



UNDERWATER TECHNOLOGY

Magazine

Number 271



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In-water bow thruster repairs



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. 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 article in this magazine deals with a recent operation that was performed with this technology on a ro-ro vessel in Rotterdam. A team of our diver/technicians mobilized on one of our workboats. They replaced the ship's damaged stern tube seals on-site. This prevented a costly drydock visit for the owner.

Further on in the magazine we take another trip down memory lane to revisit a key repair in our past. In 2001 we carried out extensive flat

bottom repairs on a container vessel in Boston in harsh winter conditions. The owner needed to sail his vessel back to Europe but the damage seemed too severe to be repaired on-site. Luckily, finding solutions for this kind of "impossible" problems is what we have been doing since Hydrex was founded 45 years ago.

We hope you enjoy reading this magazine. Contact us if you have a problem or need maintenance work carried out. We are ready to assist you 24/7.

Hydrex founder
Boud Van Rompay
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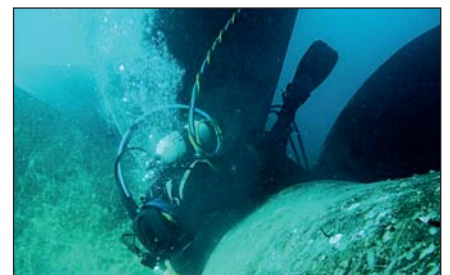
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Fast underwater stern tube seal replacement avoids need to drydock

Last month one of our diver/technician teams carried out underwater stern tube seal repairs on a 192-meter ro-ro vessel in Rotterdam. The vessel was suffering from an oil leak, making a fast repair necessary. Our men carried out the entire operation on-site and underwater using a Hydrex flexible mobdock.

Every Hydrex office has a fast response center equipped with all the latest facilities, lightweight equipment and tools. These centers were designed specifically to increase speed of service. This allowed us to immediately mobilize a team on one of our workboats to the vessel's location.

The operation started with a thorough underwater inspection of the

stern tube seal assembly. The divers then removed the rope guard of the vessel and installed the flexible mobdock around the stern tube seal assembly. This created a dry underwater environment to work in dry-dock-like conditions, a necessity for permanent stern tube seal repairs.

After cleaning the entire assembly the diver/technicians removed the three damaged seals one by one and replaced them with new ones. Because the existing running area was damaged, the team also installed a spacer ring to create a new running area for the seals.

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



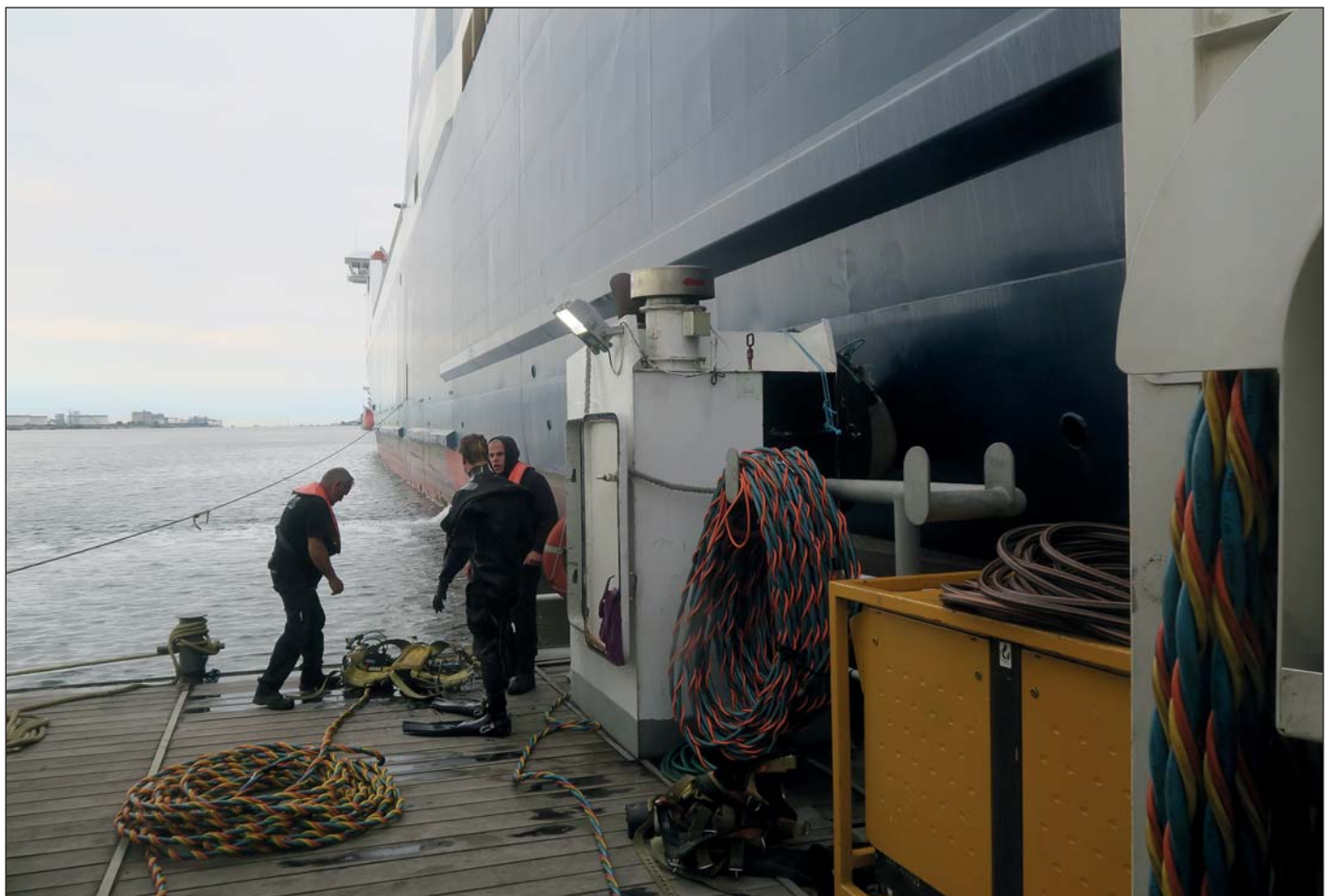
Stern tube assembly after cleaning by our team.



Our workboats allow us to mobilize throughout the entire port of Antwerp and Rotterdam within hours.



Stern tube seals can be replaced on-site inside our flexible mobock.



Our workboats are fully equipped as dive support stations with hydraulic cranes, winches, nautical and communication equipment and a dive control room.



Our workboats can be used for a wide range of operations.



The rope guard was reinstalled after the repair.



Closing up the assembly after the seal replacement.

A service engineer of the OEM was present during the operation and gave his approval for the replacement.

Every day a ship has to go off hire causes a substantial loss of money. The team therefore worked in shifts to perform the stern tube seal repairs within the shortest possible time frame. This saved the owner the time and money going to drydock would entail.

The team mobilized with one of the Hydrex workboats. These 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. They allow us to mobilize throughout the entire port of Antwerp and Rotterdam within hours. This increases flexibility of operations and helps to keep costs down for the client. ■

Underwater scrubber sea chest installation



Our wide range of maintenance and repair services includes the installation of additional sea chests required for the intakes and outlets of scrubber systems. These afloat installations are performed by installing a cofferdam on the hull.

We can help you when going to drydock is not an option, if the scrubber equipment is not available yet during docking or if the scrubber system needs to be installed before the next scheduled docking. We are able to carry out the installation of sea chests while your ves-

sel stays afloat and in most cases during cargo operations.

If you would like to discuss this possibility of in-water scrubber system installation, please contact us at +32 3 213 53 00 or hydrex@hydrex.be

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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

Extensive damage repairs to container ship in extreme conditions in Boston in 2001

Like the previous months, we are revisiting a key operation from Hydrex' rich past. We do this by republishing an article from our vault. These jobs have one thing in common: they showcase how we have always found ways to help our customers, even when an on-site solution seemed impossible at first.

This time we go back to the Winter of 2001. When a container ship ran aground in Boston it suffered a large number of tears to her flat bottom. The owners wanted the vessel back

in Europe to do the repairs – but how to sail it safely across the Atlantic?

Hydrex came to the rescue. We sent an 8-man team to Boston to carry out major underwater engineering work. Our R&D department designed unique patches. These were then manufactured and made ready to be welded underwater to the flat bottom. This was done while blizzards and freezing weather conditions did their best to hamper the operation. Needless to say, our men were not fazed and successfully completed the repair. ■



This article was first published in 2001.

Breaking new boundaries: finding solutions to problems

In Boston, USA, a 269-meter container ship had an unfortunate run-in with some rocks and ended up with large damage to her flat bottom.

This of course created a major problem for the ship owner. What temporary solution could be provided that would allow the ship to get across the Atlantic safely to their home repair base in Antwerp where they wanted the permanent repairs to be done?

Hydrex was called in to work on the problem and propose solutions for this major repair. Our technical team



Lifting one of the large plates.



After sailing from Boston to Antwerp, the ship went into dry-dock for permanent repairs.

got together to assess the damage and the extent of repair work that would be needed. We then worked out ways and means in which it could be done. Repair proposals and procedures were drawn up in order to obtain approvals from the classification society as well as the coast guard.

These were sent on to the ship managers. While there was some trepidation about whether such work could be completed by anyone, they were finally convinced that Hydrex could do the job.

An 8 man-team was sent over to Boston to start the work in liaison with a local company who provided backup and equipment. Just to challenge our team further, there were blizzards and freezing weather conditions.

The work required 5 different patches to be welded to the flat bottom. The biggest one was 14.5 meters long by 1.3 meters wide and weighed around 2 tons. To get this one into position heavy-duty rigging equipment was necessary and an expert procedure needed to be worked out so that the plates could be placed in a safe and secure way under the ship. The technical work of how to securely attach these to the ship had been worked out in advance. The first idea was to use explosive bolts as part of the system of attachment. However, due to security problems of export-



There were blizzard conditions during the entire operation.

ing such a tool into the USA, it was not possible to get them through customs in time and so our resourceful team worked out another means of attaching the plates to the ship. This time it was done by using a total of 170 screws dogs, an alternative procedure we have been testing and utilizing around the world for a long time.

To get all the plates securely attached it was estimated that a total of 2 kilometers of underwater weld seams were done by our divers, all of which are qualified and certified underwater welders. These welds





One of the patches seen in drydock after crossing the Atlantic Ocean.



Technical precision was needed to coordinate the placement of the patches.



Our divers worked at very low temperatures.



One of the larger doubler plates.

were all above head welds as they were made on the flat bottom.

The plates themselves, while flat on the outside, were designed with 2 concave surfaces on the inside meeting in the middle. This method meant that the inside of the plate would press against the damaged area and increase the surface contact and pressure with the flat bottom, thus ensuring a better contact.

Due to the extent of the damage, requirements for repairs set by class and coastguard were unusually high. After the operation they did not only gave authorization for the ship to sail back to Europe but also allowed it to be loaded up again making it possible to take container cargo back to Europe.

Under the circumstances this was an added bonus. It made the return journey at least pay its way. In one of the biggest jobs of this kind ever carried out underwater it was shown that a well-trained underwater welder team can safely and reliably carry out major jobs. In this case we provided the ship owner with a real solution. ■

Emergency repairs allow vessels to stay in business

Hydrex offers fast on-site repairs in emergency situations. Our offices have fully operational fast response centers. This allows us to immediately mobilize teams to locations around the world for a wide range of operations.

There are many unfortunate events that can stop a ship from sailing. Ships with a leaking stern tube are often not allowed to enter ports. A vessel can be tied up after a collision or a malfunctioning rudder can prevent safe maneuvering. Going to drydock is obviously not an option in such cases. Arranging the vessel to be unloaded at sea is an organizational and financial disaster for the owner. On top of this it does not solve the problem, because the damaged ship is still unable to leave its location.

Hydrex can perform routine as well as more complex underwater repairs to thrusters, propellers, rudders, stern tube seals and damaged or corroded hulls. Our divers create drydock-like conditions around the affected area so they can carry out these operations on-site and within the shortest possible time frame. This allows the vessel to sail again. In most cases a permanent repair can be performed and no follow-up is needed. If this is not possible, a class approved temporary solution is offered. The ship can then continue its schedule or can go to drydock at a more convenient time and location.

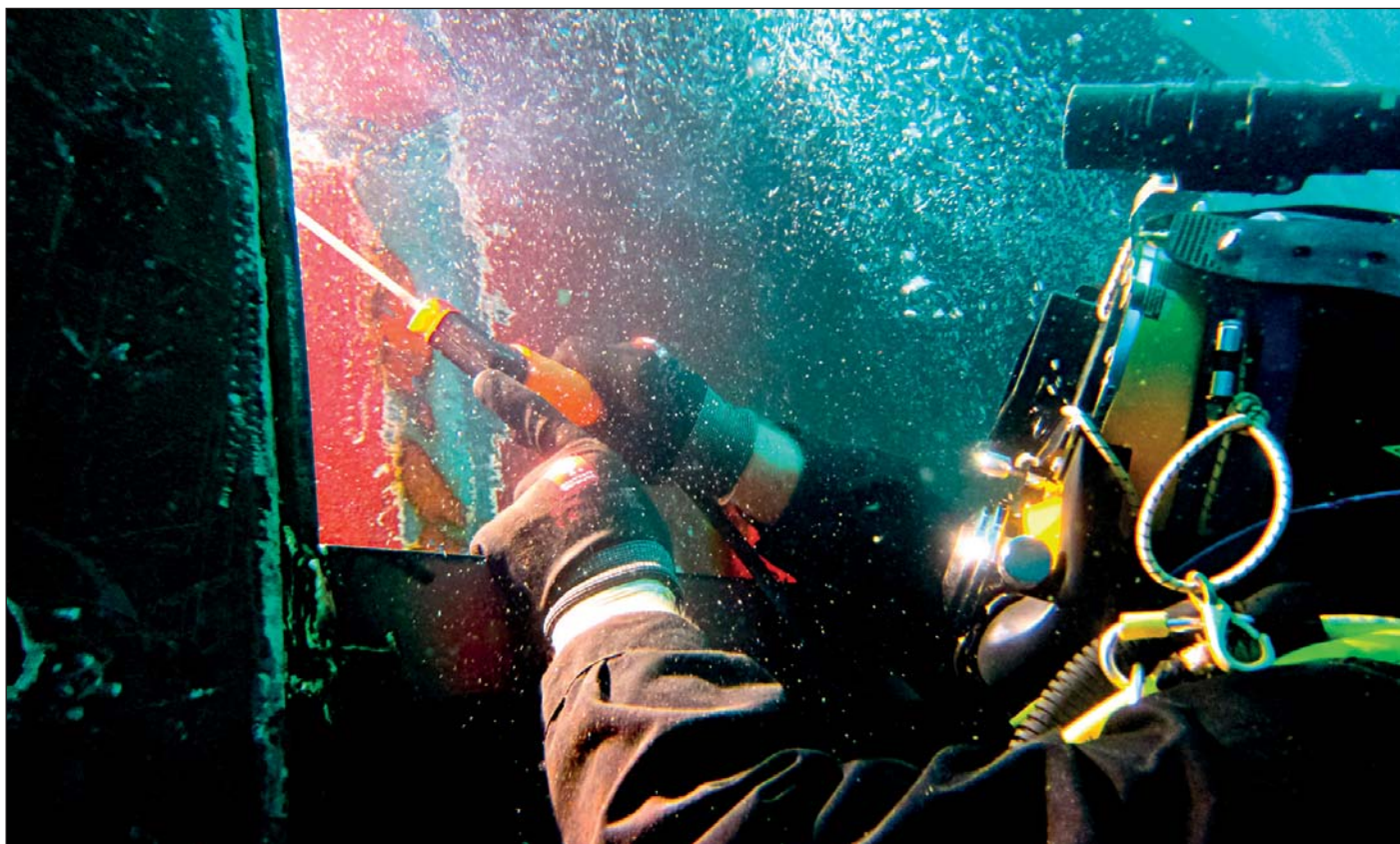
By their very nature, emergencies occur unexpectedly. However, being



Hydrex can perform routine as well as more complex repairs underwater.



Our fast response centers are equipped for a speedy mobilization to operations around the world



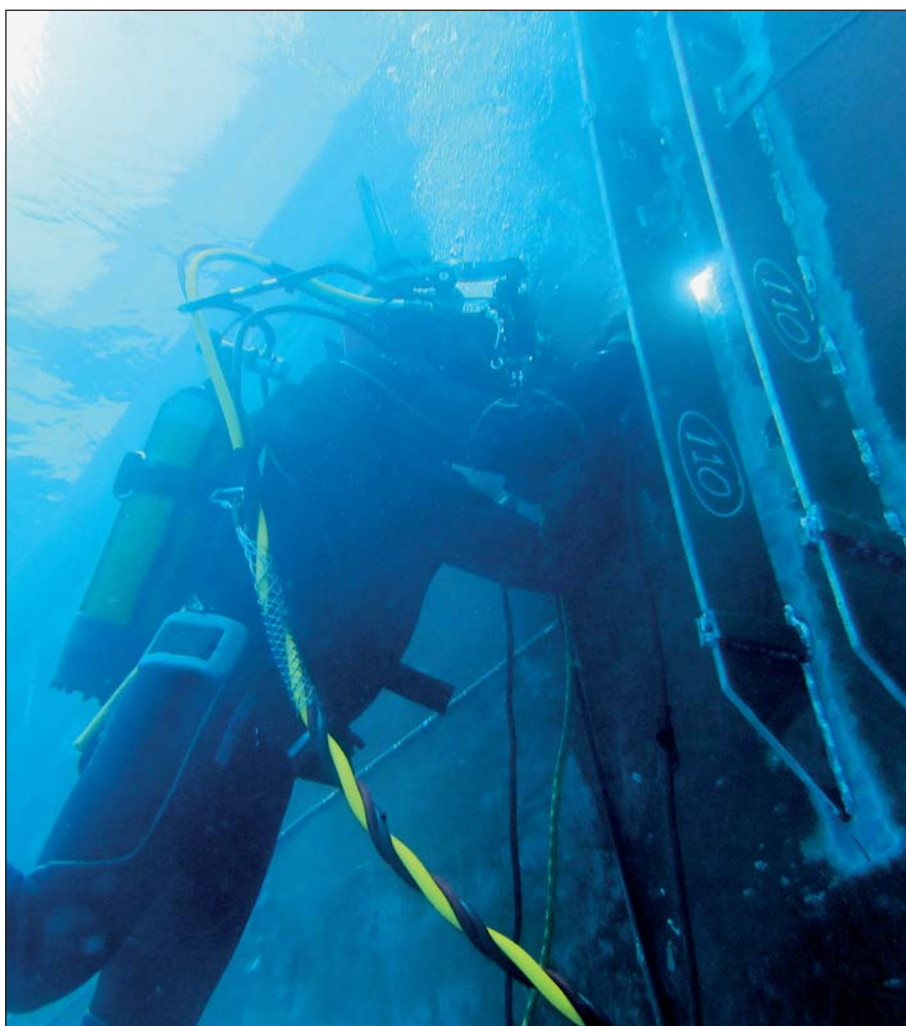
Hydrex divers are trained and certified for both dry and wet welding.

prepared for an emergency goes a long way in salvaging the situation when they do occur. We encourage you to get in touch with us, to find out what we can do and how quickly we can respond and then keep us on file as your first port of call in case an emergency does occur.

Contact us 24/7 if you need immediate assistance. Our technical department is ready to create a tailor-made solution for your specific needs. ■



Hydrex offers certified, class approved insert repairs.



Our network of offices and local support bases allows us to carry out fast and effective operations around the world.

Fast underwater propeller blade straightening and repairs



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 tech-

nique 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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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 dry-dock.

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.



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