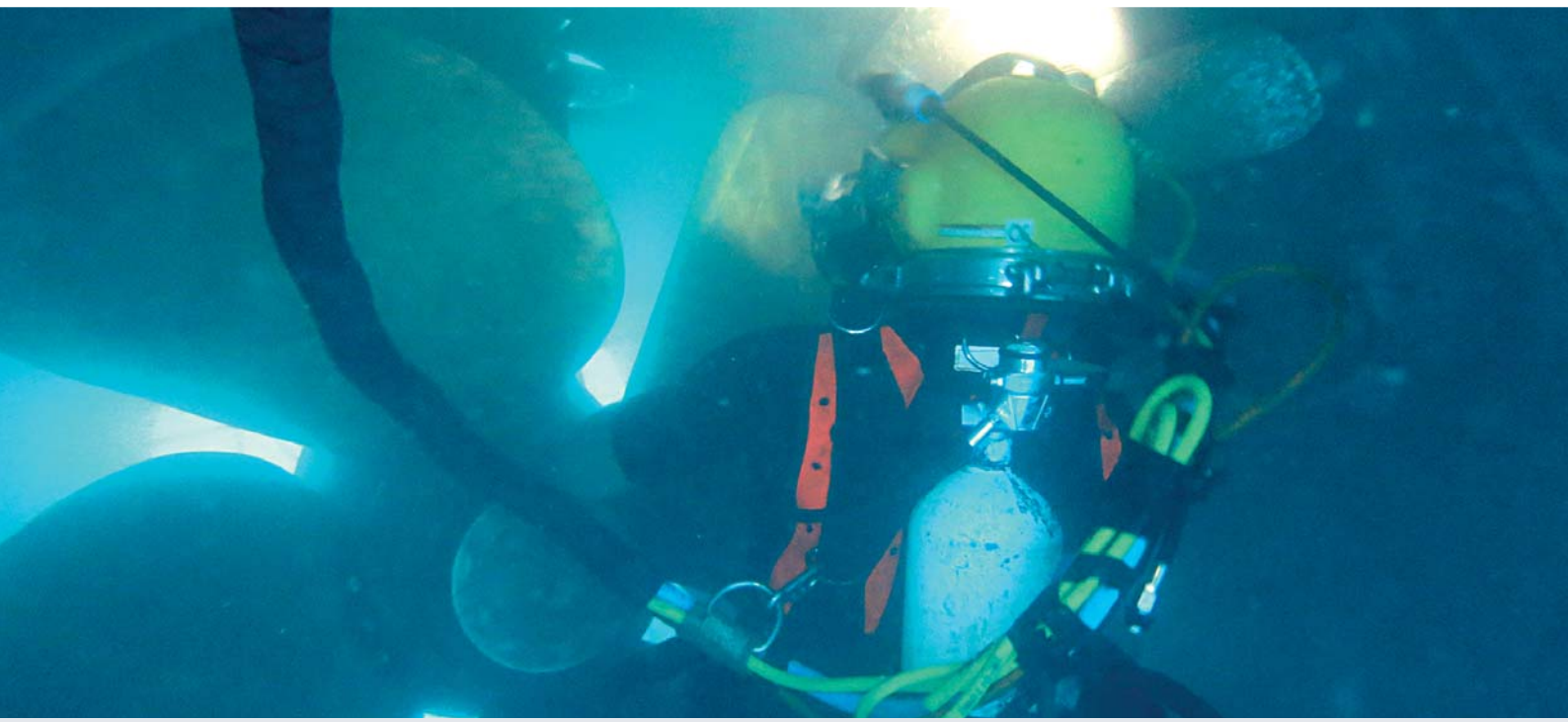
HYDREX®

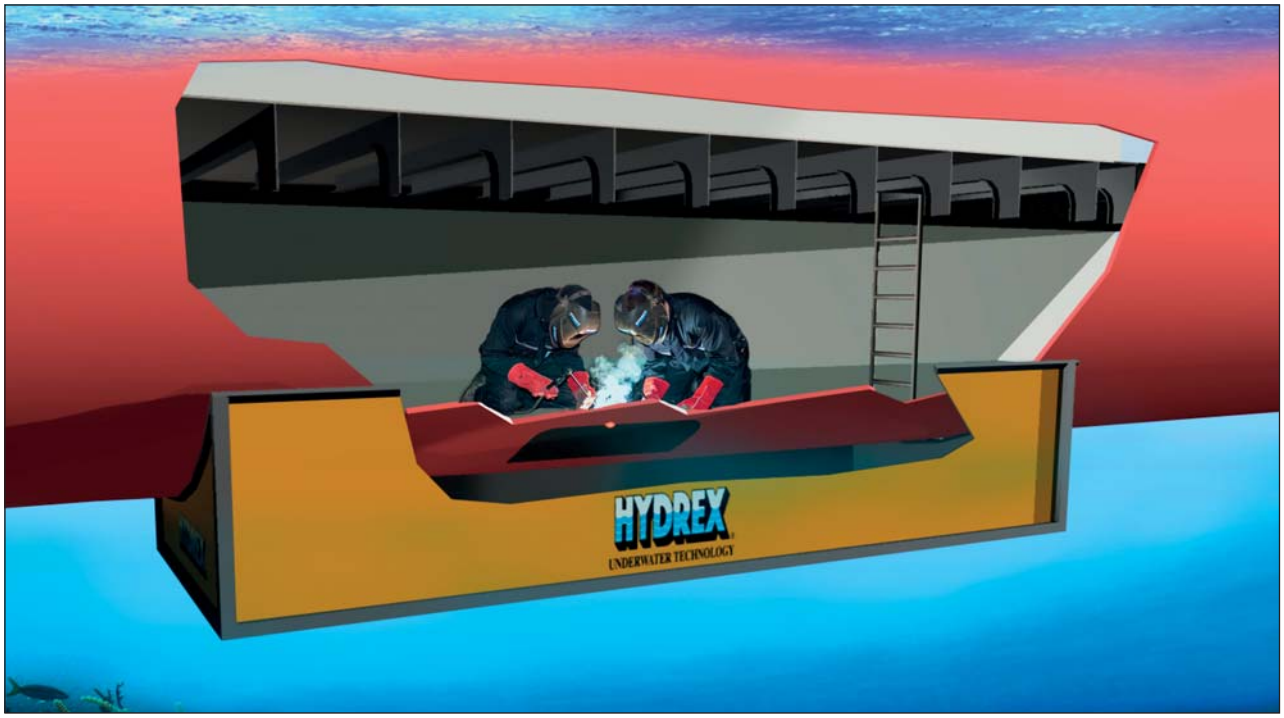
UNDERWATER TECHNOLOGY

Magazine

Number *257*



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.

HYDREX®
UNDERWATER TECHNOLOGY

Phone: + 32 3 213 5300 (24/7)
Fax: + 32 3 213 5321
hydrex@hydrex.be

www.hydrex.be

Editorial

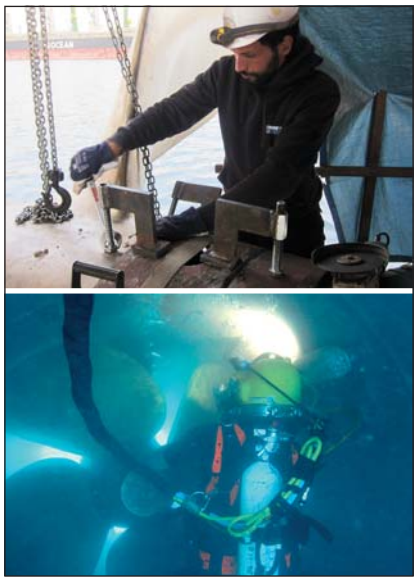
Our flexible mobdocks can be used worldwide to perform a wide variety of operations. The technology was developed by our in-house R&D department. It allows us to create a dry environment underwater for our divers to work in. The first two articles in this magazine deal with specific uses of this technology.

The first article lists the many advantages underwater stern tube seal repairs offer and highlights some recent examples.

The second article talks about a bow thruster removal and reinstallation carried out in a single operation in Australia. During this repair we worked closely together with the OEM involved to prevent a costly unplanned drydock visit.

Do not hesitate to call us when you need any repair or maintenance work performed. We have the means and knowledge to provide you with a fast and safe underwater solution.

Hydrex founder
Boud Van Rompay



Cover: Hydrex diver/technicians are trained to perform a wide range of operations to the highest quality standards.

HYDREX N.V.
On Time Worldwide High Quality Underwater Services

ISO 9001 certified

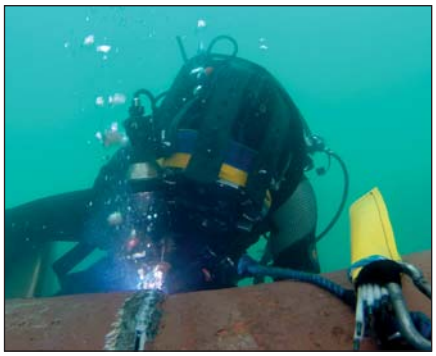
Underwater services and technology approved by:

BUREAU VERITAS
ABS
ISO 9001
VCA*
DNV·GL
ClassNK
ADC
RINA

To receive a free copy, e-mail to: hydrex@hydrex.be

HYDREX®
UNDERWATER TECHNOLOGY

Table of contents



Underwater shaft seal repairs around the globe in record time

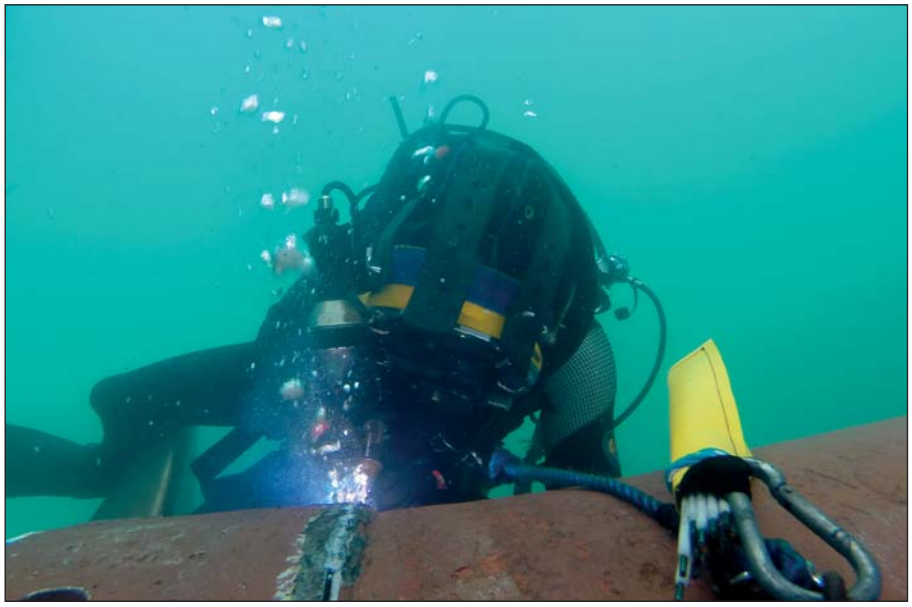
We have developed a flexible mobdock repair method that enables the underwater replacement of all types and sizes of shaft seals. This technology has been successfully used by our diver/technicians for over a decade. It allows ship owners to keep their vessel sailing, saving precious time and money.

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, Hydrex keeps the down time low. 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.

Hydrex team during one of the many operations carried out in the last months.

There can also be complications with the liners, which can be worn down and show ruts. All this is routinely handled by our teams on the jobs.

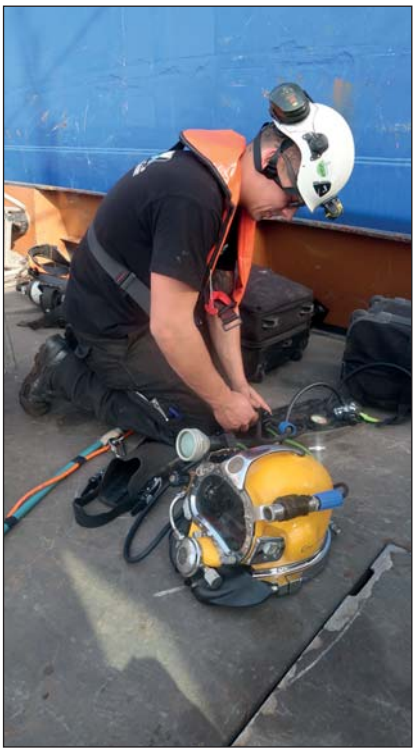

Diver/technician re-welding the rope guard after shaft seal replacement.

In this article you can find a short summary of some of the recent stern tube seal repairs our teams have carried out. Like all shaft seal repairs we offer, these were performed in cooperation with the OEM. This allows us to provide our customer with original spare parts which guarantees the best quality material. 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.

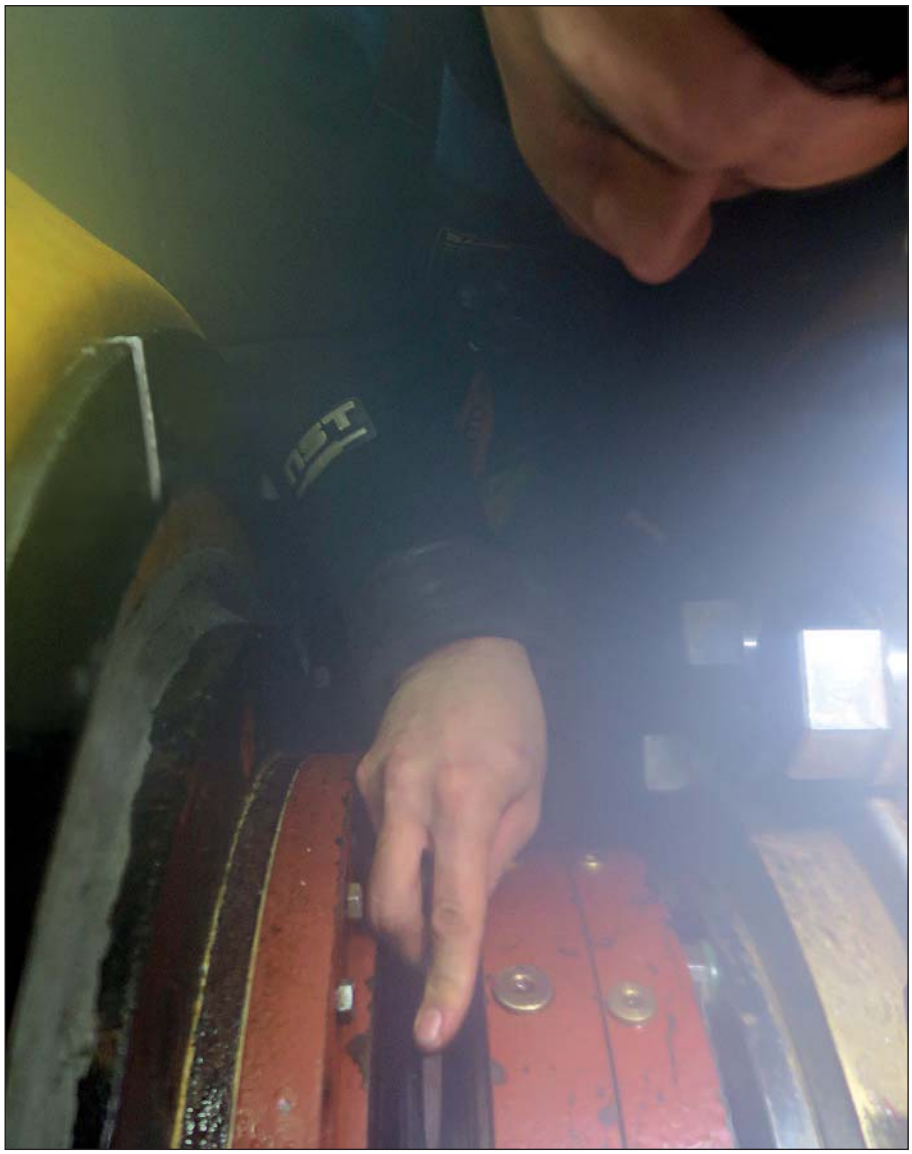
No drydocking needed thanks to seal repair

Recently one of our diver/technician teams carried out an underwater stern tube seal repair on a tanker berthed in Antwerp. The ship was suffering from an oil leak, making an on-site repair necessary.

Hydrex diver working inside the flexible mobdock.



All diving equipment is checked prior to any underwater operation.



Diver/technician working on the stern tube seals.

Once the operation was approved all preparations were handled swiftly and the lightweight equipment was mobilized almost immediately. Our team was on-site and ready to start the seal replacement when the vessel arrived in Antwerp.

The operation started with a thorough underwater inspection of the stern tube seal assembly. It was revealed that a rope and a fishing net were entangled around it. Both were removed by our divers and the flexible mobdock was installed to allow for work in dry conditions. The team then removed the three damaged seals and replaced them with new ones.

After the seals had been successfully replaced, the owner could sail his vessel to her next stop free of oil leaks. Despite the vessel's location close to our headquarters in Antwerp our well stocked fast response center nevertheless saved the owner a costly and unwelcome trip to drydock.

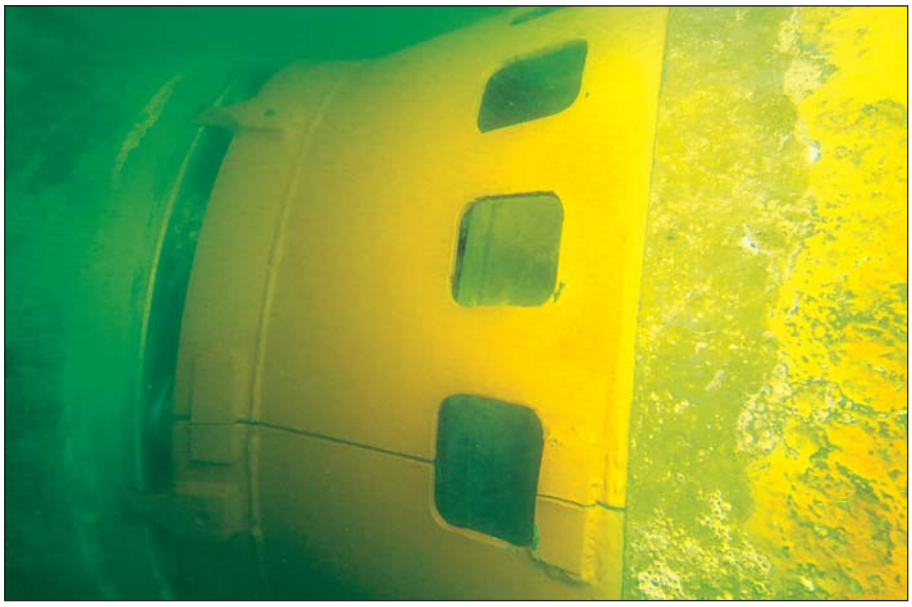
Two assemblies, twelve seals, one Hydrex team

A team of our 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.

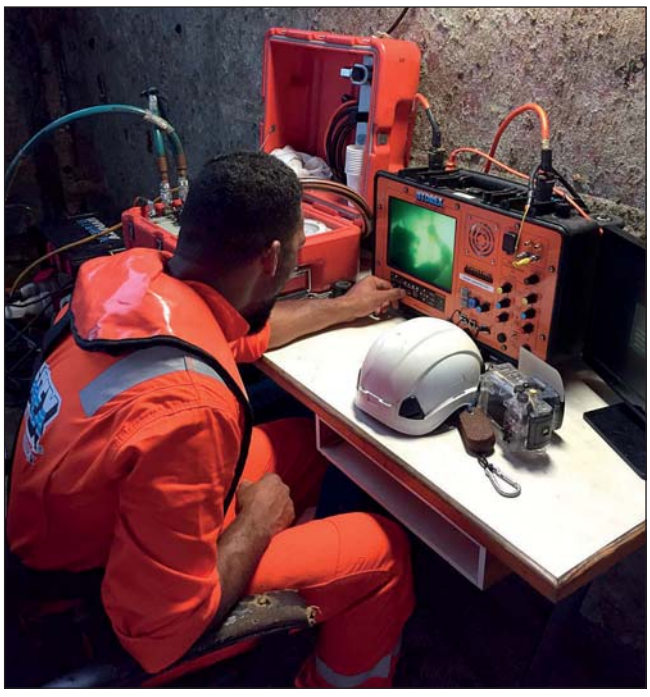
The unit left the field after its project was finished and was berthed alongside to have repair and maintenance work carried out without docking. We were asked to perform the stern tube seal repairs during the available window of opportunity.

After the diving team performed a thorough underwater inspection of the assembly they installed on of our flexible mobdocks. Next they 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. The six seals of the starboard side assembly were then given the same treatment.

Hydrex diver getting ready for underwater operation.



After reinstallation of the rope guard the repair was complete.



Supervisor monitoring the underwater operation.

Hydrex diver inside flexible mobdock during seal repair in Mexico.

Immediate mobilization to seal renewal in Singapore

A Hydrex diver/technician team carried out underwater stern tube seal repairs on a 138-meter LNG tanker during the vessel's stop in Singapore. The ship's stern tube was suffering an oil leak, making a quick on-site repair necessary.

As a result of our many years of experience, our technical department was able to offer a repair plan to the customer very quickly. Once the operation was approved, all preparations were handled swiftly and the lightweight equipment was mobilized from our fast response center almost immediately. Within a matter of days our diver/technicians were on-site and ready to start the seal replacement.

During the operation the team removed the three damaged seals and replaced them with new ones. A technician of the seal manufacturer was present during the operation to give his approval of the repair.

Finding the best solution for specific conditions

An 180-meter oil tanker had a leaking stern tube assembly. The owner contacted us and asked us to find the best possible afloat repair solution. Because the vessel could be trimmed we suggested to replace the damaged seals above water during the ship's stop in Flushing instead of using one of our flexible mobdocks.

Our team first built a scaffolding around the stern tube seal assembly. Next they removed the rope guard. This allowed them to clean the entire area and perform an inspection. The assembly was then opened to give the service engineer of the OEM access to the seals.

After the seals had been replaced the assembly was closed again. Leakage tests were then successfully carried out. Our technicians repositioned and secured the rope guard. They removed the scaffolding to conclude the operation.

The damaged stern tube seals were replaced one by one in Singapore.

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.

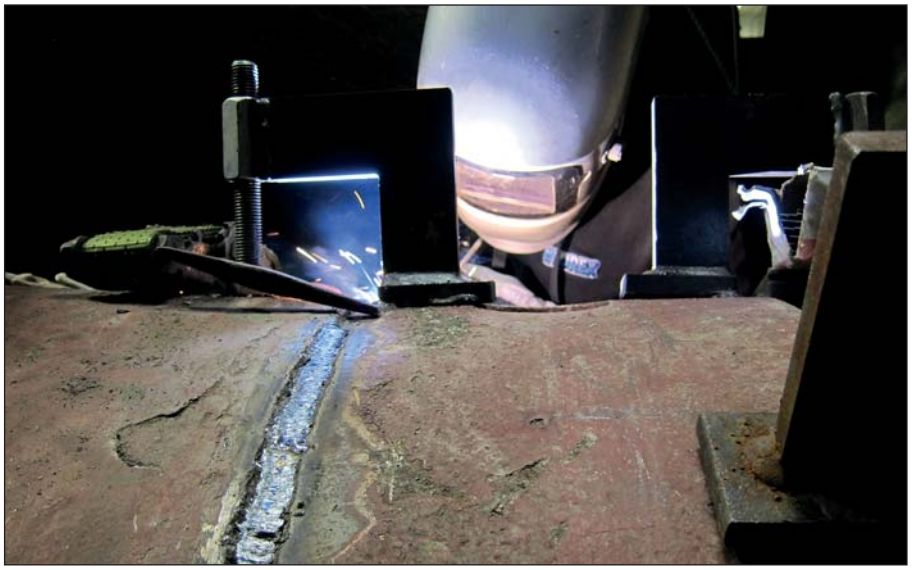
Major defects on rudders very often cause unscheduled drydocking of ships. The new method designed by our technical department allows engineers, welders and inspectors to perform their tasks in dry conditions. Class approved permanent repairs on-site, without moving the ship, are now possible and commercial 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.

HYDREX®
UNDERWATER TECHNOLOGY

Hydrex technicians during the removal of the rope guard.

Stern tube assembly after replacement of the seals.



Reinstalling the rope guard after the replacement… and welding it.

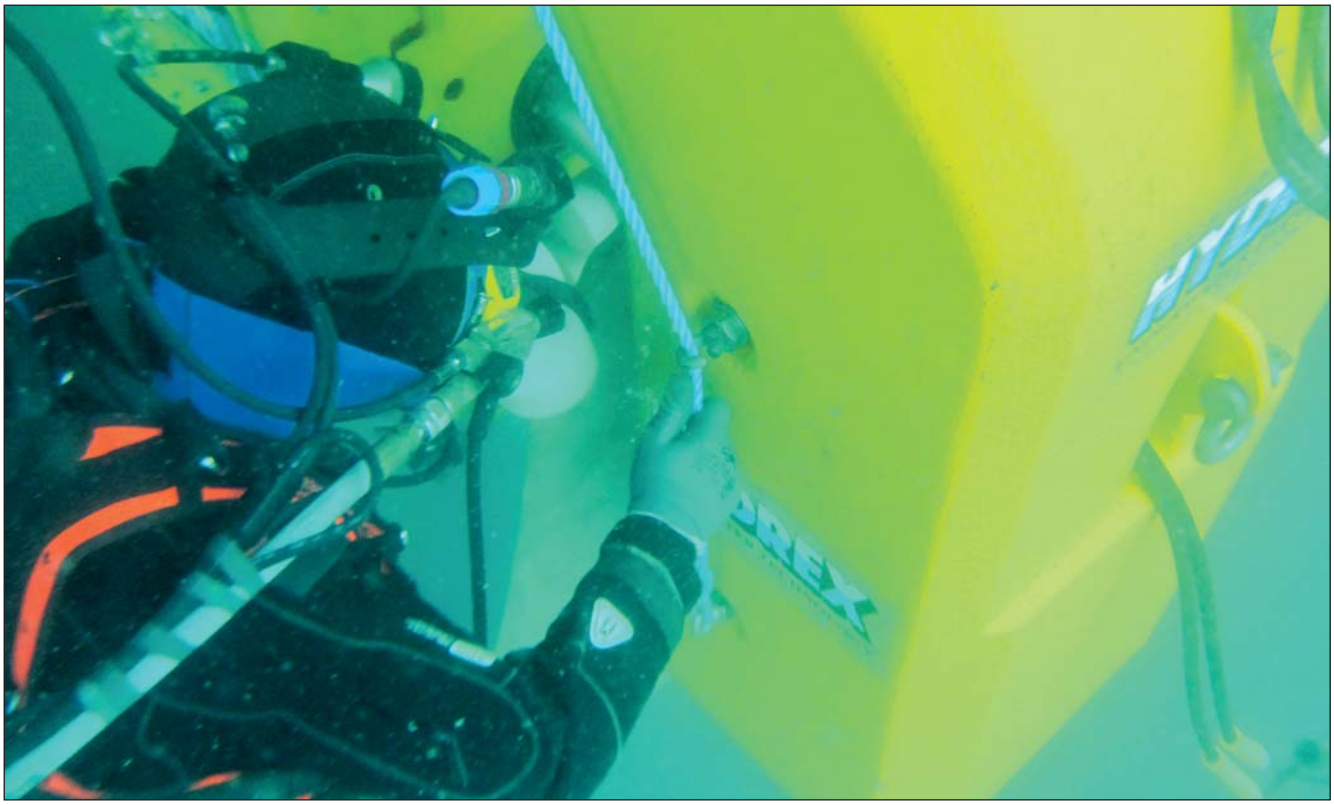
This operation is a perfect example of how we use our experience and know-how to offer the best solution for a specific situation. Often an underwater seal replacement using our flexible mobdock technique is the only option, but in this case trimming the vessel was more efficient.

Conclusion

Every Hydrex office has a fast response center equipped with all the latest facilities, lightweight equipment and tools. This allows for a timely arrival of Hydrex teams on any location around the world with everything they need to successfully complete the job.

For more information on seal or other underwater repairs, please contact one of our offices. We are at your disposal 24/7. ■

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 propel-ler'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.

Underwater bow thruster removal and reinstallation in Australia

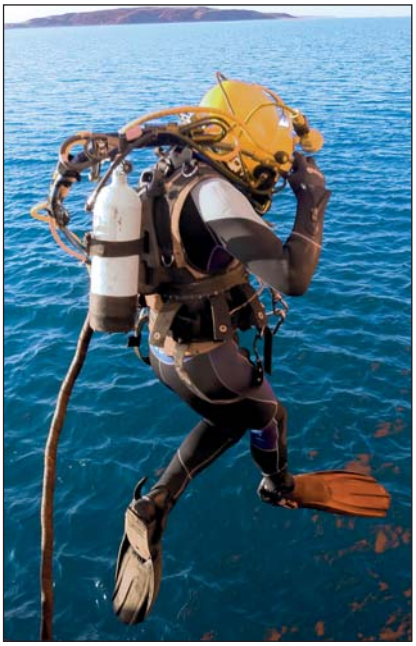
To save time and money for the owner of an offshore supply vessel, Hydrex removed the bow thruster of the ship and reinstalled the unit after it was overhauled while the vessel was at anchorage in Dampier, Australia. By carrying out both parts of the operation underwater the ship could stay on the project and did not have to go to drydock.

Flexible mobdocks ready for installation.

Despite the remote location of the vessel, our technical department was able to very swiftly make all practical logistic arrangements and arrange a mobilization of the equipment. In the recent past we have carried out several operations in Australia, among which an emergency stern tube seal repair on another offshore supply vessel.

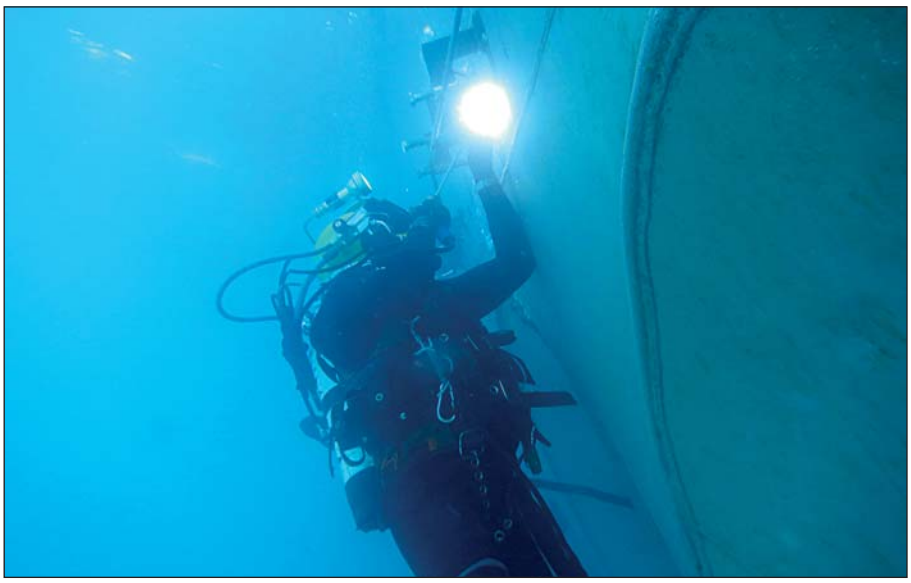
When the vessel was sailing towards Dampier, a team of diver/technicians mobilized as well. They set up a monitoring station on a workboat and sailed to the vessel's location. As soon as the ship was at anchorage, a small Hydrex team went on board and prepared the bow thruster engine room for the removal of the unit so that there would be no ingress of water once the unit was taken out. In the meantime the majority of the repair team started the underwater operation. They first

Hydrex diver getting ready for underwater operation



... and taking the plunge.

Preparing the hull for installation of the flexible mobdocks.



Diver performing welding work on the hull.

Overhauled thruster ready for reinstallation.

removed the thruster tunnel grids. Next they detached the blades one by one and replaced them with blind flanges to prevent oil from leaking from the thruster.

In-house developed equipment

We have a special R&D department that is continuously looking for new ways to streamline the repair procedures used by our teams. One of the results of their research is a cradle designed especially for thruster operations. This device has been used on many thruster operations around the world. It allowed the Hydrex divers to remove the bow thruster unit from the thruster tunnel and bring it onboard the workboat in one take using the ship's crane.

The unit was then brought to a local workshop where it was overhauled by a technician team of the OEM. The Hydrex team remained on stand-by so that they could immediately start the reinstallation when the bow thruster arrived back on location. This kept both the travel cost and the time-frame needed for the operation to the absolute minimum.

The overhauled thruster unit was brought back inside the tunnel using the reverse procedure. Next, another technology developed by Hydrex in-house was used to close off the thruster tunnel: our flexible mobdocks. Mobdock is short for 'Mobile mini drydock' because they enable our diver/technicians to create a dry environment to work in, while the vessel stays afloat. These mobdocks have been used during thruster operations for 20 years now. Because

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 much time and money.

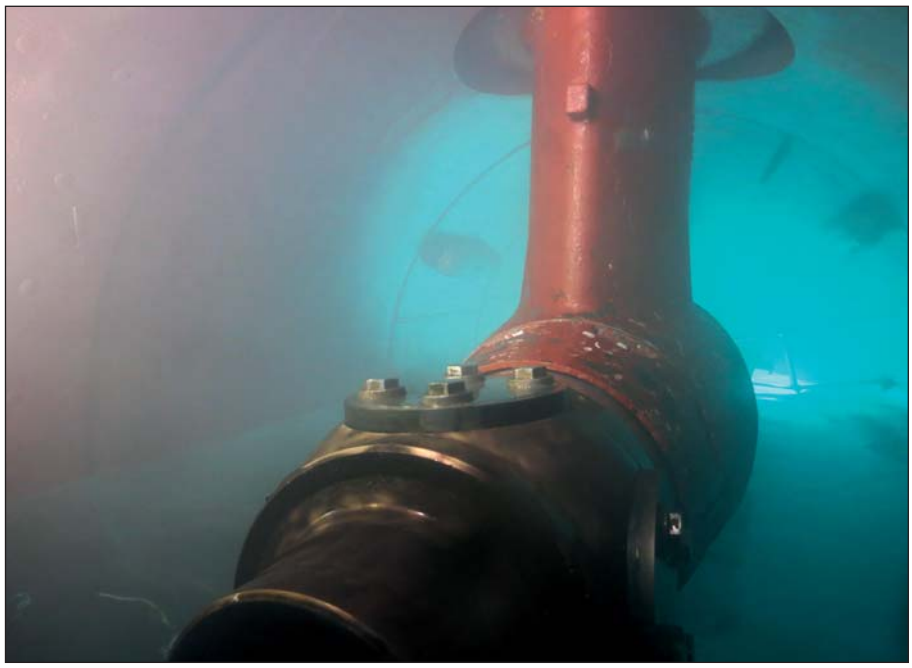
Hydrex diver/technicians can carry out inspections underwater and on-site very swiftly without disturbing the vessel's sailing schedule.

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.

HYDREX®
UNDERWATER TECHNOLOGY

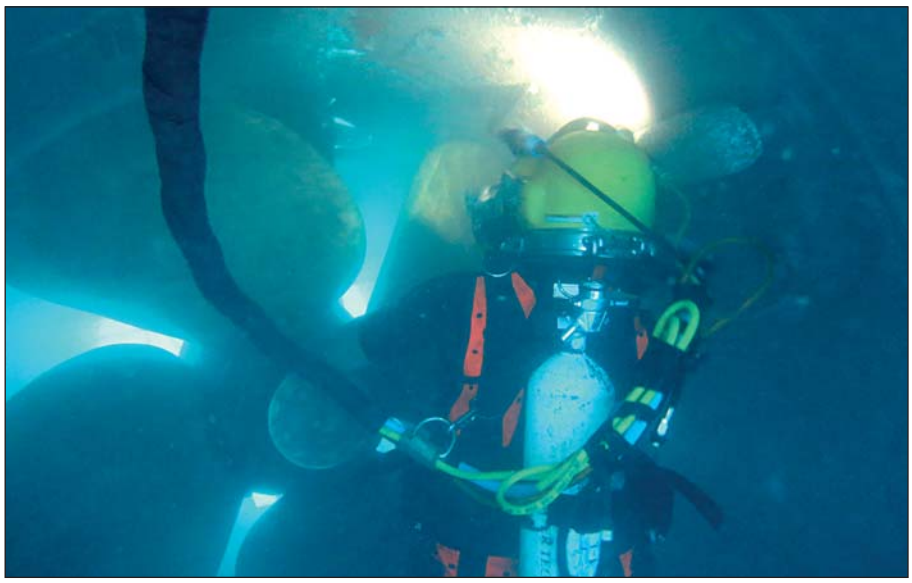
Bow thruster propeller blades after removal, prior to being refurbished.



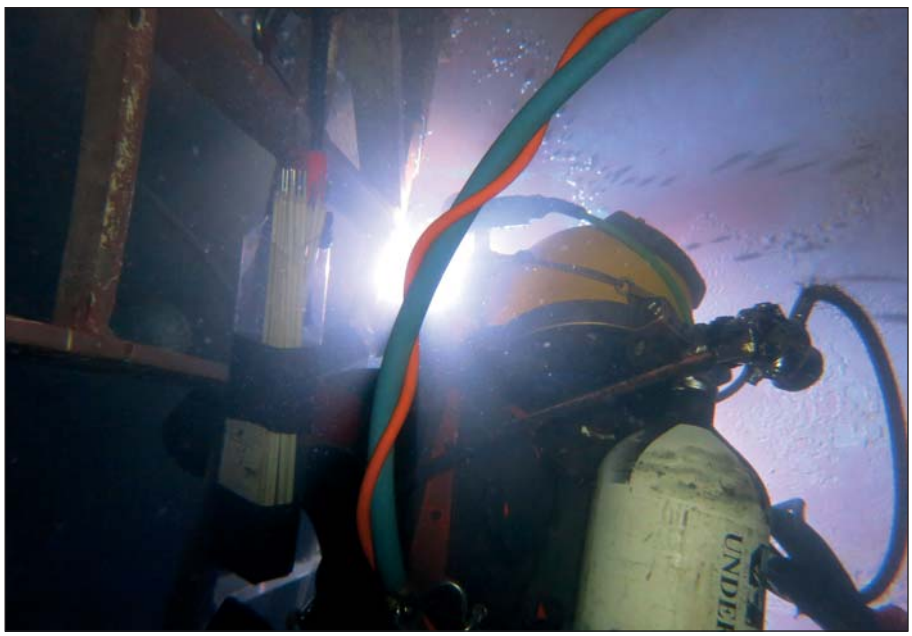
Thruster unit inside underwater habitat.

Overhauled bow thruster united inside re-flooded tunnel.

Reinstalled and secured thruster blades.



Hydrex diver performing final inspection of reinstalled thruster blades.



Reinstallation of thruster tunnel grid.

they are flexible they can be shipped to anywhere in the world by plane very fast.

The diver/technicians repositioned the gearbox using chain blocks and secured it with bolts. All thruster propeller blades were then reinstalled one by one and the thruster unit was reconnected to the engine room.

After a successful leakage test, the team removed the flexible mob-docks. Once the tunnel was flooded, the tunnel grids were reinstalled. This concluded the operation.

Conclusion

Performing both the removal and reinstallation of a thruster on such a short notice can only be done successfully by people who have experience with such challenges and the relevant know-how. This is why Hydrex has a technical department capable of arranging such a fast mobilization, an in-house R&D department that can take care of the engineering aspect and highly experienced diver/technicians who are trained to perform the required class-approved repair procedures.

During the entire operation we also worked closely together with the OEM, which allowed us to offer the best possible solution to our customer within the shortest possible time-frame. ■

Dive support workboats offer many logistic possibilities

The Hydrex headquarters in Antwerp has two dive support workboats available for immediate mobilization. Both 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 our office in Antwerp.

The workboats are positioned in Antwerp or Rotterdam, where a wide range of equipment and tools is available at all times.

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 where a wide range of equipment is available.

Hydrex has experienced and certified 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.

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

Hydrex US ready to mobilize immediately

Hydrex has an office located in Clearwater in the Tampa Bay area that is ready to mobilize immediately. The office has a fast response center that is equipped with an extensive range of state of the art logistics, trucks, tools and diving support equipment. This enables Hydrex US to efficiently service vessels and offshore units calling on ports in Canada, North, Central and South America as well as the Caribbean.

All staff members of the Hydrex office in Clearwater undergo stringent training at the Hydrex headquarters in Antwerp. They can carry out both simple and complex high quality jobs even in the harshest of circumstances.

Repairs to thrusters, propellers, rudders, stern tube seals, damaged or corroded hulls and all other underwater repair as well as maintenance services are done while the vessel is afloat. This eliminates the need to drydock.

All used methods are fully approved by all major classification societies.

HYDREX®
UNDERWATER TECHNOLOGY

Always on time

Hydrex offers turnkey underwater repair solutions to shipowners wherever and whenever they are needed. Hydrex's multidisciplinary 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 performs 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 we 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.

HYDREX®
UNDERWATER TECHNOLOGY

Headquarters Hydrex N.V. - Antwerp
Phone: + 32 3 213 5300 (24/7)
E-mail: hydrex@hydrex.be

Hydrex Rotterdam
Phone: +31 10 313 25 19 (24/7)
E-mail: info@hydrex.nl

Hydrex Spain - Algeciras
Phone: + 34 956 675 049 (24/7)
E-mail: info@hydrex.es

Hydrex LLC - Tampa, U.S.A.
Phone: + 1 727 443 3900 (24/7)
E-mail: info@hydrex.us

www.hydrex.be