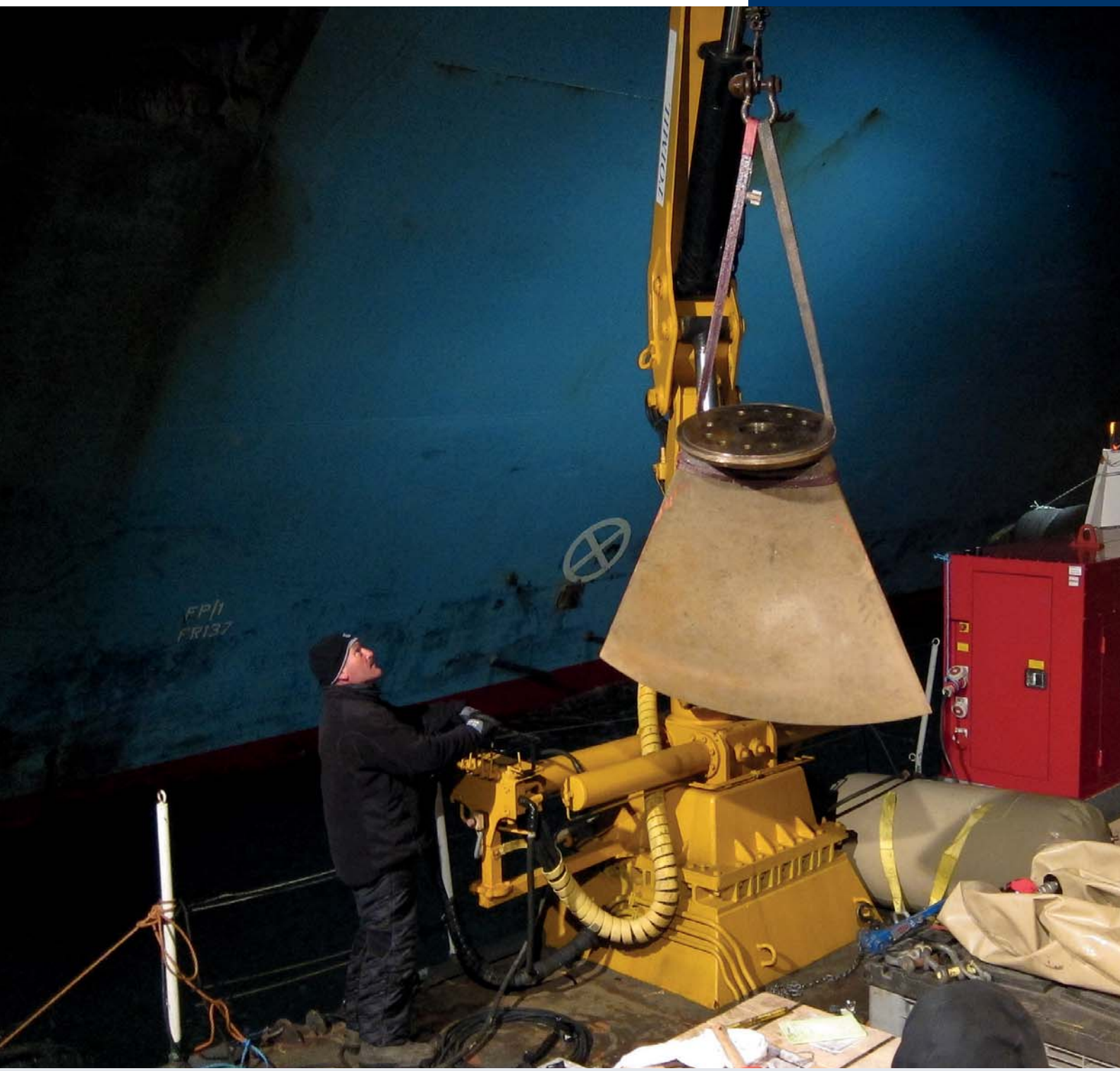
HYDREX®

UNDERWATER TECHNOLOGY

NEWS

LETTER | *196*



Contents

KEEPING SHIPS IN BUSINESS

ISO 9001 certified

Underwater services and technology approved by:

Fast response

Through an ever-expanding, worldwide network of offices and service stations, Hydrex can provide a wide range of services. From these locations, specialized repair and diver teams can be mobilized immediately to almost anywhere in the world.

All the lightweight equipment used by the teams is stored in fast response centers which are designed specifically for the purpose of speed and are equipped with all the latest facilities and tools. A good example of the easy to transport equipment is a range of unique flexible mobdocks which are used to perform stern tube seal, thruster, rudder and other permanent repairs that require a dry working environment.

With 40 years of experience and well trained diving teams at its disposal, the Hydrex technical department knows how to handle any kind of situation without loss of quality or loss of time for the customer.

Because Hydrex brings drydock-like conditions to the ship, you do not have to take your vessel off-hire and into drydock. This saves you valuable time and money.

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Underwater bow thruster removal in Rotterdam using new Hydrex workboats

A Hydrex diver/technician team mobilized to Rotterdam last month to remove the bow thruster of a 300-meter container vessel. The unit needed to be overhauled. Hydrex performed the operation underwater using the company's own workboats based at the Antwerp depot. This made it possible for the owner to keep his vessel out of drydock.

Fully loaded Hydrex dive support workboat on its way to Rotterdam.

The team mobilized from the Hydrex headquarters in Antwerp after all basic preparations had been made and the needed equipment was loaded onto one of the Hydrex workboats. The Hydrex catamarans are fully equipped as dive support stations with hydraulic cranes, winches, nautical and communication equipment and a dive control room. They can be used for a wide range of operations in Belgium, the Netherlands, the United Kingdom and France, permitting even more rapid deployment from the Antwerp depot. This increases flexibility of operations and helps to keep costs down for the client.

First the bow thruster blades were detached and brought to the surface.

After they arrived in Rotterdam, the divers installed flexible mobdocks on both sides of the thruster tunnel. Next they emptied all water from the tunnel. This created a dry working area around the bow thruster unit. The team could then detach the bow thruster blades one by one.

The blades were replaced by a blind flange to prevent oil leaking from the thruster and water from ingressing. Next the diver/technicians removed the flexible mobdocks again, concluding the first part of the operation.

Bow thruster unit brought onboard the Hydrex workboat.

Hydrex diver/technicians lowering the unit onto the deck.

Hydrex team arriving back at headquarters with the bow thruster unit.

The following step was to secure the gearbox with hoisting equipment. The team then disconnected the bow thruster unit from the engine room and lowered it onto a cradle. This cradle was designed especially for thruster operations. It can be adjusted to the size of the unit. In this manner the thruster is prevented from tipping over and Hydrex divers can remove the unit in one take.

The bow thruster was then brought onboard the Hydrex workboat, ready to be overhauled. Next the team securely sealed off the engine room by positioning a flange over the space connecting the thruster tunnel to the room. This allows the vessel to sail until the overhauled unit is reinstalled.

With the bow thruster unit on deck the team sailed back to the Hydrex headquarters. From there the unit was transported to the manufacturer to be overhauled.

Performing a job like this on a tight schedule takes a lot of planning. This can only be done successfully by staff who have familiarity with such operations and the relevant know-how and equipment. Hydrex has a technical department capable of executing all the required planning. Our diver/technicians are trained and qualified to perform the full range of required class-approved repair procedures in even the harshest conditions. Hydrex also has very well-equipped rapid response centers including customized workboats, ready to mobilize directly to the job site. This saved the owner precious time and money. ■

Fast underwater stern tube seal replacement with new generation mobdock

Last month a Hydrex diver/technician team carried out underwater stern tube seal repairs on a 190-meter bulker vessel in Zeebrugge, not far from headquarters in Antwerp. The repair was performed in icy weather conditions.

Hydrex equipment and monitoring station on the snowy quay.

The vessel was suffering from an oil leak, making a fast repair necessary. Using one of the company's flexible mobdocks the team was able to carry out the entire operation on-site and underwater, saving time and money for the owners.

Hydrex continues to invest in the research necessary to keep evolving repair techniques and procedures. Over the years the Hydrex R&D department has constantly improved the flexible mobdock (mobile mini drydock) technique to make it possible for Hydrex diver/technicians to perform permanent repairs on seals, thrusters, rudders and almost any other part of the underwater vessel without going to drydock.

Inside the flexible mobdock drydock-like conditions are created.

The latest generation of flexible mobdocks allows Hydrex to carry out the replacement of virtually any type of stern tube seals very quickly on-site.

These flexible mobdocks are stored at the fast response centers. Designed specifically to increase speed of service, these centers are equipped with all the latest facilities, lightweight equipment and tools. This allowed us to mobilize a team together with all the needed equipment to the bulker's location within the shortest possible time frame.

After the diving team had set up a monitoring station, the operation

Hydrex diver ready to dive towards the stern tube area.

Diver/technician monitoring the diving operation.

started with a thorough underwater inspection of the stern tube seal assembly. The divers discovered that the rope guard was missing.

The team then installed the flexible mobdock around the stern tube seal assembly creating a dry underwater environment, a necessity for permanent stern tube seal repairs. Next the team removed the damaged seals one by one and replaced them with new ones.

The operation ended with the conducting of a pressure test with positive results and the removal of the flexible mobdock.

By creating a dry environment underwater, the divers were able to rapidly complete the required work on-site. Every day a ship has to go off-hire causes a substantial loss of money. The teams therefore worked in shifts to perform the stern tube seal repairs within the shortest possible time frame. The in-situ repair saved the owner the time and money which going to drydock would have entailed. ■

The split ring was cleaned and reinstalled after the stern tube seal replacement.

Hydrex diver lifted on board.

Underwater propeller repairs with Hydrex new generation equipment

Last month Hydrex diver/technician teams performed successful propeller repairs on vessels berthed in Antwerp (Belgium) and Rostock (Germany) and on a ship at anchorage in Fujairah (U.A.E).

By taking advantage of the in-house developed cold straightening technique, damaged blades can be straightened underwater. This allows a ship to return to commercial operations without the need to drydock. Optimum efficiency of the propellers can be restored by bringing the blades back close to their original form.

If straightening is not an option, the affected area on the blade will be cropped to restore the hydrodynamic balance. This kind of repair is carried out with the propeller blade cutting equipment developed by the Hydrex research department.

Hydrex team and cold straightening machine arriving in Rostock.

Underwater propeller blade straightening in Rostock

With three of the four blades of its propeller severely bent, a 180-meter bulker needed a fast, on-site solution to restore the propeller's balance and efficiency. Hydrex diver/technicians are trained to carry out repairs underwater in the shortest possible time frame. A team was rapidly mobilized to the ship's location in Rostock to perform a cold straightening of the blades.

After the equipment arrived at the vessel's location the team started the underwater operation with a detailed underwater survey of the damaged propeller blades. The inspection revealed that two blades had bent over 40° while a third one had bent no less than 85°. The fourth blade had only suffered some smaller cracks which could be ground away.


Diver/technician guiding the new generation straightening machine underwater.

Permanent 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 lightweight and can be mobilized very rapidly in our special flight containers. Therefore this new service is now available worldwide.

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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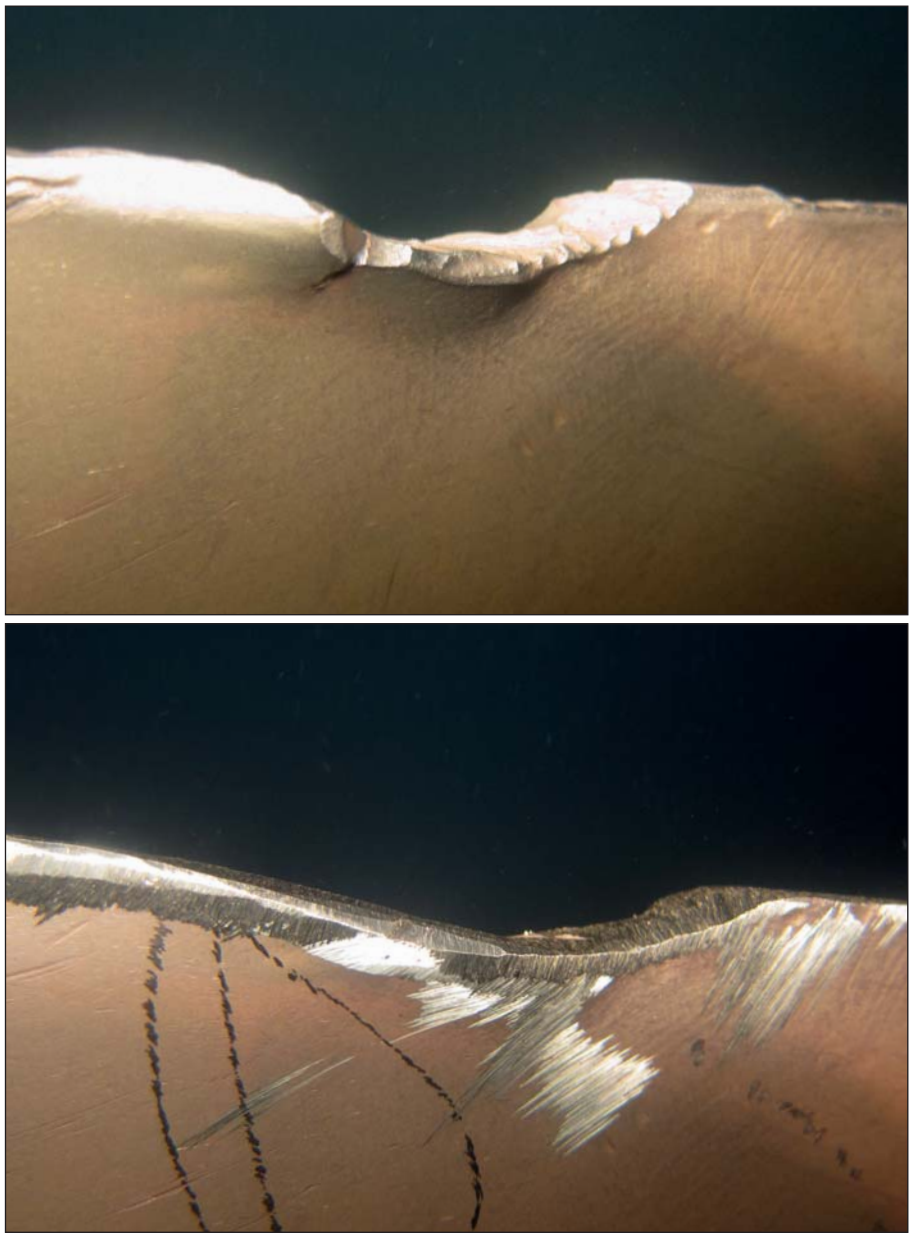

Chipped trailing edge of propeller blade (above) and during grinding (under)

The team then positioned the straightening machine underwater over the bends of the trailing edges of the first blade. In close communication with the team leader in the monitoring station on-shore, the divers applied pressure to return the bent blade to its original state. This procedure was then successfully repeated for the other damaged blades. Even the blade that had been bent almost 90° was returned to its original position with the new cold straightening machine. This restored the propeller's efficiency.

Afterwards a video and photo inspection was carried out to the approval of the attending surveyor.

Underwater propeller blade modification in Fujairah

A Hydrex diver/technician team mobilized to a 180-meter tanker at anchorage in Fujairah. The vessel had suffered damage to the four blades of its propeller and the owner wanted Hydrex to perform an underwater repair.

An underwater inspection revealed that the blades had suffered smaller cracks and dents along their trailing edges. Because the damage to the blades was limited, the ship expe-

Hydrex diver polishing the grinded edge of a propeller blade in Fujairah.

rienced no vibrations and only a small loss of performance. No straightening or cropping was required. The Hydrex divers therefore ground away the cracks and polished the edges of the blades. This gave the propeller back its original efficiency. It will also prevent further cracking.

A representative of the vessel monitored the entire operation and was very satisfied with the result of the repair.

Fast underwater propeller blade repair in Antwerp

One of the four propeller blades of a 190-meter roro vessel was severely

A fully grinded and polished propeller blade will minimize the loss of performance.

Fast underwater ship 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 mobdocks. 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 the 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.

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Heavy cracked area of the damaged propeller blade in Antwerp.

Part of the bent area on the blade was damaged too severely and needed to be cropped.

damaged. The owner of the ship contacted Hydrex on a Friday evening, looking for a solution. After proposing an on-site solution, Hydrex mobilized a team to ship's location in Antwerp the next morning to carry out and underwater repair. This allowed the owner to keep his vessel on schedule.

During the underwater survey of the propeller, the team discovered that the blade was bent on two different locations: on the trailing edge and on the tip. The bent on the trailing edge could not be straightened in its entirety. For this reason the team cropped a small portion of the damage and straightened the remaining area. The tip was restored to its original position completely. By doing this the greatest possible efficiency was achieved for the vessel.

Conclusion

Our R&D department is constantly looking into ways to enhance the available propeller repair techniques even further to improve our services. New models of both the straightening and the cutting machines have recently been put into service. These allow us to straighten blades that could previously only be cropped and to crop extremely damaged blades with only a minimal loss of efficiency for the propeller. ■

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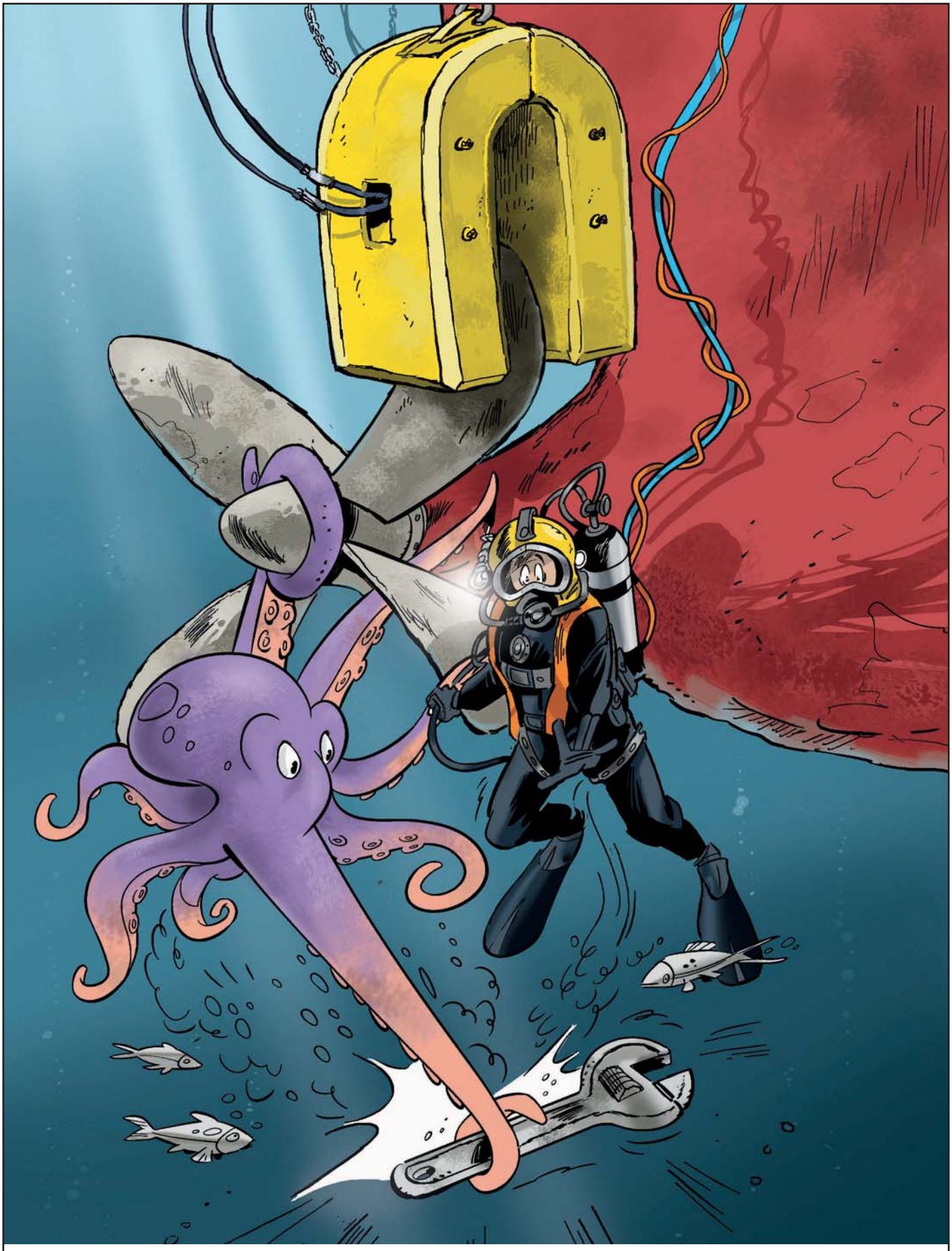

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On-site permanent insert repairs in Belgium, the Netherlands and Cameroon

Hydrex teams of diver/technicians mobilized to vessels berthed in Zeebrugge (Belgium), Amsterdam (the Netherlands) and Douala (Cameroon) to perform insert repairs on a roro vessel and two tankers. These repairs were carried out according to the Hydrex class approved procedure for the welding of inserts in a vessel's shell plating while afloat by using an external cofferdam.

Hydrex diver/technican preparing for underwater operation in Zeebrugge.

A 560 mm crack in the bottom shell plating of a 203-meter roro vessel needed to be repaired during the ship's stop in Zeebrugge. The Hydrex team therefore carried out a detailed inspection of both the onboard as well as the water side of the shell plating, after which they installed a cofferdam over the affected area.

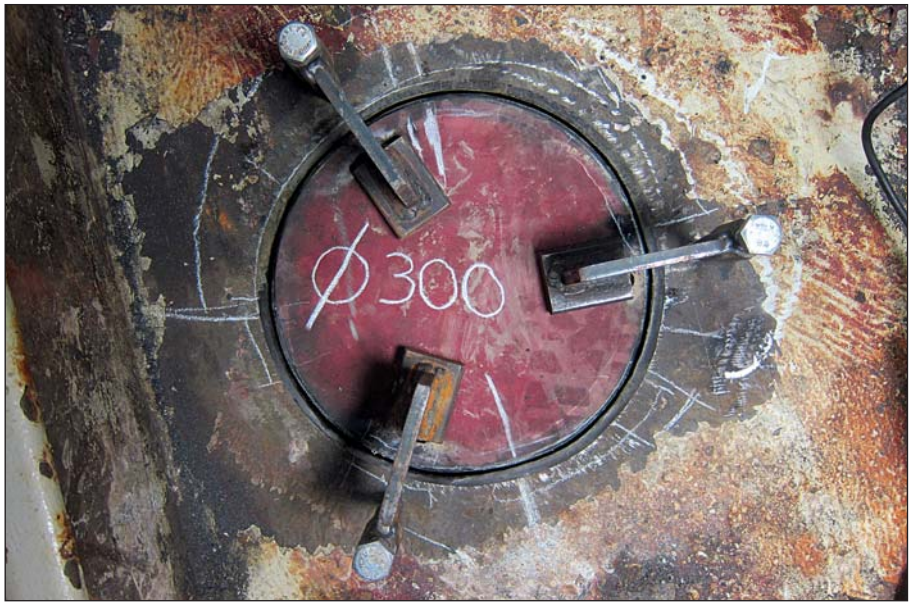
This allowed them to remove the frames covering the damage and cut away a 610 mm x 320 mm piece of the shell plating around the 560 mm crack. Next they positioned a new insert plate of the same dimensions and secured it with a full penetration weld. An independent tester then carried out ultrasonic testing and the repair was approved by the DNV surveyor who was present during the operation. The diver/technicians then reinstalled the frames and removed the cofferdam, concluding the repair.

Securing the new insert plate with full penetration weld on roro vessel in Zeebrugge.

In Amsterdam a round insert with a diameter of 300 mm was installed on a 144-meter tanker to stop the leak in one of the ballast tanks of the vessel.

After the ship had been declared gas free, the Hydrex diver/technician team started with a detailed inspection of the damaged area, both underwater and inside the ballast tank. The team then installed a cofferdam over the crack and removed the damaged area. Next the diver/technicians prepared the edges of the hole and installed the new insert with a full penetration weld. This was done under the supervision of an LR surveyor. After successful

New insert plate with reinstalled frames on roro vessel.



Round insert plate positioned on tanker in Amsterdam.

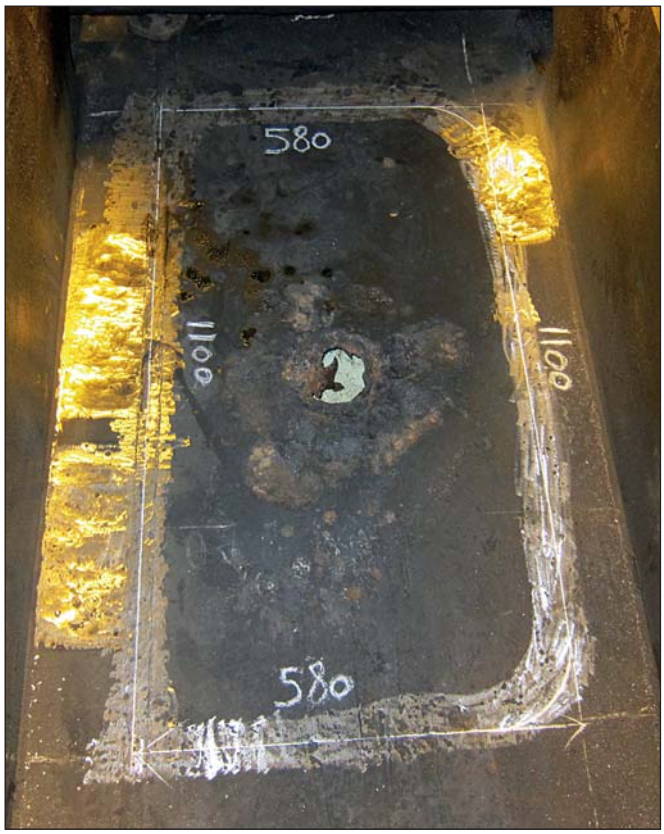
ultrasonic testing of the weld seams of the new insert, the cofferdam was removed. The owner could sail his vessel free of cracks.

Another Hydrex diver/technician team removed the cavitated area on the flat bottom area in the ballast tank of a 228-meter tanker. The operation was carried out during the ship's stop in Douala, Cameroon.

A temporary doubler plate had been installed over the cavitation. The team therefore performed the underwater part of the inspection after

All welding work is performed according to class approved procedures.

New insert in Amsterdam seen from the outside.



Cavitated area on tanker in Cameroon, ready to be cut away.


New insert in Cameroon positioned and ready to be welded.

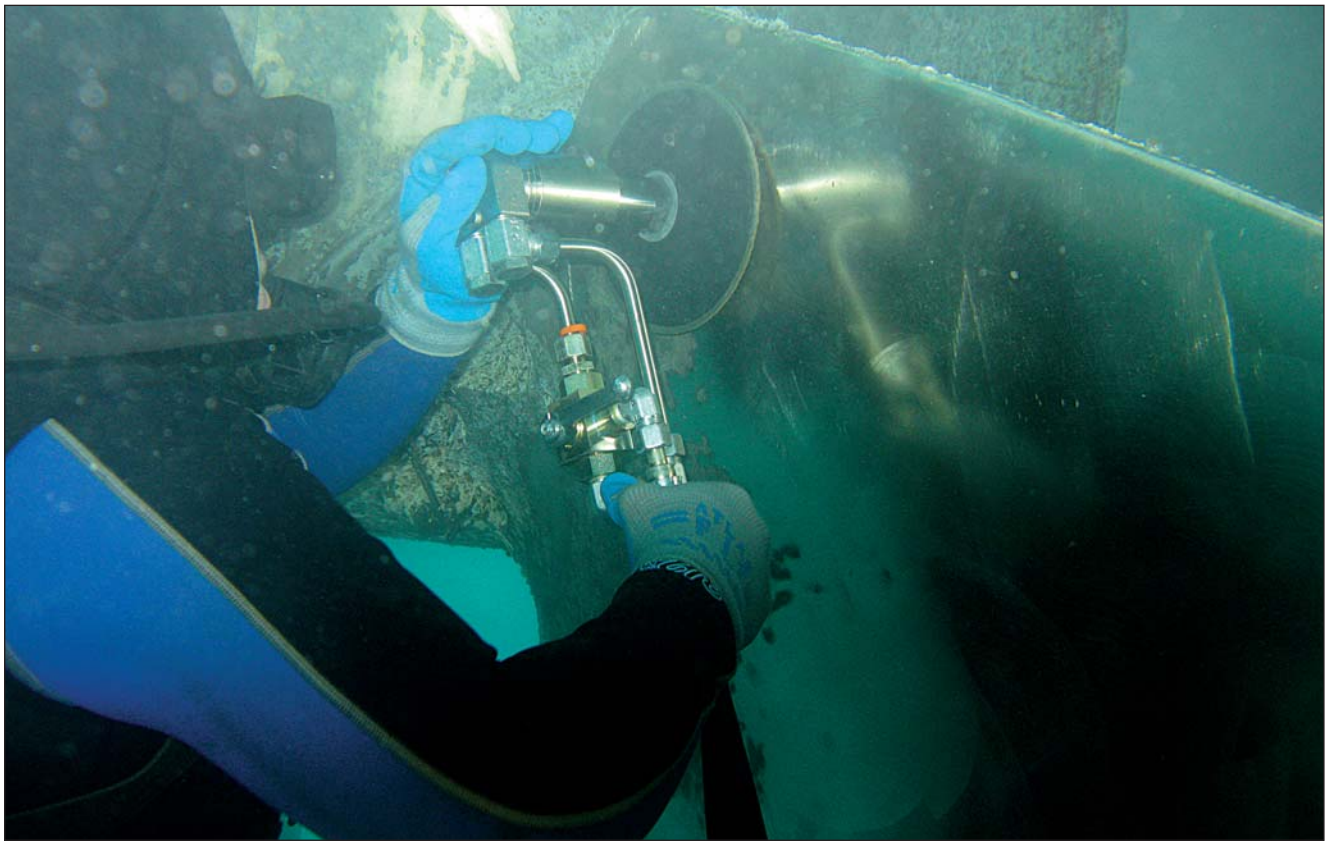

Class approved permanent insert plate in Cameroon.

which they installed the cofferdam. The diver/technicians then removed the doubler plate and inspected the onboard side of the cavitation damage. A 1100 mm x 580 mm area was cut away, removing the area that had been damaged the most. After the team installed and welded the new insert plate, they filled up three smaller cavitation spots around the insert. An ultrasonic tester carried out the required NDT test and the BV surveyor approved the operation.

Our divers are trained to perform a wide range of procedures; they stayed in close communication with each other and with the technical department in the office, throughout these operations. This allowed them to finish these jobs within the shortest possible time frame and this without any compromise of the high quality standards Hydrex is known for.

These permanent repairs allowed the owners of the vessels to continue their schedule without having to go to drydock. As a result, no further attention to the hull cracks will be needed. ■

New generation propeller cleaning offers large cost savings



The effect of a rough propeller on the vessel's fuel consumption is big. The cost of remedying a rough propeller is very minor. Remedies for a rough propeller are not only simple and quick to execute, they also represent a fast, high return on investment.

A rough propeller results in a fuel penalty for the ship. How large that penalty is depends on the degree of roughness. At current fuel prices, the fuel penalty from a rough propeller adds up to a high cost. Conversely, the savings attainable from keeping a ship's propeller clean and smooth are significant.

Cleaning a propeller once every month or every two months would in many cases be optimum. If carried out this frequently, cleaning with a relatively soft tool is adequate to keep a well-maintained propeller smooth enough for maximum fuel savings.

Thanks to its network of offices and service stations, Hydrex can offer propeller cleanings on a worldwide basis. These operations are carried out using underwater equipment designed and developed in-house specifically for propeller maintenance. Hydrex combines this service with underwater inspections where this is economically advantageous to the shipowner or operator.

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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 Tampa (U.S.A), Algeciras (Spain), Visakhapatnam (India), and Port Gentil (Gabon).

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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