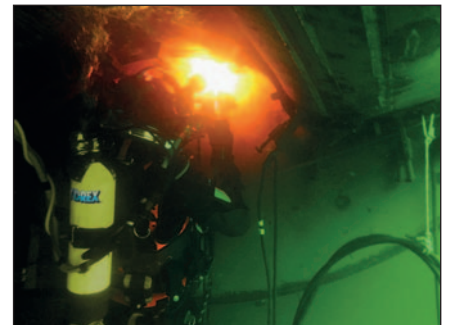
In case you missed any of these articles, you can find them on our website (www.hydrax.be), as well as free downloads of the magazines in which they were published.

I wish you all the best for the Holiday Season and the coming year. Rest assured that we will be ready to assist you 24/7 throughout the holidays and in 2025, as we have been since Hydrex was founded 50 years ago.

Hydrex founder
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ISO 9001 & 45001 certified

Underwater services and technology approved by:

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Hydrex ready to assist you during the Holiday Season

The Holiday Season is nearing and most people are looking forward to a well-deserved break. At Hydrex we remain at your service throughout the entire end of the year period, 24/7.

A problem with your vessel can occur at any moment during the year, so we know how important it is to have someone you can rely on anytime, anywhere.



Hydrex team working in winter conditions.



Hydrex workboat during operation.



Harsh conditions do not stop our dive teams.

If your vessel is in need of any type of underwater service, you are very welcome to mail us or give us a call. After an evaluation of the request we can quickly let you know whether an underwater solution is possible. We will give you a fast and clear answer to your questions.

Our offices in Antwerp, Rotterdam, Algeciras and Tampa are ready to assist you together with a network of agents and local support bases. We are able to mobilize immediately.

Any question or enquiry can be sent to hydrex@hydrex.be. You can also call us 24/7 at +32 3 213 53 00.

We wish you all the best for the New Year and hope you can sail safely and without trouble. ■

**KEEPING SHIPS
IN BUSINESS**

Revolutionizing underwater welding repairs since 1974

“In the early 20th century, it would have been considered suicide for a diver to shoot an electric arc into the water. Though professional diving was already an established industry and had been for hundreds of years, underwater welding was not. That all changed when Konstantin Khrenov, a Soviet engineer, invented a method to join and cut metals underwater.

“Khrenov wanted to find a way to weld underwater for quicker vessel repairs. WWI had ended, but WWII was beginning to brew and the USSR was mobilizing its fleets. As Khrenov discovered, one of the largest hurdles to successful wet welds lie in the sporadic outflow of gas bubbles from the point of contact with the arc and metal. This reaction caused major porosity in the welds, and the bubbles burst out, untamed. With the help of others, Khrenov devised a waterproof coat-

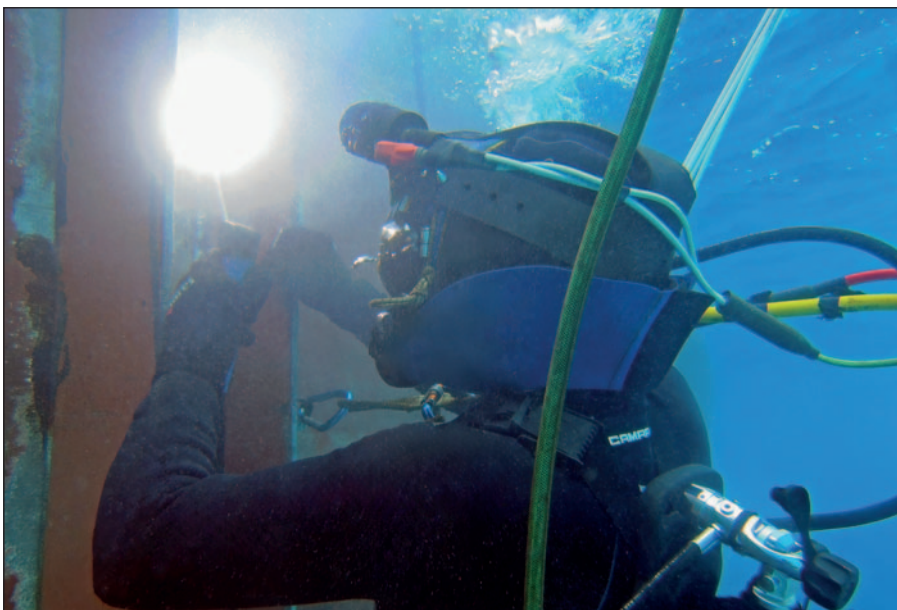


Our teams routinely perform underwater welding work to the highest quality standard.

ing for the electrodes, and a stable power source.

“In 1932 after successful experimentation in the labs, Khrenov traveled with engineers to the Black Sea for further successful testing. Under-water welding was born.”¹

However, it was not until the 1970s that the first underwater wet welding procedure was qualified to American Welding Society (AWS) standards by White Grubbs and Dale Anders of Chicago Bridge & Iron (CB&I) and the commercial development of underwater electrodes began.

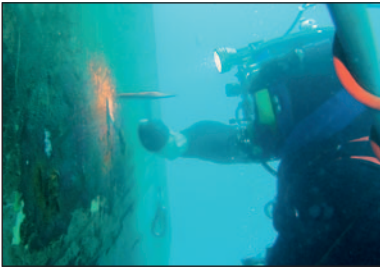


Hydrex has been at the forefront of wet welding for over 50 years.

Hydrex has been at the forefront of wet welding for the last 50 years. In this period, we have regularly introduced new welding techniques. We have also developed new equipment that makes it much easier to monitor and test the weld seams. This has been done by our in-house R&D department who cooperate closely with our diver/technician teams. Together they help us undertake the research required to keep evolving the available welding techniques.

¹Source: <https://waterwelders.com/history-of-underwater-welding/>, accessed November 12, 2024.

Hydrex underwater inspections

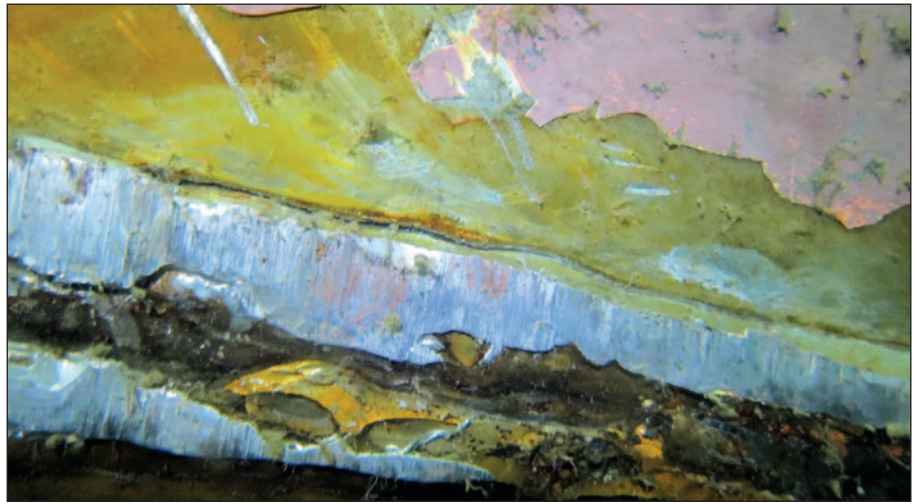


Underwater inspections are an essential aspect of ship repairs. Building upon conventional technical skills and know-how while also taking advantage of the latest technology, Hydrex offers a unique hull monitoring service to its customers. This gives ship-owners total control of the underwater hull and 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 shipowners. 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.



Damaged aft bulkhead area of drill ship.



Disconnected transit flap brought to shore.

Training of our divers consists of both theoretical classes in the course room and practical drills on our premises. There they have access to a wide range of underwater tools and a variety of other equipment, including a dry welding training area and three dive tanks in which to practice underwater welding.

We can carry out classification certified grade A wet welding. To guarantee the required high standard of these underwater welds, NDT tests are performed by ABS surveyors before the certificates are awarded.

New divers also get the opportunity to assist veteran team members dur-

ing operations. The training enables them to become experienced divers/technicians and take advantage of the technical know-how and practical knowledge we have accumulated over the last 50 years.

Below is a summary of just a few of the many underwater welding repairs that illustrate the vast welding experience we have built since 1974.

Hull repair on drill ship

The transit flap of a 225-meter drill ship came loose and started swinging dangerously. This caused damage in the aft bulkhead and a leak in



Hydrex diver/welder getting ready for repair on drill ship.

the ballast tank situated behind the moonpool hull. A fast solution was needed to prevent further damage. The vessel was in Dakar.

We mobilized a team of diver/technicians. After an inspection of the damage, they disconnected the transit flap. It was then brought to shore,

cut in three pieces and taken away. The divers also took all the measurements needed to design a repair plan for the second phase. Because of the unstable condition of the flap, it was essential to keep to the highest safety standards, especially during this first part of the operation.

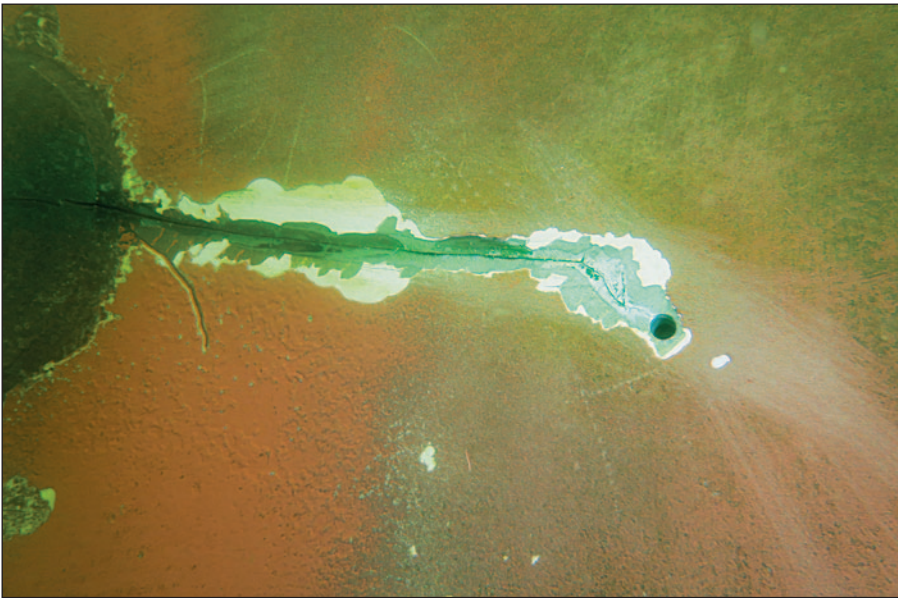
The second part of the operation consisted of the installation of six doubler plates over the damaged areas in the aft bulkhead. Constructed with the exact measurements taken during a detailed inspection, they were positioned and secured underwater by our certified diver/welders. All water was then



One of six doubler plates installed in Dakar.



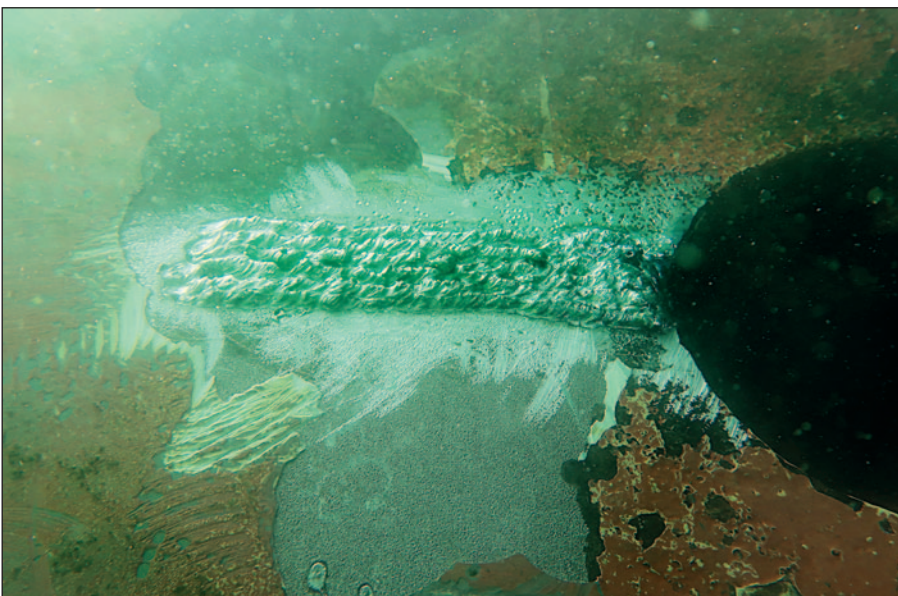
Our divers are all certified welders.



Crack arrests were drilled on the extremities of the cracks.



Crack on rudder of bulker in Le Havre.



Welding was used to fill cracks on two sister vessels after they had been ground out.



Hydrex teams consist of experienced diver/welders.

emptied from the damaged ballast tank. The crew performed an inspection of the tank and confirmed that the compromised hull was once again fully sealed.

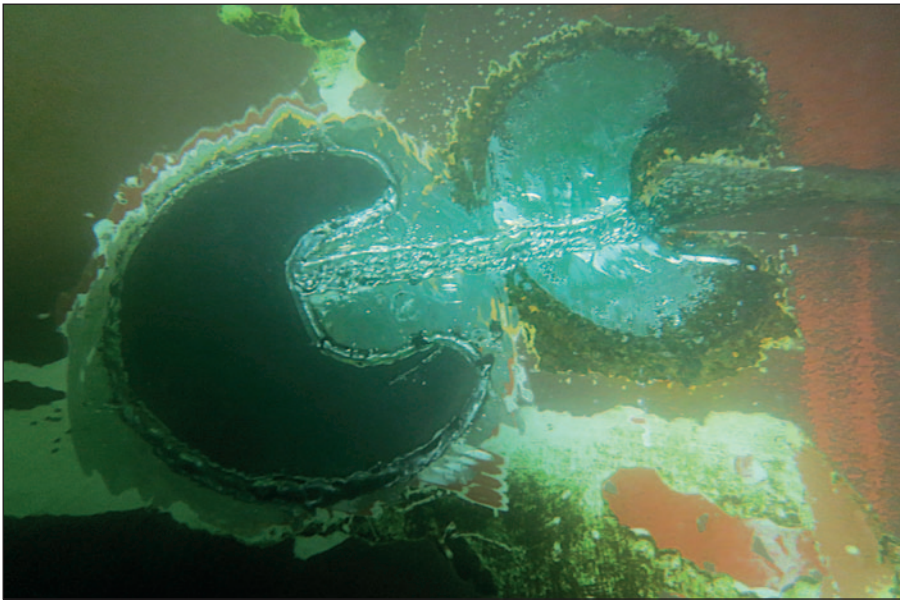
Thanks to the installation of the doubler plates, the ship could safely start its contract. A permanent solution could be planned at a more opportune time.

Rudder cracks repairs

A 230-meter ro-ro ship in Zeebrugge had suffered cracks on both sides of the rudder flap. On the starboard side a branching crack was found while a single crack was present on the port side.

Our divers first drilled arrests on all extremities of the cracks to prevent them from spreading. They then positioned C-shaped plates over the crack arrests and secured these with wet welding.

This allowed the owner to sail his ship without having to worry about the condition of the rudder. He can



C-shaped plated welded over the crack.

have a permanent repair carried out during the ship's next scheduled dry-dock visit at a more convenient time and location.

On two 229-meter sister bulker ships in Le Havre and Dunkirk respectively, cracks were found on the upper pintle corner of the hinge that connects the rudder flap to the main rudder blade. Fortunately these cracks could be repaired by grinding them out after a crack arrest had been drilled. The affected area was then filled with clad welding.

The cracks on these rudders were spotted during an underwater inspection before they caused problems for the ship. This once again shows the benefits of having regular inspections carried out by competent divers, followed by comprehensive and accurate reports. Our teams can detect any problem so that they can be corrected early and prevent the more costly repair which neglect and further damage would bring about.

Summary

When we send a team out on the road, we know that they can perform underwater welding work to the highest quality standard and this on a daily basis. This is very important because our customers pay to get the best result without any unnecessary loss of time. So that is what we deliver. Always. ■



Divers can be trained in wet welding and other aspects of underwater work in one of our three in-house diving tanks.



Underwater re

Seal repairs

We have developed a reliable technology that enables the underwater replacement of all types and sizes of shaft seals.



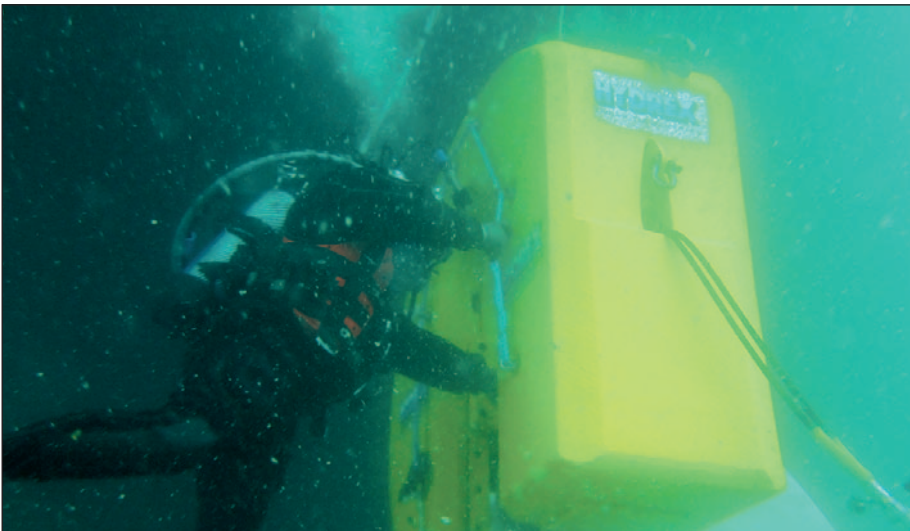
Thruster repairs

We can assist shipowners with almost any



Propeller repairs

When damage to propellers occurs due to impact with ice and other debris we can fix these, even if the damage is extensive.



Rudder repairs

We can perform permanent repairs on any rudder at anchorage and cargo operations continuing



Underwater maintenance

Inspections

We offer a full range of hull monitoring services including IWS and class inspections. This gives owners total control of their ship's hull condition.

Propeller buffing

We developed an efficient technology to enhance propeller blade surfaces underwater and achieve surface conditions never seen before.

Anode installation

We can install both ICCP and sacrificial anodes. If needed we can supply the anodes.

Repair solutions

any problem encountered with thrusters.



any type of rudder while the vessel remains in the water.



Hull repairs

Our on-site hull repair services include the renewal of both small and large areas of damaged hull plating.



Scrubber repairs

We can assist shipowners at moment's notice when a scrubber pipe corrodes and needs replacing.



Transducer installation

Our teams can very quickly replace or install speedlogs and echosounders without any hindrance to a ship's schedule.

Blanking

We can blank overboard valves, inlets, seachests or any other underwater opening to allow for onboard repairs. This is done very quickly and on-site.

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Stern tube seal repairs



Using our flexible mobdock method to create a dry underwater environment, we have carried out stern tube seal repairs and replacements underwater for some years now in cooperation with OEMs.

This technology brings drydock

conditions to the ship rather than having to take the ship to drydock, saving a considerable amount of time and money in doing so.

This class accepted method is performed by our diving teams under our warranty. It can be used while the ship is carrying out its

usual cargo or other commercial operations in port.

Visit the special stern tube seal repair section on our website for more information and examples of the many seal repairs we have performed in recent years.

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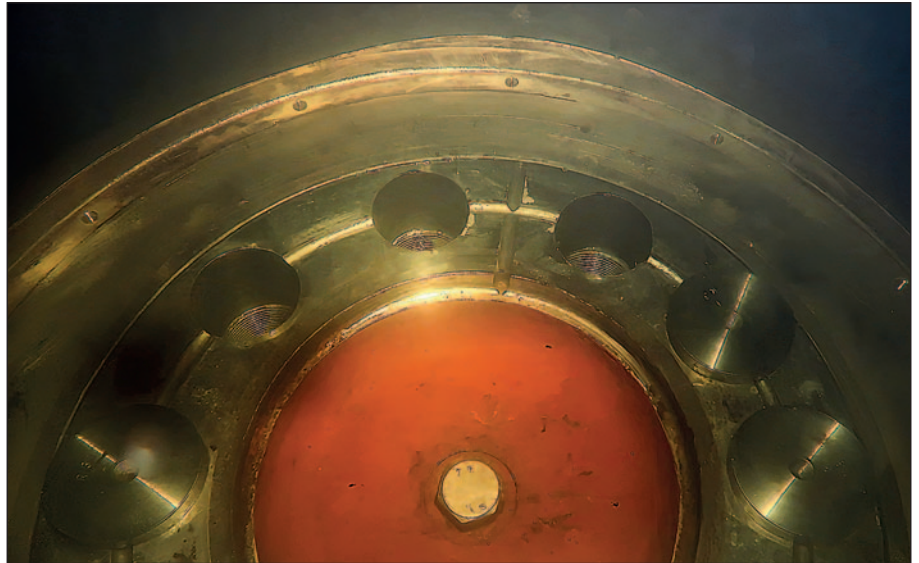
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Underwater propeller blade replacement in Amsterdam

A 173-meter, heavy load carrier needed to have one of its propeller blades replaced during the ship's stop in Amsterdam. We therefore sent a team to the vessel's location to perform the operation underwater.

Oil was leaking from beneath one of the propeller blades of ship and the blade seal needed to be replaced. A fast, on-site solution was essential to keep the ship on schedule.

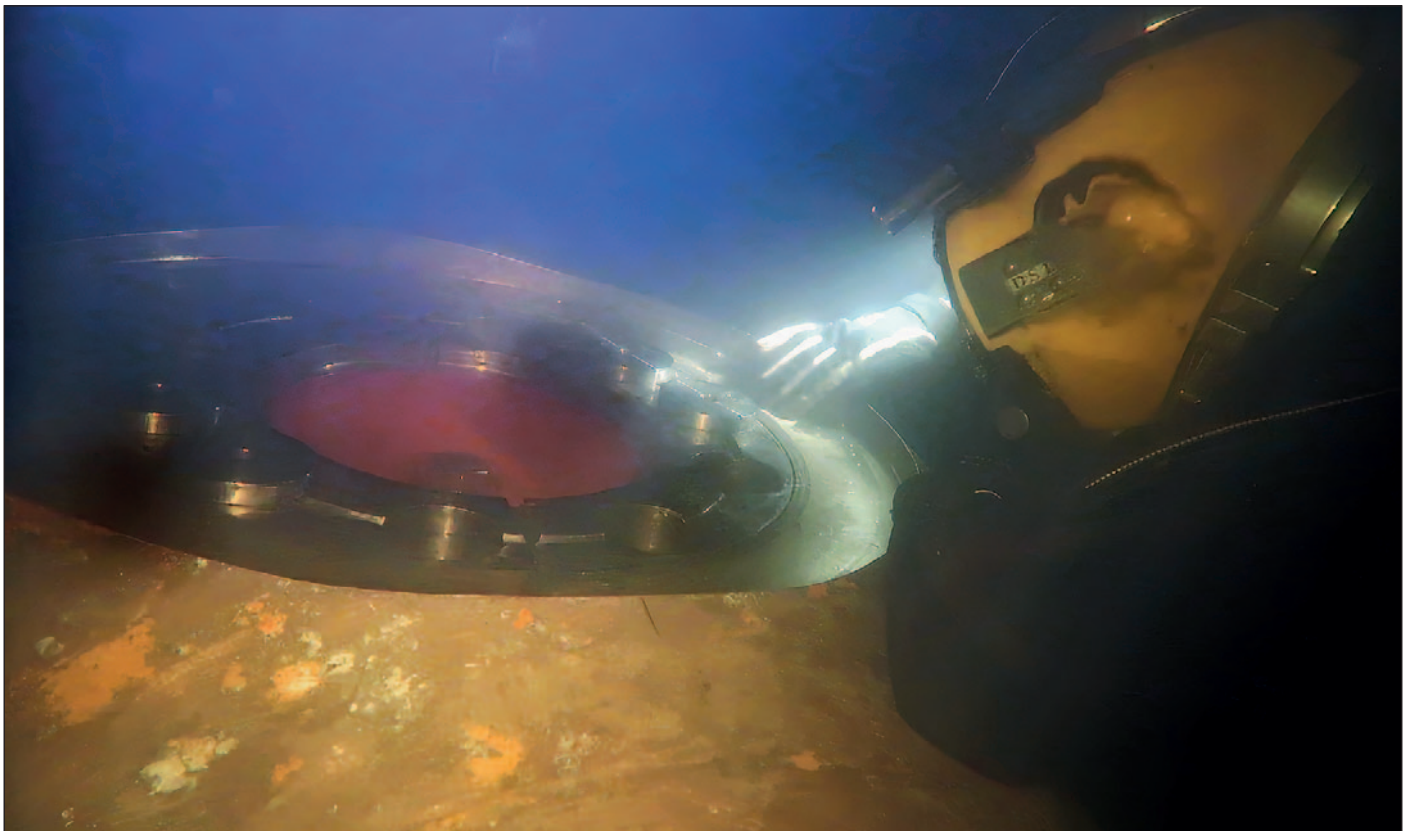
Our team started the repair with the installation of chain blocks to rig the first blade. The bolts could only be removed by cutting them with the aid of special equipment. The propeller blade was then lifted, and the damaged blade seal was replaced



The propeller hub after removal of the blade.

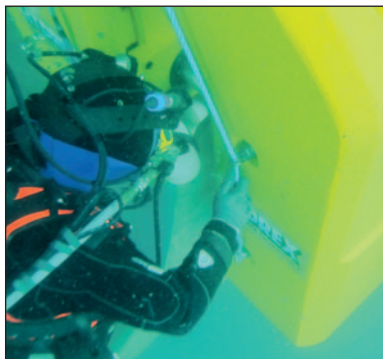
with a new one. After the seal was installed, the replacement blade was positioned, and secured with new bolts.

A successful oil pressure test and underwater inspection of the entire propeller were performed, concluding the repair.



After removal of the blade, the surface underneath was inspected.

Fast underwater propeller blade straightening



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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Hydrex diver guiding the new blade into position.



All our divers have experience with a wide range of operations.

Because there is always a large stock of state-of-the-art tools ready in our fast response center, mobilization to this or any other kind of operation can be almost immediate. This enabled the owner to sail his ship on schedule. No costly drydock visit had to be planned. ■

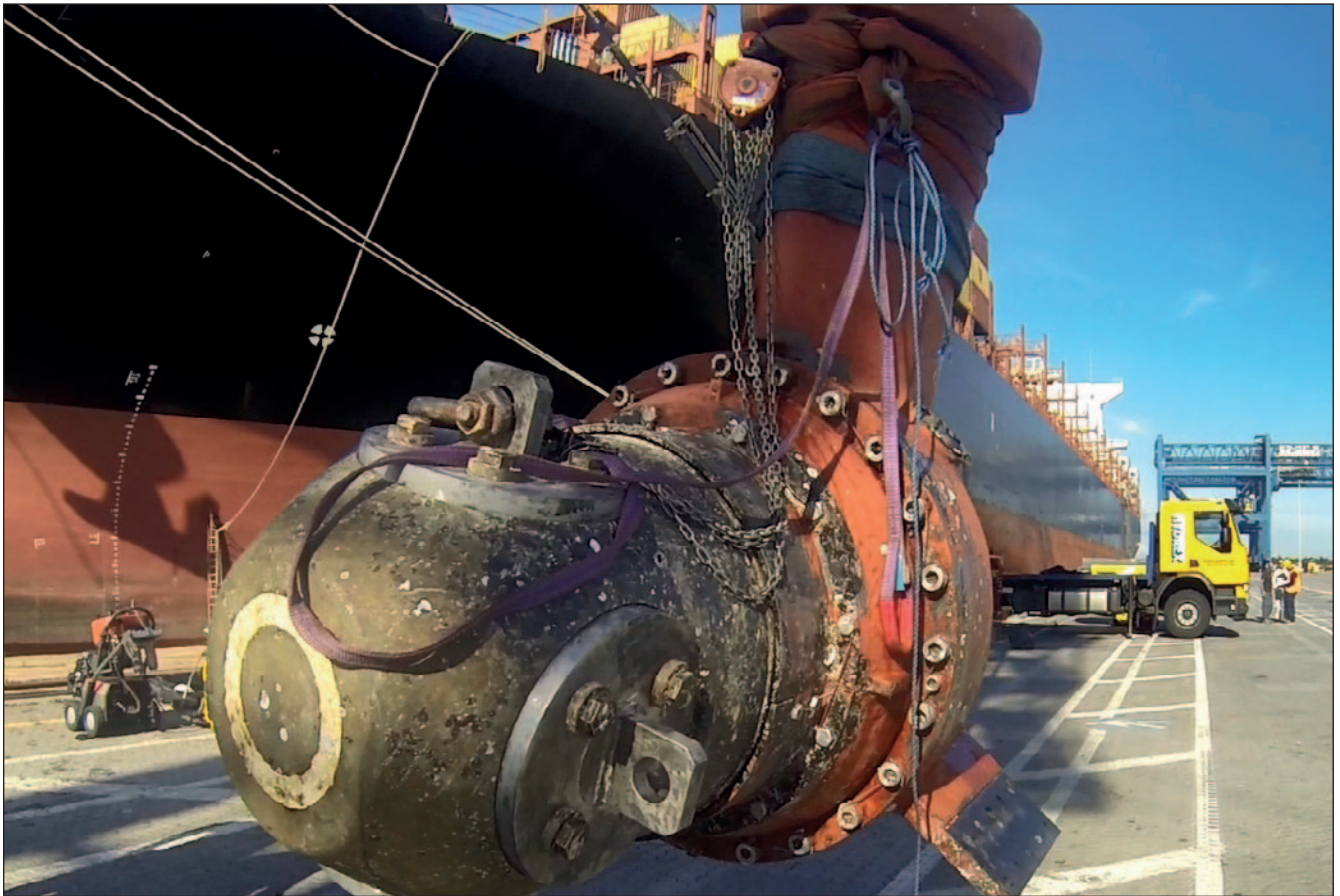
Contact us for more information on any type of underwater propeller repairs. We are at your disposal 24/7.

If you have received this magazine at the wrong address or if your company is going to move, please let us know.

You can contact us at:
hydrex@hydrex.be
or at
+ 32 3 213 53 00

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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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HYDREX
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Underwater services in Rotterdam



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