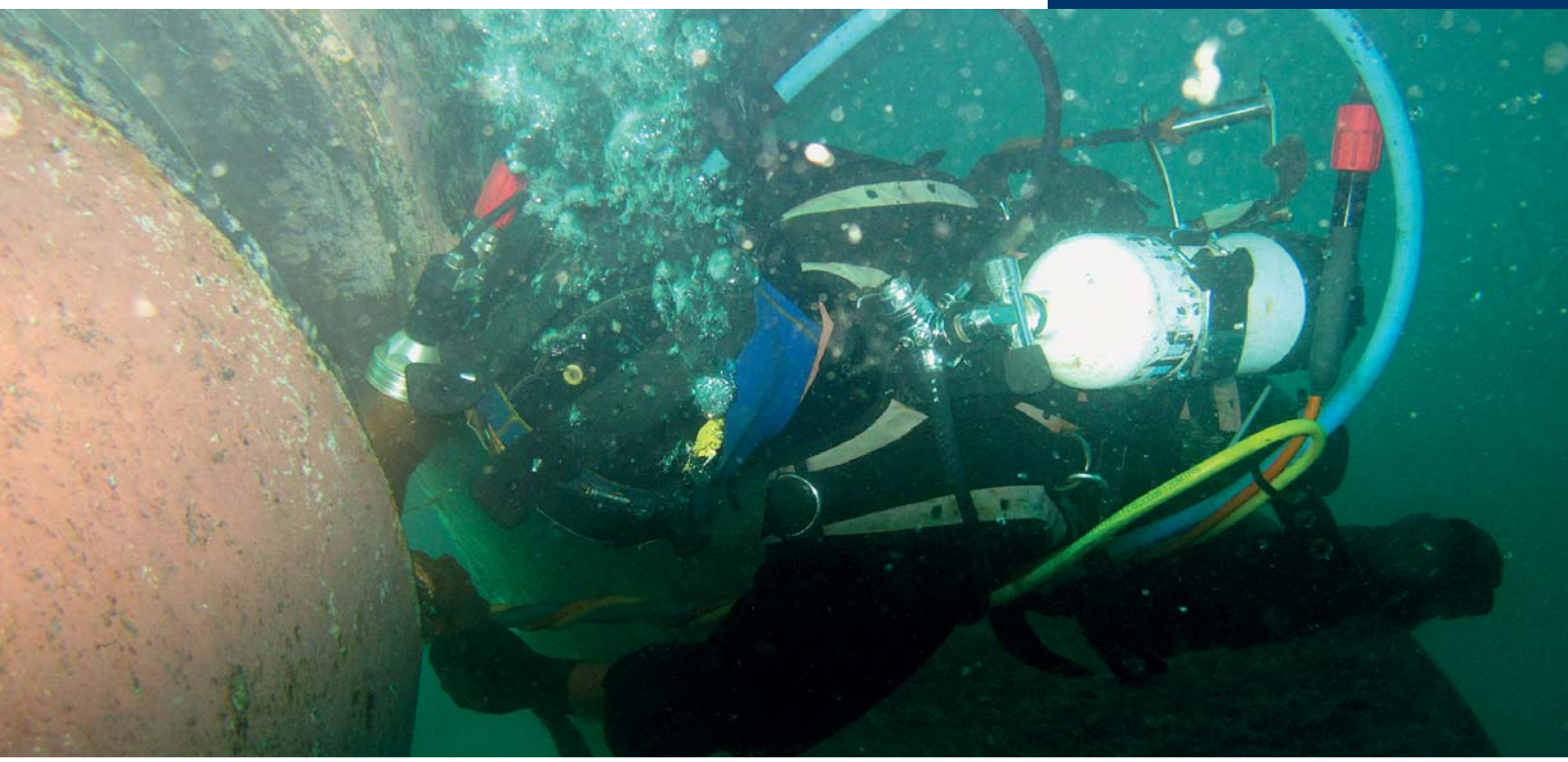
HYDREX®

UNDERWATER TECHNOLOGY

NEWS

LETTER | 234



Contents

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 dive support equipment. This enables 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.

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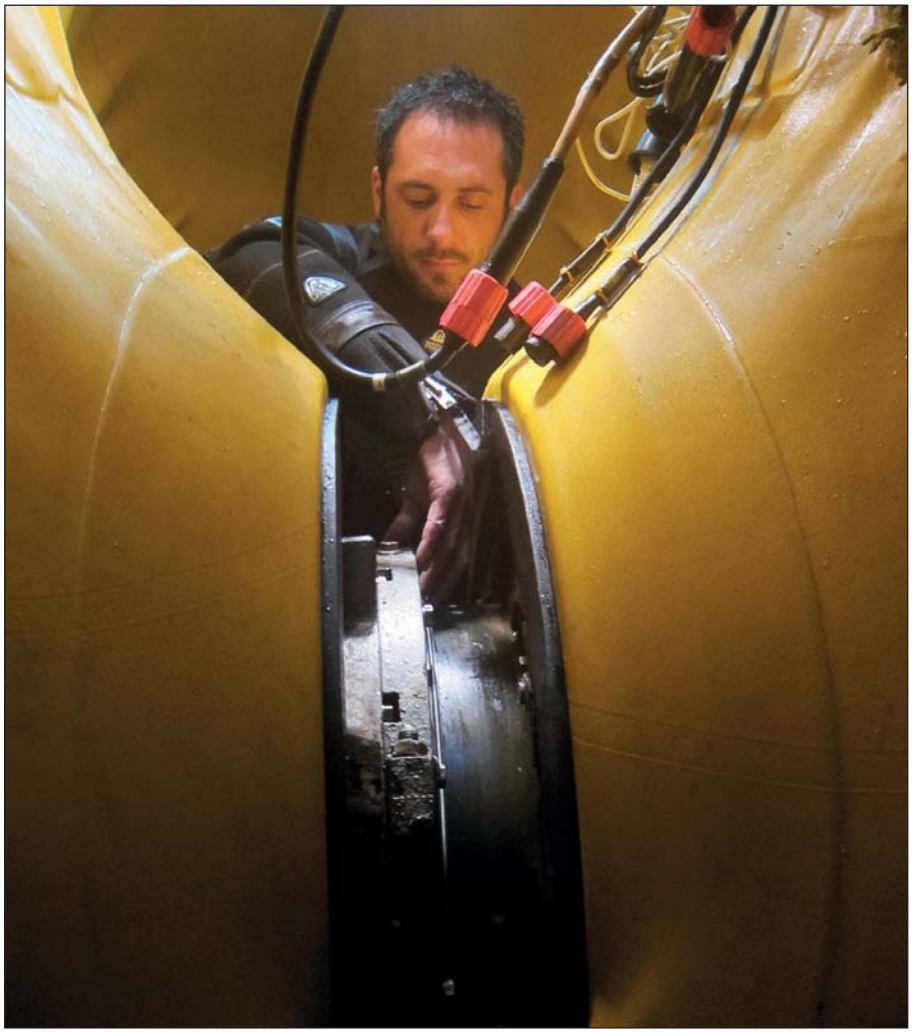
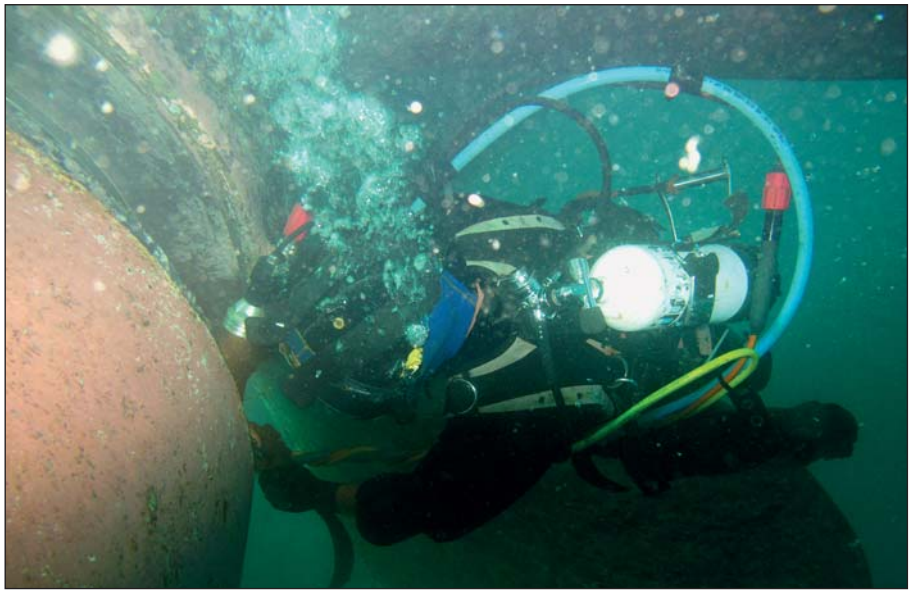
Underwater repairs: case studies

Hydrex is able to perform a wide variety of operations with its flexible mobdocks. These enable us to create a dry environment underwater for our divers to work in. There is no need to send the vessel to drydock. We will bring the drydock to you and all operations can be carried out alongside or at anchorage. Normal commercial activities can therefore continue without interruption. The lightweight mobdocks allow for a fast mobilization and the necessary adaptability.



Hydrex diver/technician working inside flexible mobdock.

Hydrex was the first company ever to use a prefabricated cofferdam, introduced as early as 1979. It was used to carry out repairs to the *m/v Lunar Venture*. By 1983 the technology was in use to perform insert repairs on double bottom tanks from the inside. The company has advanced this concept extensively over the last 30 years, along with the technology to ensure that fast, professional and high quality work can be done while the vessel stays afloat and even while continuing normal ship operations.



Hydrex diver preparing stern tube assembly for installation of a flexible mobdock.

Initially these techniques were applied mainly to the repair and replacement of bow thrusters. Using steel cofferdams as a mobdock to seal off the thruster tunnel, with an access shaft protruding above the water, work teams accessed the tunnel and from there could work on the thruster in complete safety.

Preparing a new split type spacer ring for installation.

We has since then developed this technology further using lightweight flexible mobdocks (mobile mini drydock). These were first used in 2002 and have been further developed by our in-house R&D department ever since. Hydrex constantly invests in the research necessary to evolve repair techniques and procedures. It is now possible for our diver/technicians to perform permanent repairs on seals, thrusters and any other part of the underwater vessel without the need to go to drydock.

For many of these operations we work together with OEMs. The most common type of mobdock operations are seal and thruster repairs or replacements. Mobdocks needed for underwater repairs on the standard sizes of seal assemblies and thruster tunnels are available in our fast response centers for immediate transportation. Tailor-made mobdocks can also be designed be our R&D department.

Hydrex truck and equipment arriving on-site.

Dry shaft seal renewal underwater

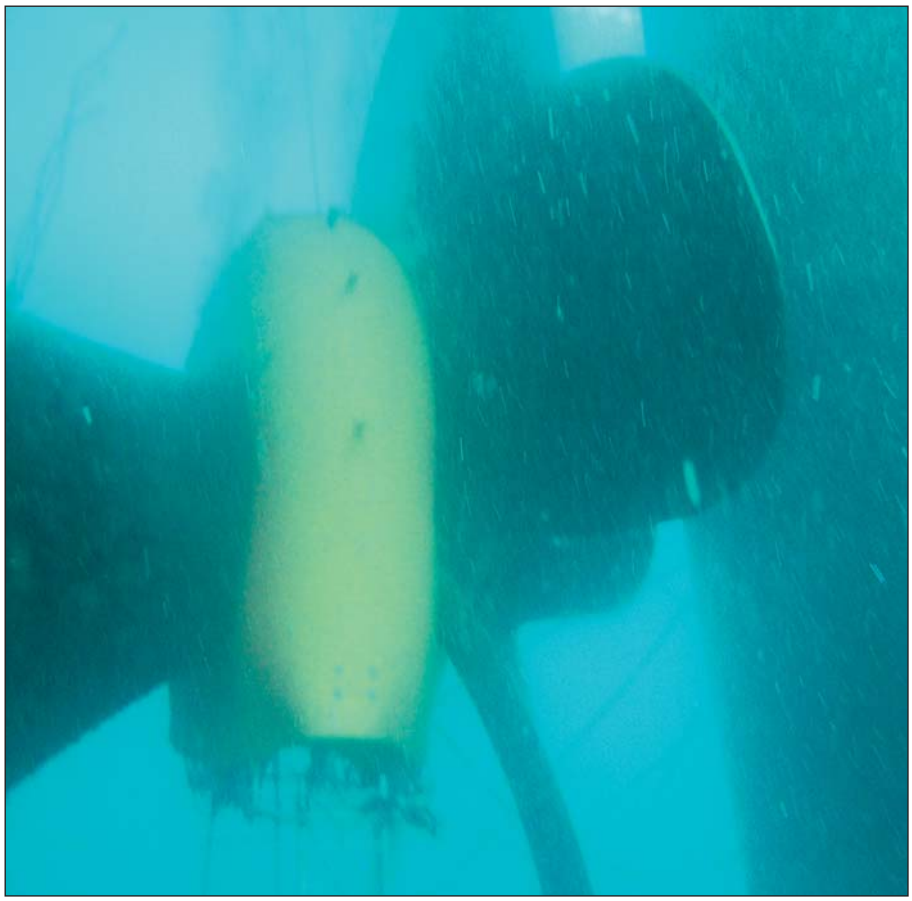
Damaged stern tube seals will cause an increasing amount of oil leaking or water ingress as the damage worsens. By replacing the seals when the damage is first discovered Hydrex keeps the down time low. Oil leakages can also produce a potential or actual liability when for instance going to the United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

By using a flexible habitat our divers create a drydocklike environment 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 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 running marks. All this is routinely handled by the teams on the jobs. 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.

Case study: Underwater stern tube seal repair under challenging circumstances

Oil was leaking from the stern tube seal assembly of a 157-meter dred-



Flexible mobdock installed around a stern tube assembly.

Hydrex technician inside a closed-off thruster tunnel

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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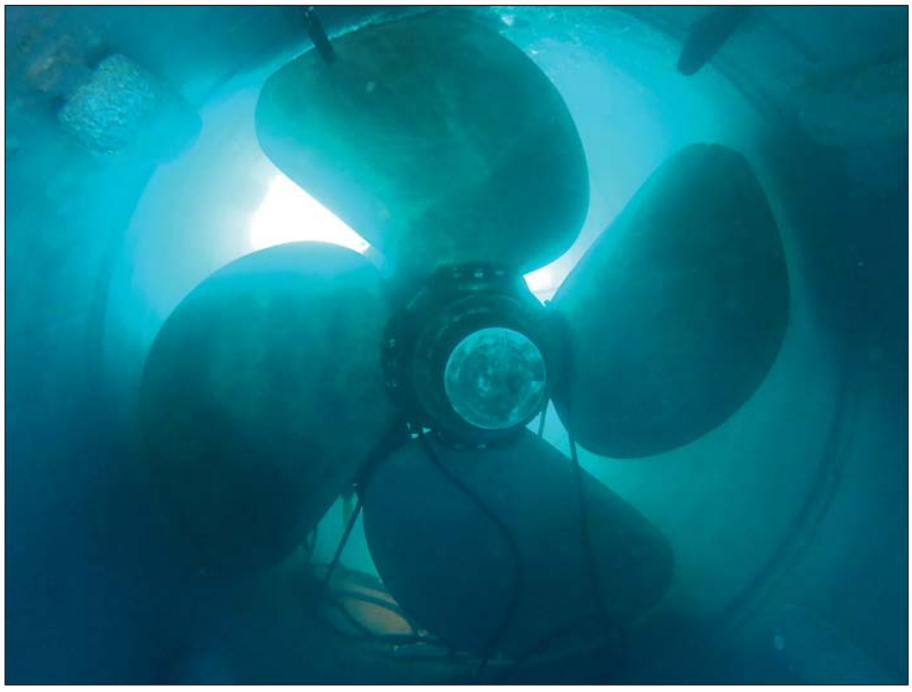
Preparing a bow thruster unit for reinstallation.



Reinstalled bow thruster unit and blades.

ger. A team of Hydrex diver/technicians therefore mobilized to the vessel's location in Uruguay, together with all the needed equipment.

A thorough underwater inspection revealed that the entire housing of the assembly was severely corroded and needed to be replaced. Because the housing consisted of split shells, this could easily be done by the Hydrex team.

Next they installed the flexible mobdock. The team then removed the three damaged seals one by one and replaced them with new ones.

Because the existing running area was worn out, the diver/technicians installed a spacer ring to create a new running area for the seals. Thanks to a newly developed method, this could also be done inside the flexible mobdock.

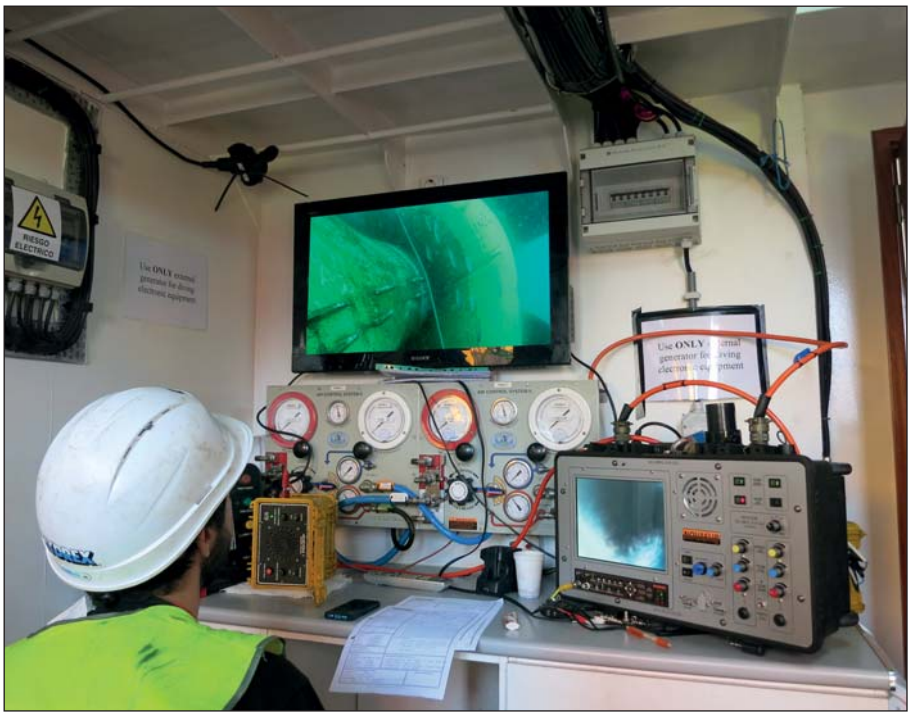
The stern tube seal repair was carried out in less than optimum conditions. There was almost no inwater visibility at Montevideo at the time of the repair. It made the diving operations a lot more challenging However, our divers are trained to be flexible and adapt to constantly changing working conditions. This made it possible for Hydrex to perform the stern tube seal repairs under the strictest safety regulations, to the highest quality standards and without any unnecessary delay. The dredger was able to leave Montevideo in time to sail to its next operation.

Bow thrusters

Hydrex diver/technicians can perform a wide range of repair or maintenance work on all types of thrusters. An entire unit can be overhauled, propeller blades and seals can be replaced or repair work on another specific part of a thruster can be performed on-site. These repairs are performed in cooperation with OEMs and can be carried out while the vessel stays afloat with minimum impact on its schedule.

Bow thruster operations are carried out using our flexible mobdocks that close off the thruster tunnel on both sides. These lightweight mobdocks can quickly be transported to any location around the world.

In most cases a thruster overhaul is planned during a scheduled drydocking. This usually means that the unit is removed in drydock. The ships then has to wait for the repaired thruster to return and be reinstalled before the vessel can leave drydock. This means a longer drydock time and consequent cost. Hydrex can however remove the unit while the ship is still afloat so it can already be brought to the



Hydrex team leader monitoring an underwater operation.

Hydrex technician performing repair work inside a closed off thruster tunnel.

manufacturer to be overhauled. When the vessel enters drydock the overhauled unit will be ready for reinstallation without any delay. The reverse procedure is also possible. If the thruster is removed in drydock, Hydrex can reinstall it in dry conditions underwater at a later date. In this way the ship can already leave drydock while the unit is still with the manufacturer.

Case study: Fast response keeps vessel on project in Australia

A Hydrex team removed the bow thruster of a large offshore supply vessel and reinstalled the unit after it was overhauled. By carrying out both parts of the operation underwater while the vessel was at anchorage in Dampier, Australia, the ship did not have to go to drydock and could stay on the project.

Despite the remote location of the vessel, our technical department was able to make all logistic arrangements and arrange a mobilization of the equipment swiftly. Recently we have carried out several operations in Australia, all of which were done with a limited window of opportunity available.

After our divers removed the bow thruster unit it was brought to a local workshop where it was overhauled by a technician team of the OEM. The Hydrex team remained on standby so that they could immediately start the dry reinstallation when the bow thruster arrived back on location.

Information

If you have any questions regarding a possible mobdock repair, do not hesitate to contact us.

Animations of the procedures used can be found on our website. For more information on mobdock or other underwater repairs, please contact one of our offices. We are at your disposal 24/7 and ready to mobilize almost immediately. ■

KEEPING SHIPS IN BUSINESS

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 commercials 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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Fast mobilization for crack repair in Zeebrugge

We were contacted by the representative of a 163-meter roro vessel to carry out a crack repair during the ship's stop in Zeebrugge. The operation was carried out swiftly during the Pentecost weekend in May.

Installation of the blank over the crack.

A team of Hydrex diver/welders travelled from our Headquarters in Antwerp to Zeebrugge with all the required equipment. Because our fast response centers have a large stock of state-of-the-art equipment ready, mobilization for smaller operations like this can be almost immediately.

After arriving on-site, our team set up their equipment while the team leader discussed the scope of work with the superintendent and the representative of the classification society.

When the work area was declared gas free, our divers started the operation with an inspection of the damaged area and this on both sides of the hull. The crack was located in the engine room ballast tank under a

The repair started with the cleaning of the waterside of the damaged area. This allowed the team to take the exact measurement of the crack: 600 mm on the outside. Next a blank was installed over the area. The diver/technicians could then perform work on the crack inside the engine room without water ingress.

The team then removed the frames, bulkheads and a cement box to get access to the crack. Inside the engine room it measured 700 mm. To prevent it from spreading, crack arrests were drilled at its extremities. Next our diver/technicians ground out the crack over its entire length. It was then filled with our class approved full penetration welding.

Application of dye penetrant to make crack more visible.

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.

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Drilling of crack arrests to prevent crack from spreading.

Ground out crack ready for welding.

Crack filled with full penetration weld.

Ultrasonic testing of repaired crack.

Repaired crack seen from the waterside after removal of blank.

When the crack had been filled, ultrasonic testing was carried out by and independent tester. The repair was approved by the surveyor and the bulkheads and frames were reinstalled. Finally the blank was removed from the waterside of the crack.

As a result of this temporary repair the owner of the vessel does not have to go off schedule for an emergency visit to drydock, but can make arrangements for a follow up repair at a more convenient time and location. ■

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:
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New generation cold straightening equipment

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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Keeping ships in business

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 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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