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KEEPING SHIPS IN BUSINESS

ISO 9001 certified

Underwater services and technology approved by:



**BUREAU
VERITAS**



ClassNK



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.

HYDREX[®]

UNDERWATER TECHNOLOGY

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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.



- 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.

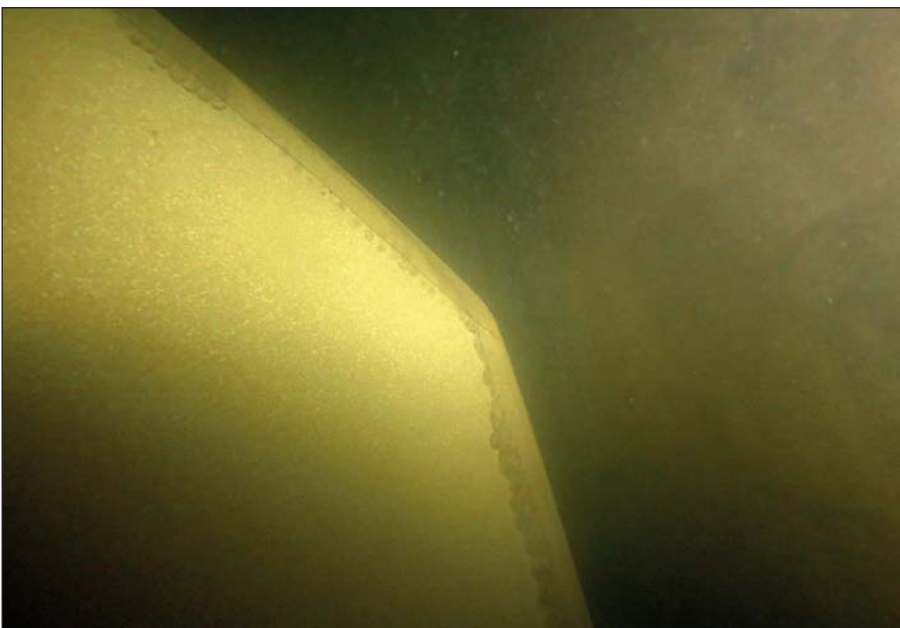
Because we have over 40 year experience in both maintenance and repair services, we can carry out any required follow up repair very fast without any unnecessary loss of time. Planning in a new date is not needed as all our diver/technicians are skilled to perform the repair work as well.

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

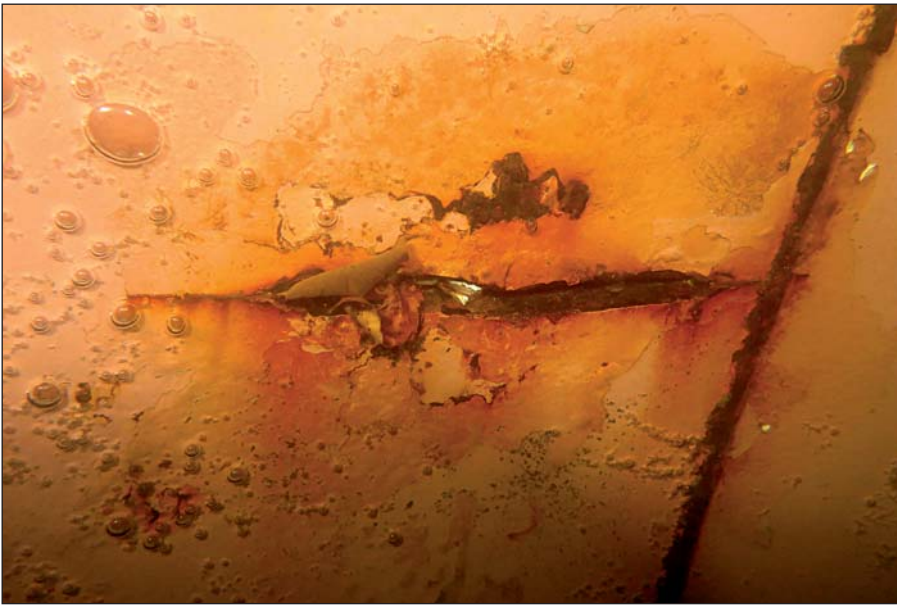
There is another important way for underwater inspections to be used to save costs. A thorough inspection carried out a week or two before a ship is due to go to drydock can save a great deal of money in drydock. An



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



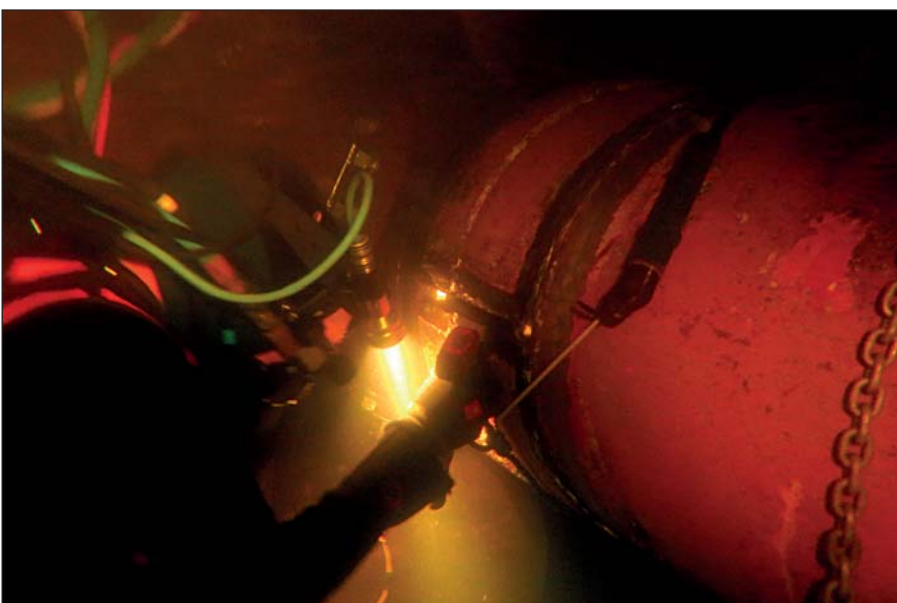
Hydrex divers are experienced in both maintenance and repair operations.



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.

Permanent in-water rudder repairs now possible without drydocking

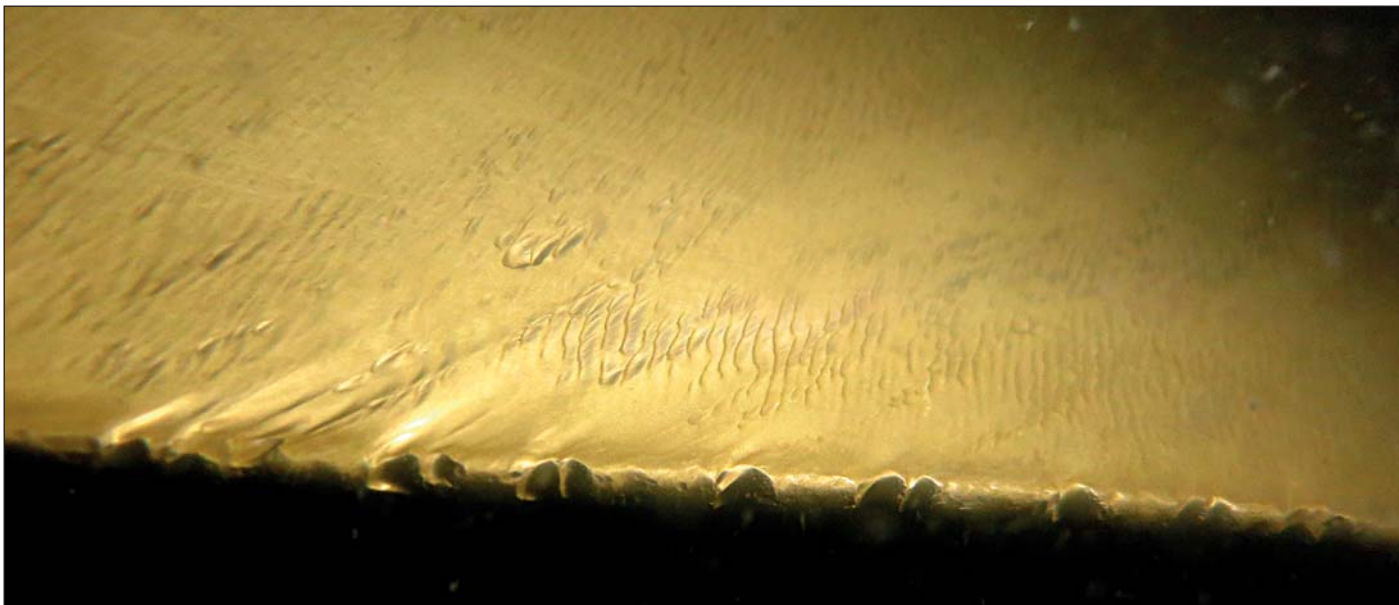


Hydrex has developed an entirely new method enabling permanent repairs of rudders without drydocking the ship. Permanent repairs were hitherto not possible and ships had to drydock in case a major defect was found. The newly designed equipment is light-weight and can be mobilized very rapidly in our 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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An inspection will give a shipowner a perfect assessment of any damage, so that he can take an informed decision on what to do.

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

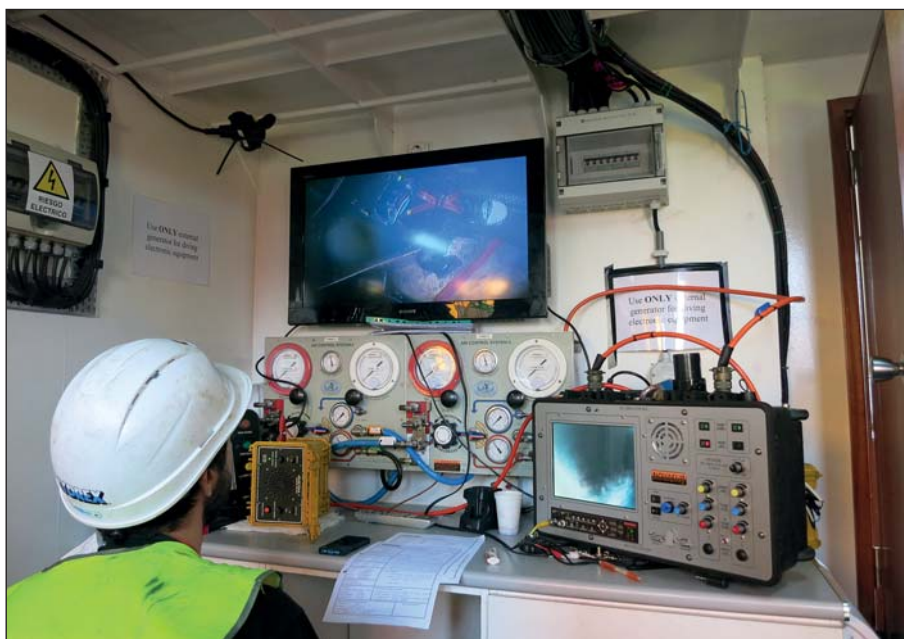
another maintenance operation like a propeller buffing or any type of repair job.

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 recently on two ferries in Calais. Because of the nature of these vessels, the time 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. ■

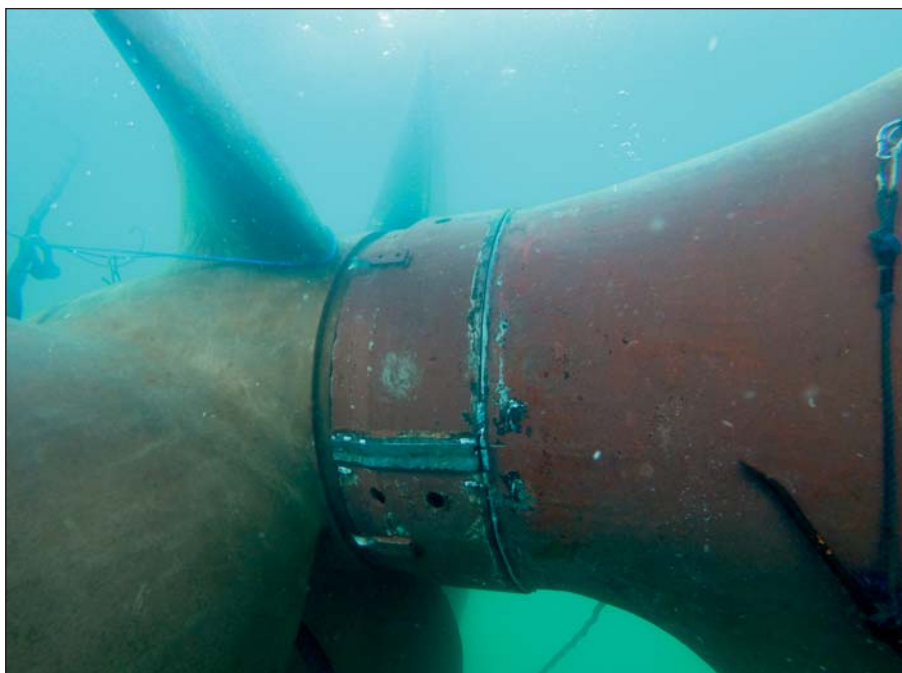


Hydrex team leader monitoring an underwater operation.

Underwater stern tube seal repair in Panama saves time and money

A Hydrex diver/technician team carried out underwater stern tube seal repairs on a 196-meter LPG tanker in Panama. The ship was suffering from an oil leak, making an on-site repair necessary. Using a Hydrex flexible mobdock the team was able to carry out the entire operation on-site and underwater, saving the owner an expensive and time-consuming trip to drydock.

Hydrex has the technology that enables repairs to be done afloat and underwater on all types of seals. We create a dry underwater working environment around a seal assembly. This allows for work on the seal assembly in dry conditions. Prior to this technology the only option was to go into drydock, along with all the attendant loss of time and money.



The assembly after reinstallation of the rope guard.

Every Hydrex office has a fast response center equipped with all the latest facilities, equipment and tools. These centers were designed specifically to increase speed of service. The lightweight flexible mobdocks

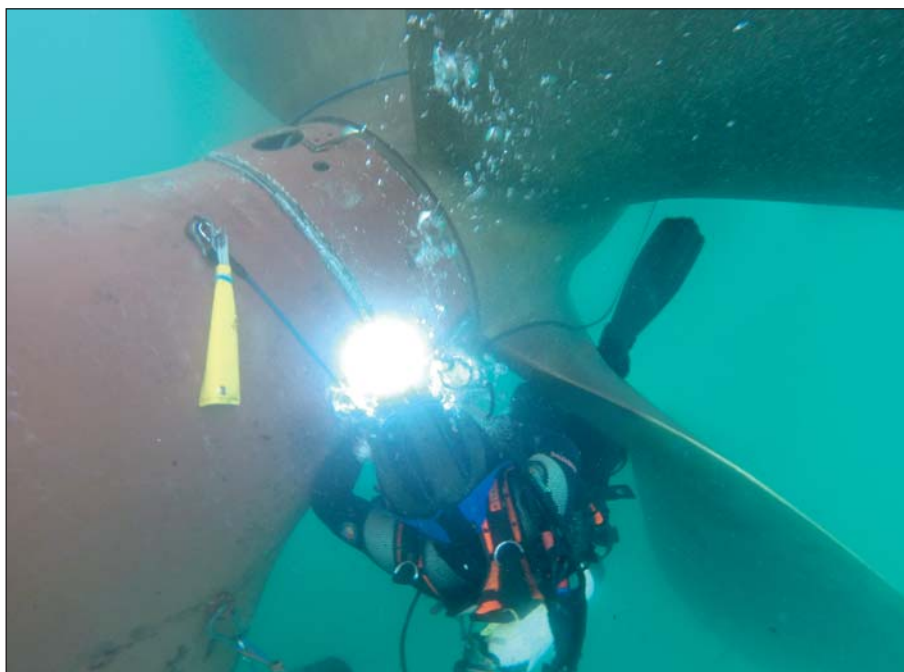
packed in flight containers allow for a very fast mobilization and a timely arrival of Hydrex teams on any location around the world with everything they need to successfully complete the job.

The following case study gives an account of a recent underwater stern tube seal repair performed by Hydrex.

Leaking stern tube repaired on-site

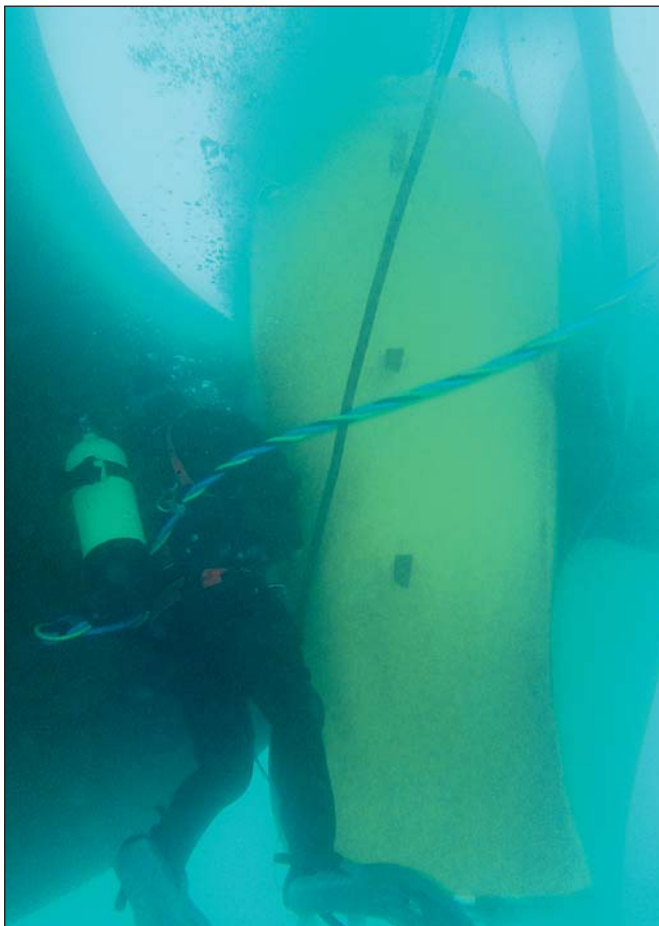
A team of Hydrex diver/technicians mobilized to the tanker's location in Panama, together with all the needed equipment.

After the diving team had set up a monitoring station they removed the rope guard and performed a thorough



Hydrex diver/technician working on the rope guard.





The Hydrex flexible mobdock creates a dry environment around the stern tube seal assembly.



Hydrex diver working on the assembly inside the flexible mobdock.



The rope guard was removed to give access to the seal assembly.



One of the damaged seals prior to replacement.

underwater inspection of the stern tube seal assembly. Next they installed the flexible mobdock. The team then removed the four damaged seals one by one and replaced them with new ones.

All parts of the stern tube seal assembly were then reinstalled and secured. Leakage tests were carried out with

positive results, after which the divers removed the flexible mobdock. The operation ended with the reinstallation of the rope guard.

Summary

Damaged stern tube seals will cause an increasing amount of oil leaking from the stern tube assembly as the

damage worsens. By replacing the seals on-site when the damage is first discovered Hydrex can keep the down time low while the ship keeps its schedule. ■

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Dive support workboats offer many logistic possibilities for our customers

Our offices in Antwerp and Rotterdam have dive support workboats available for immediate mobilization. These vessels can be used for a wide range of operations in Belgium, the Netherlands, the United Kingdom and France.

The catamarans are fully equipped as dive support stations with hydraulic cranes, hydraulic winches, nautical and communication equipment and a dive control room. A PDF document with details about the vessels can be found on our website (<http://www.hydrex.be/case-story/89>) or requested by contacting one of our offices.

The workboats are docked right outside the Antwerp office, where a wide range of state-of-the-art equipment and tools is available at all



Hydrex has experienced diver/technicians ready to mobilize together with the workboats.



Both workboats are fully equipped as dive support stations.



Hydrex workboat during operation.



The workboats are stationed in Antwerp and Rotterdam where a wide range of extra equipment is available.

times and in the center of the Rotterdam port from where we can mobilize throughout the entire port within hours.

Hydrex has experienced and certi-

fied teams of diver/technicians ready to mobilize together with the workboats. They can carry out routine operations as well as highly technical repair work within a very short time frame and all to Hydrex's

well-known high quality standards.

Contact us 24/7 for more information about these vessels or the underwater services Hydrex offers. ■



Hydrex workboat with equipment next to tanker during underwater operation.

Hydrex Rotterdam ready to assist you



On the 1st of March the Hydrex office in Rotterdam officially opened. Its purpose is to improve the delivery of our services and underwater expertise to the maritime industry of Rotterdam.

To enable a fast mobilization throughout the entire Rotterdam port without delaying a ship's com-

mercials operations, Hydrex dive support vessels are stationed in Rotterdam. Since the opening these workboats have proved to be a valuable asset during a variety of operations in the port. They are fully equipped with hydraulic cranes, winches, a dive spread and control room.

This allows Hydrex to offer simple maintenance operations as well as

repairs on all parts of the underwater ship propulsion system and the hull. Hydrex operations are class approved and carried out alongside or at anchorage while commercial activities continue without disruption.

Feel free to contact the Rotterdam office if you want to find out how we can assist you and your vessel.

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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 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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