

HYDREX[®]

UNDERWATER TECHNOLOGY

Magazine

Number 249



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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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Editorial



Our flexible mobdocks can be used worldwide to perform a wide variety of operations. They were developed by our in-house R&D department and allow us to create a dry environment underwater for our divers to work in. The first article in this magazine deals with a recent operation that was performed with this technology on an offshore platform in Mexico.

Providing a service that is both versatile and effective, Hydrex has built a reputation as the world's leading underwater repair and replacement specialists. With an ever-expanding worldwide network of offices and support bases, we can provide fast service at reasonable costs.

Contact us if you need any repair or maintenance work performed. We have the means and knowledge to provide you with a fast, underwater solution. If speed is of the essence or if you require a routine underwater operation, call us and we will prevent any unwanted loss of time. This will enable you to keep your vessel sailing safely, economically and on schedule.

Hydrex founder
Boud Van Rompay



Cover: Double on-site seal repair on offshore platform in Mexico



ISO 9001 certified

Underwater services and technology approved by:



**BUREAU
VERITAS**



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Double on-site seal repair on offshore platform in Mexico

In August a team of Hydrex Divers traveled to Veracruz, Mexico for a stern tube seal repair. The operation consisted of the underwater replacement of the damaged seals on both assemblies of a semi-submersible offshore platform.

The unit left the field after its project was finished and was berthed alongside to have repair and maintenance work carried out without docking. We were asked to perform the stern tube seal repairs during the available window of opportunity.



Offshore platform in Gulf of Mexico by Marcelo.salazard - Own work, CC BY-SA 4.0

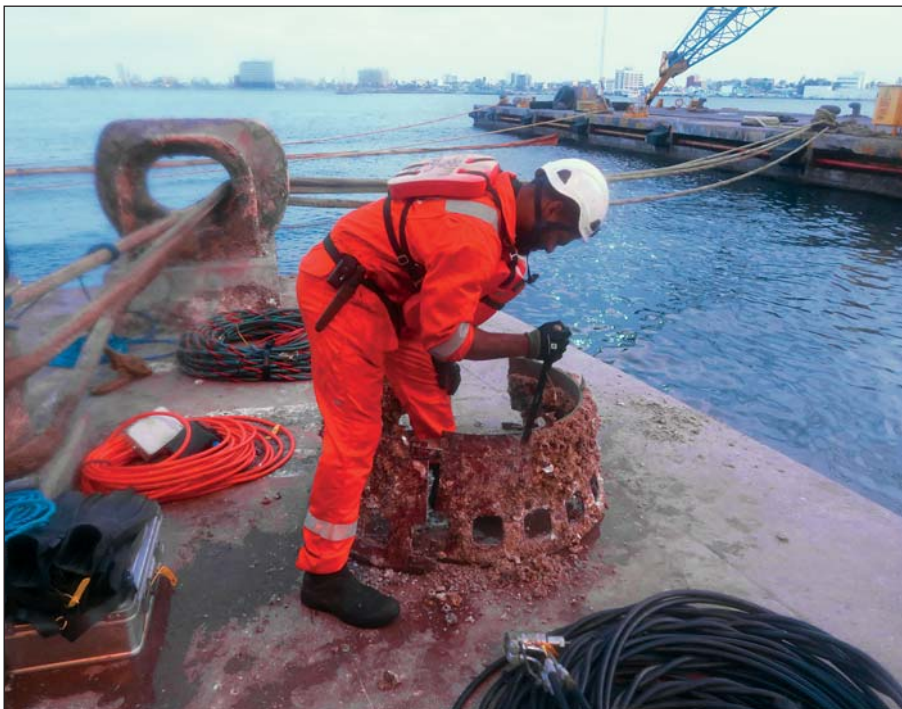


Hydrex diver inside flexible mobdock during seal repair in Mexico.

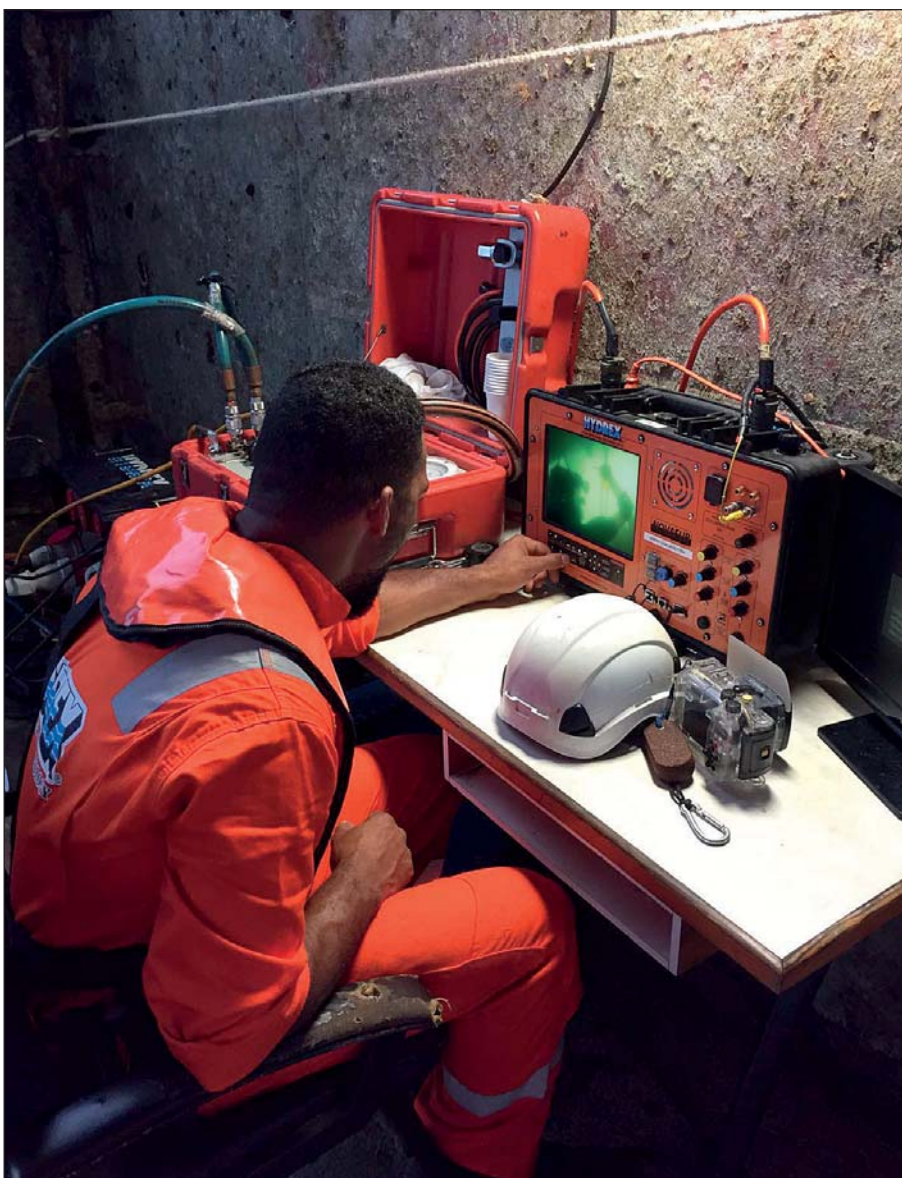
This kind of underwater repair is possible thanks to our in-house developed flexible mobdock technique. We have been using this technology successfully for well over a decade and our teams have carried out many underwater shaft seal replacements in that period.

The customer first contacted us in the beginning of the year to have the repair carried out before the summer. After a change in the platform's schedule we were asked to move the operation to August. We have always put our customers' needs first so we swiftly complied to the request.

When the unit arrived in Veracruz, our team mobilized together with all the required equipment. In this particular case the operation could be planned well in advance. Our lightweight flexible mobdocks are designed to be transported fast and



Cleaning a rope guard before reinstallation.



Supervisor monitoring the underwater operation.

easy to any location around the world. It allows us to respond very swiftly when an emergency repair is needed.

Two assemblies, twelve seals, one Hydrex team

After the diving team removed the rope guard of the portside stern tube seal assembly, they performed a thorough underwater inspection of the assembly. Next they installed the flexible mobdock. They then removed the four damaged aft seals one by one and replaced them with new ones. The two forward seals were also replaced during the repair.

All parts of the assembly were then reinstalled and secured. Leakage tests were carried out with positive results, after which the divers removed the flexible mobdock. This part of the operation ended with the reinstallation of the rope guard.

All six seals of the starboard side assembly were then given the same treatment. At the request of the customer part of our diver/technician team remained on standby for a short time to make sure everything was in order. When this was the case, they left the platform together with the rest of our equipment. This concluded the repair.

A to Z package

Damaged stern tube seals will often cause an increasing amount of oil leaking or water ingress as the damage worsens. By replacing the seals when the damage is first discovered Hydrex keeps the down time low. Oil leakages can also produce a potential or actual liability when for instance going to the United States or other sensitive areas. When they have a leaking stern tube, ships are often not

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.

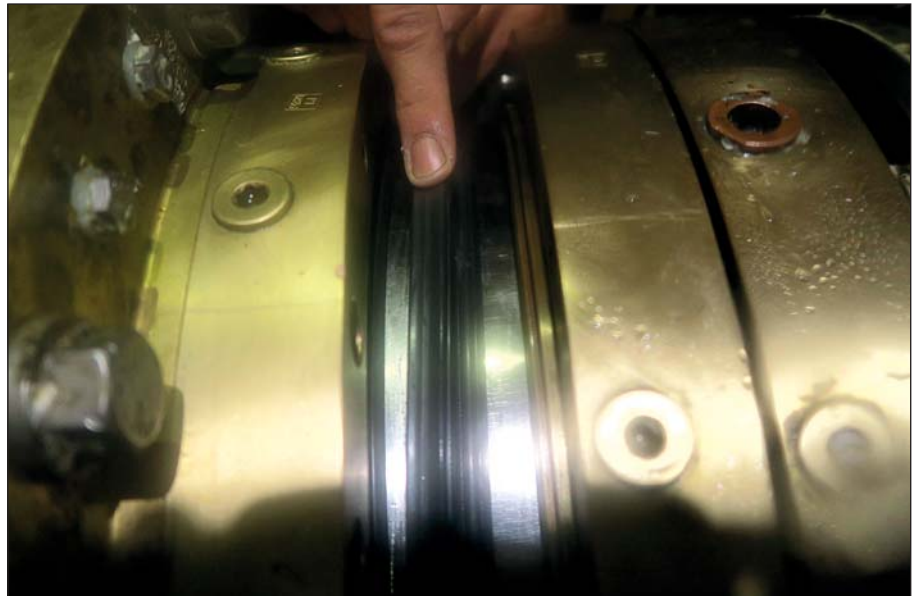
By taking advantage of this technique damaged blades can be straightened underwater, allowing the ship to return to commercial operations without the need to drydock. Blades can be brought back close to their original form, restoring the propeller's optimum efficiency.

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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One of our divers preparing the installation of the flexible mobdock.



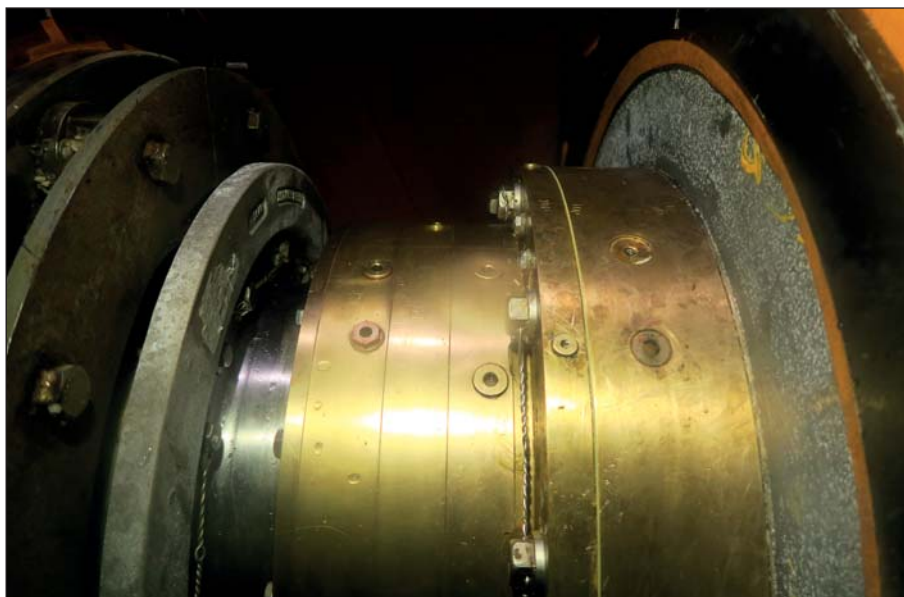
New stern tube seals after bonding.



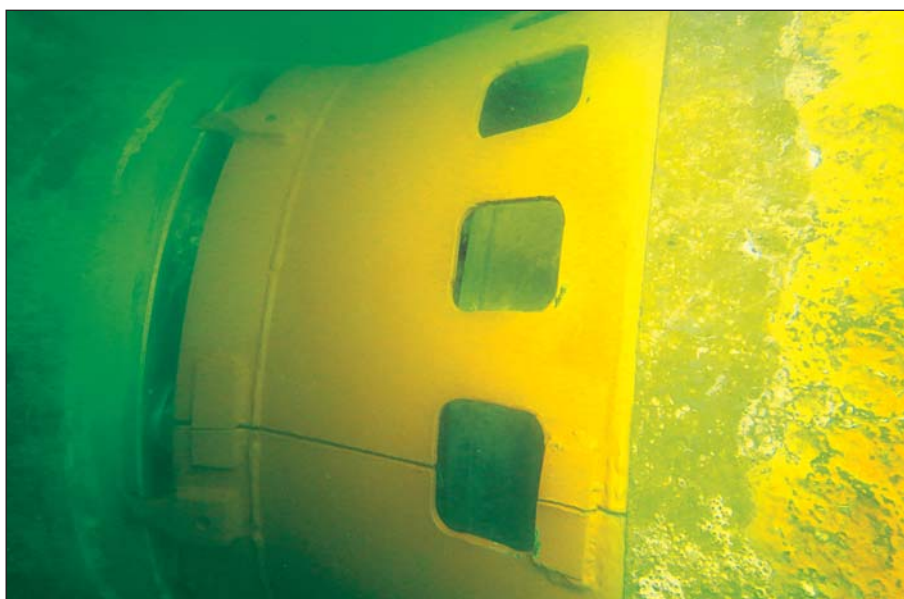
Hydrex diver getting ready for underwater operation.



Reinstallation of one of the rope guards.



One of the assemblies after replacement of all its seals.



After reinstallation of the rope guard the repair was complete.

allowed to enter ports, or they can receive heavy fines.

By using a flexible habitat our divers create a drydocklike environment underwater around a seal assembly. This enables our teams to perform seals replacements or other work on the housing. These repairs or replacements can be performed on a large variety of seal applications.

It is not always totally straightforward to replace seals as 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. All this is routinely handled by our team on the job. We usually supply the equipment and the owner is free to supply his own seals. We can handle all type of seals from all original manufacturers. ■

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**KEEPING SHIPS
IN BUSINESS**



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



The immeasurable value of underwater inspections

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 their ship's hull condition and consequently its performance, with only a minimum of work on their part.

Underwater inspections represent a small investment and, if properly done, have the potential to save an owner a great deal of money.

Competent underwater inspections, particularly if carried out regularly can detect

- Problems with the propeller such as bent or damaged blades (which can put undue strain on bearings), roughness due to fouling, cavita-



Hydrex diver/technician during the inspection of a stern tube seal assembly.

- tion damage or bad polishing which can reduce the propeller's efficiency.
- Anodes which have wasted away, rendering the cathodic protection

system unworkable, leading to corrosion and added hull friction.

- Hull cracks or other damage which, if not rapidly arrested, can worsen and increase the cost of any subsequent repair.
- Ropes inside the stern tube assembly which may cause seal problems if neglected.
- Leaking stern tube or thruster seals which can cause an environmental problem in port and lead to costly changes to a ship's schedule if not caught quickly and repaired.
- Clogged sea chest grids (preventing proper cooling of the ship's engines), or loose or damaged grids.
- Loose or broken grids on thruster tunnels which can result in damage to thruster propellers.
- Damaged, bent, broken or detached bilge keels which again can become much worse if not caught early.



Hydrex team arriving next to a ferry in Calais for a bow thruster inspection with a very short window of opportunity.



- A damaged rudder which will continue to deteriorate if not addressed rapidly, resulting in the need for much more costly repairs and representing a safety hazard in extreme cases.

Regular inspections carried out by competent divers and followed by comprehensive and accurate reports can detect any of these or other problems so that they can be corrected early and prevent the more costly repair which neglect and further damage would incur.

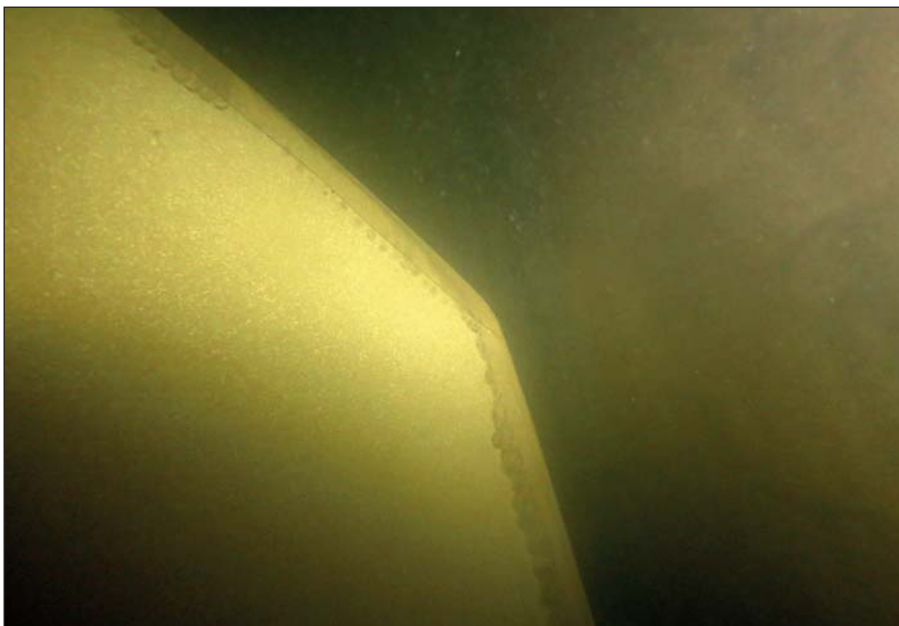
Because we have over 40 year experience in both maintenance and repair services, we can carry out any required follow up repair very fast without any unnecessary loss of time. Planning in a new slot is not needed as all our diver/technicians are skilled to perform the repair work as well.

If the damage found during an inspection can be anticipated, the required equipment can be mobilized in advance. Otherwise it can be transported to the location of the vessel immediately from one of our fast response centers where a large stock is available for our teams at all times.

This was demonstrated last month when a rope guard had come loose, which was revealed during an underwater inspection. The Hydrex team secured the rope guard without any delay for the owner.

Inspections before dry-docking

There is another important way for underwater inspections to be used to save costs. A thorough inspection

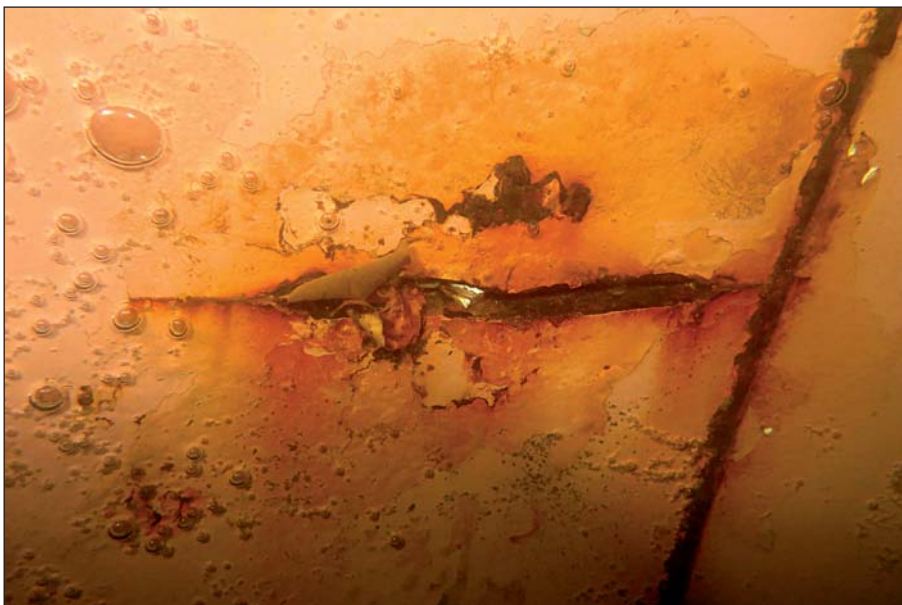


All three bow thrusters were inspected in the short time before the ferry had to sail again.



Hydrex divers are experienced in both maintenance and repair operations.

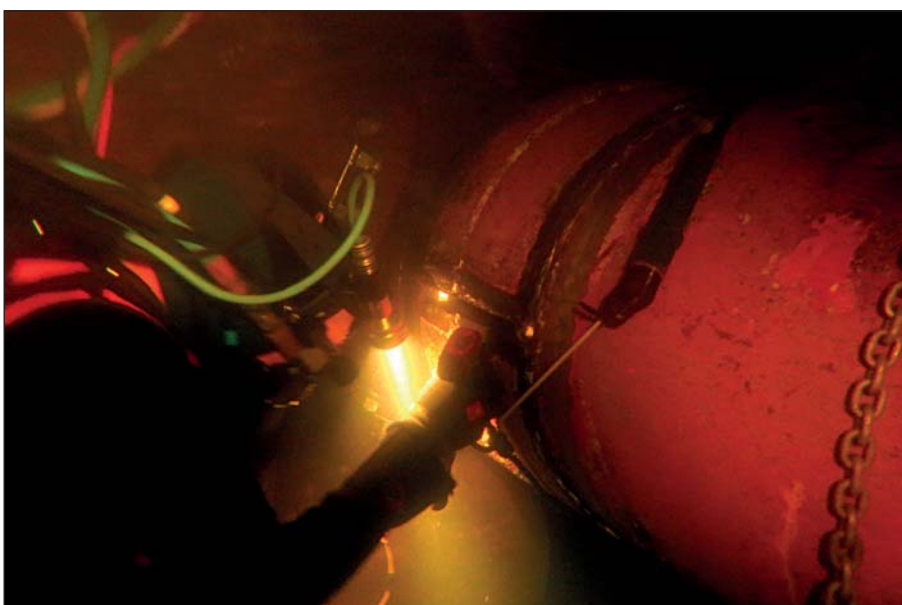




If damage is found during an inspection, our team can perform the required follow up repair.



We can carry out repairs for the shipping as well as the offshore industry.



Hydrex diver working on the rope guard.

carried out a week or two before a ship is due to go to drydock can save a great deal of money in drydock. An accurate estimate of work required can lead to efficient scheduling. If thrusters are to be repaired in drydock they can be removed prior to the ship's drydocking and can be repaired and ready for reinstallation when the ship is in drydock, rather than waiting until the docking to find out and then having to extend time in drydock in order to repair and replace the thruster.

An accurate report on the state of the rudder can lead to effective repair and recoating of the rudder so that it does not suffer further damage.

The all-too-frequent scenario of a low estimate for drydocking which grows exponentially once the drydock gate has closed and the ship is out of the water can thus be avoided.

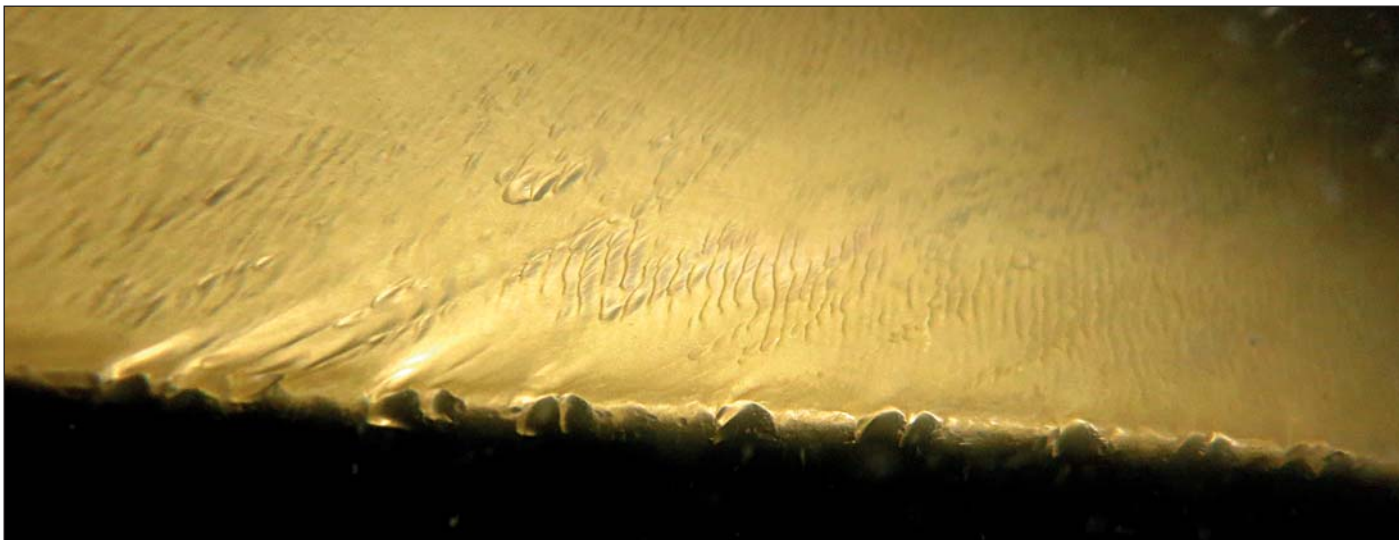
Easy to combine with other operations

Because an underwater inspection is a small operation, it can be combined with one or more other operations very easily. This can be another maintenance operation like a propeller buffing or any type of repair job.

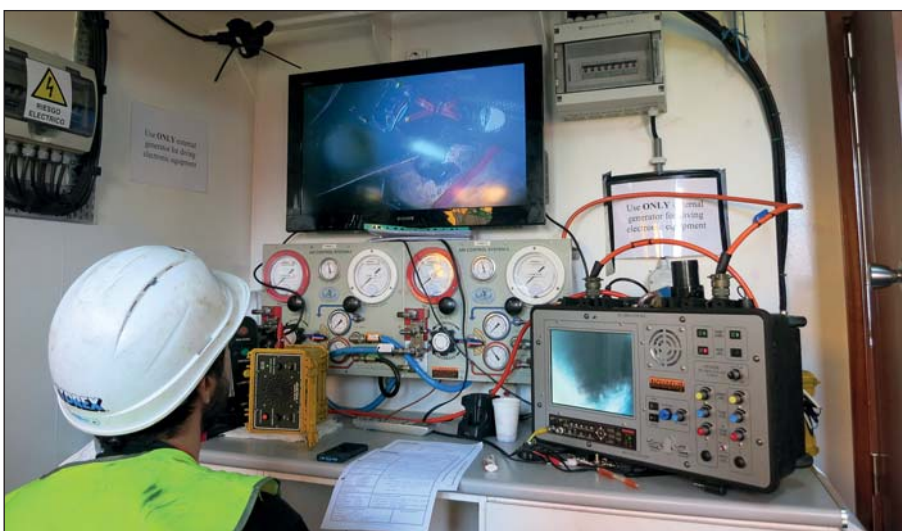
By doing this, the shipowner is saved the hassle and cost of multiple mobilizations and possible delays to his vessel's sailing schedule.

Speed is of the essence

Hydrex diver/technicians can carry out inspections underwater and on-site very swiftly without disturbing the vessel's sailing schedule. A good example of this are the inspections of the bow thrusters carried out on two ferries in Calais. Because of the nature of these vessels, the time



An inspection will give a shipowner a perfect assessment of any damage, so that he can take an informed decision on what to do.



Hydrex team leader monitoring an underwater operation.

frame was extremely short. Both times all three bow thrusters needed to be inspected in the small window available. A change to the schedule was out of the question as it would do great harm to the reputation of the owner.

We have always put great effort into minimizing the impact of our services to the schedule of a vessel. Our teams are trained to adapt themselves to the agenda of the ship and not the other way around. ■

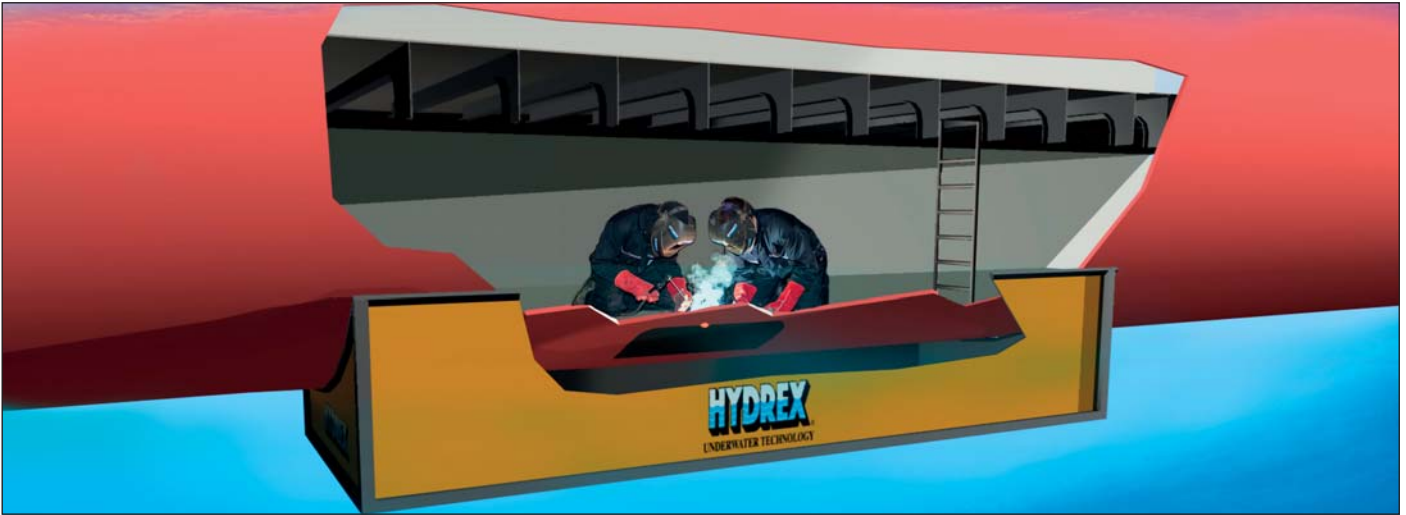
Hydrex will be present at Europort in Rotterdam, the Netherlands from November 7 until November 10. We would like to welcome you at our booth 1009 in hall 1, Holland pavilion.

If you would like to learn more about how Hydrex can assist you, please visit our booth at Europort. Our team will be happy to give you the information you need. You can also contact one of our offices if you would like to make an appointment for the exhibition or if you need assistance. We are at your disposal 24/7.

EUROPORT
exhibition for
maritime technology
7-10 November 2017
Rotterdam Ahoy



Hydrex *permanent* hull repairs out of drydock



Hydrex carries out permanent hull repairs without interruption of operations, approved by all major classification societies.

Hydrex developed and delivers **permanent hull repairs on vessels afloat, fully approved by all the major classification societies. No need to go to drydock. No need to redo later in drydock. Gets your ship back in business fast, saving time and money.**

How is it done?

1. We start off with an inspection to determine extent of defect.
2. Made-to-measure cofferdam secured on outside of hull to keep water out and create a dry environment during repair.
3. Crack removal/defective plating cropped.
4. Insert fitted.
5. Insert tacked in place.
6. Class approved full penetration welding from inside the ship and frame renewed as needed.
7. Independent ultrasonic testing to verify the welding.
8. The cofferdam is then removed.

Each step is checked by class before proceeding.

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. Therefore this new service is now available world-wide.

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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Cofferdam placed over crack.



Removing the damaged area.



Preparing the edge of the opening for the new insert.



Insert cut and fitted.



Insert tacked in place.



Full penetration weld.



Independent testing.



New frames welded.

Example of a permanent hull repair:

Inspection of a 172-meter general cargo vessel located in Rotterdam revealed a crack in the port side water ballast tank. An insert measuring 300 x 300 x 15mm needed to be welded and the frame renewed. The Hydrex team located the crack and

installed a cofferdam large enough to cover the crack. They created a dry environment so that the plate could be cropped and the insert welded from inside the ballast tank. The cropped area was prepared, the insert fitted and then full penetration welding was carried out. Following ultrasonic testing the frame was fitted and rewelded.

This is just one example of the many permanent insert repairs carried out by Hydrex over the last few months. Do not wait to go to dry-dock. Get hull cracks and damage repaired now, afloat, *permanently*. It is fast, hassle-free, on-time and cost-saving. ■





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 Rotterdam, 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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