

HYDREX[®]

UNDERWATER TECHNOLOGY

Magazine

Number 217



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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.



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Editorial



Providing a service that is both versatile and effective, Hydrex has built a reputation as the world's leading underwater repair and replacement specialists. With an ever-expanding worldwide network of offices, agents and support bases, we can provide fast service at reasonable costs.

Our divers are trained to handle different circumstances to the highest safety and quality standards. Whether the job at hand is a routine operation or a complex tailor-made project. Every operation we carry out is performed with the same purpose in mind: to keep the customer's vessel out of drydock and allow him to keep his ship on schedule.

So do not hesitate to call us when you need any repair or maintenance work performed. Hydrex has the means and knowledge to provide you with a fast, underwater solution. This will enable you to keep your vessel sailing safely, economically and on schedule.

Best regards,

Hydrex founder
Boud Van Rompay



Cover: Hydrex diver/technician during a complex hull operation.



ISO 9001 certified

Underwater services and technology approved by:



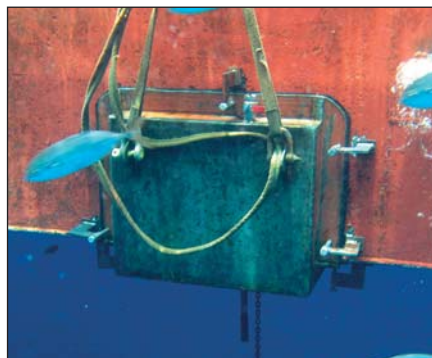
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Fast propeller repairs restore efficiency and save money

When damage to propellers occurs due to impact with ice and other debris, Hydrex will help you, even if the damage is quite extensive.

A ship with bent or cracked propeller blades might experience severe vibrations while sailing. The classification society might demand a repair before the vessel is allowed to sail on. By straightening the blades or cropping them, Hydrex can restore the propeller's balance, resulting in a green light from the class for the vessel.

A propeller modification can easily be combined with any other maintenance or repair operation that needs to be carried out on the vessel. Thanks to the flexibility of the Hydrex teams this allows a vessel to keep to its schedule.

Prior to a propeller repair, a detailed underwater inspection is carried out



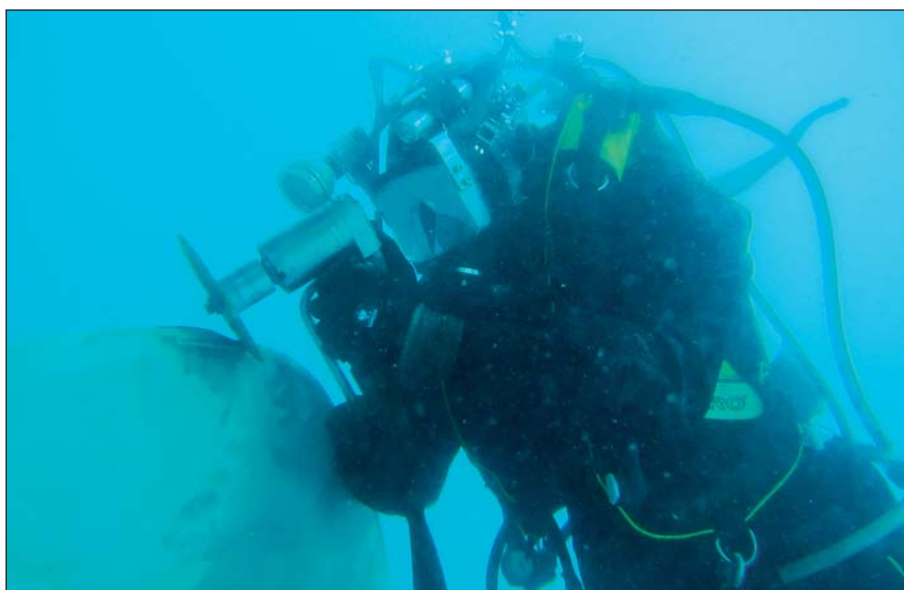
Hydrex diver positioning the cold straightening machine over a bent blade.

by our divers. They are certified to make a full assessment of the condition of the propeller. The exact dimensions and position of the damage can then be communicated to the Hydrex technical department

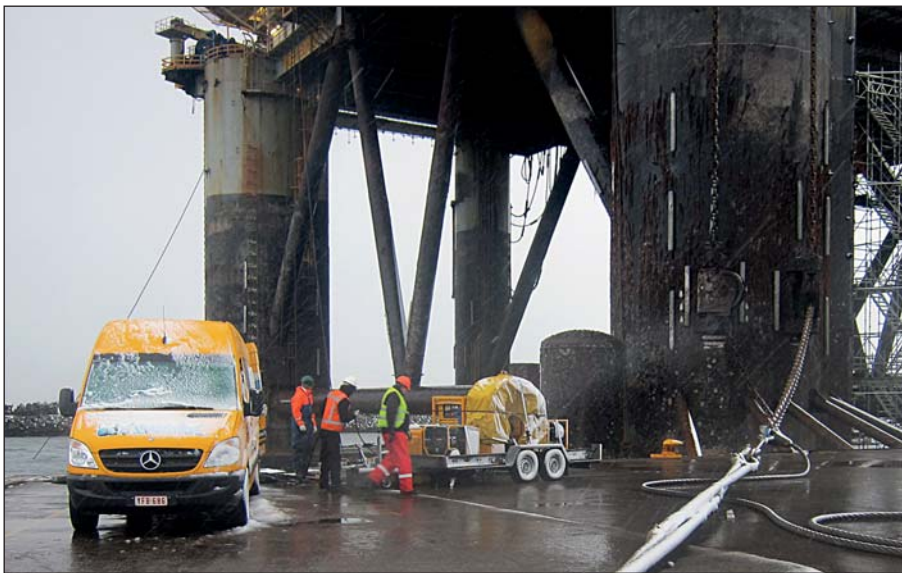
supervising the operation. This is essential because the calculations need to be perfectly accurate to achieve an ideal result with the repair. Hydrex team members are not only divers, but have experience in dealing with all kinds of different situations and circumstances. They are trained to think with the people in the technical department. As diver/technician experts, they can assist in working out the best solution and have the skill and experience needed to implement the theoretical solutions that have been worked out.

Propeller blade straightening and cropping

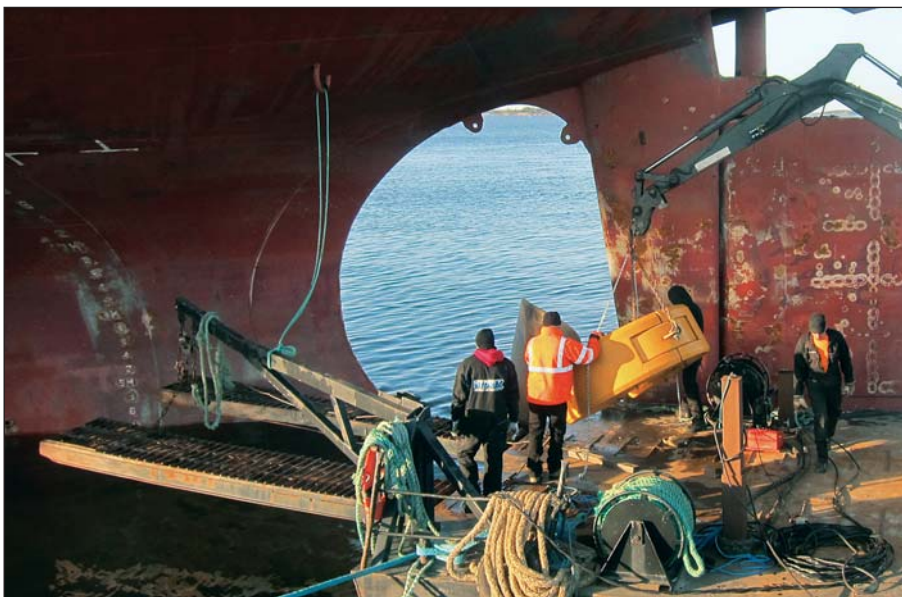
By taking advantage of the in-house developed cold straightening technique, damaged blades can be straightened underwater, allowing the ship



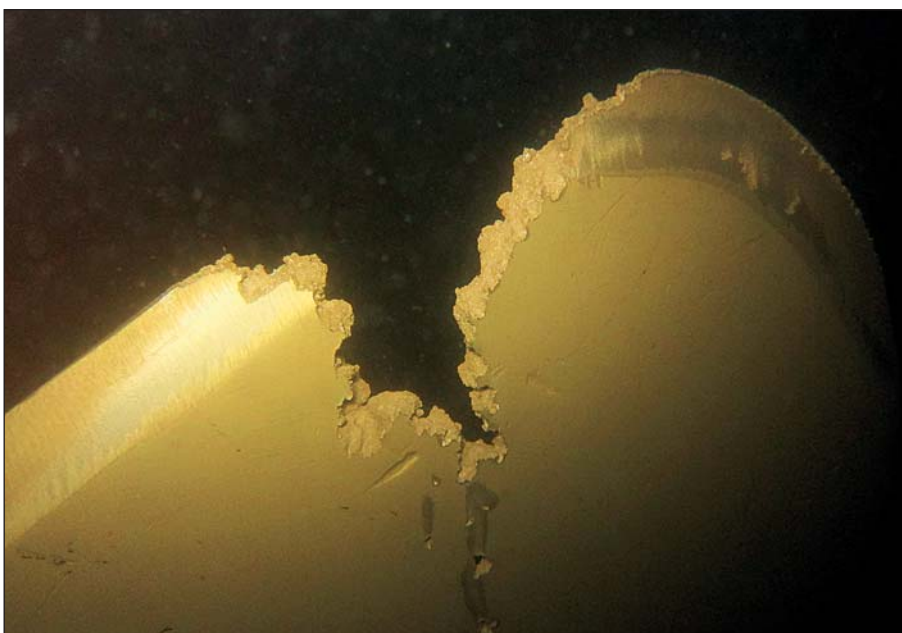
Hydrex/diver technician carrying out grinding work on the trailing edge of a damaged propeller blade.



Hydrex truck and equipment on-site.



Diver/technicians positioning the latest version of the Hydrex cold straightening machine over a bent propeller blade.



Heavily corroded propeller blades can be cropped to restore a propeller's balance.

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.

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After cropping, the edges of the blade are smoothened to bring the propeller's efficiency back as close to its optimum condition as possible.



Hydrex uses in-house developed state-of-the art equipment.



Cropping a damaged propeller blade at the correct cutting line restores balance to a propeller.

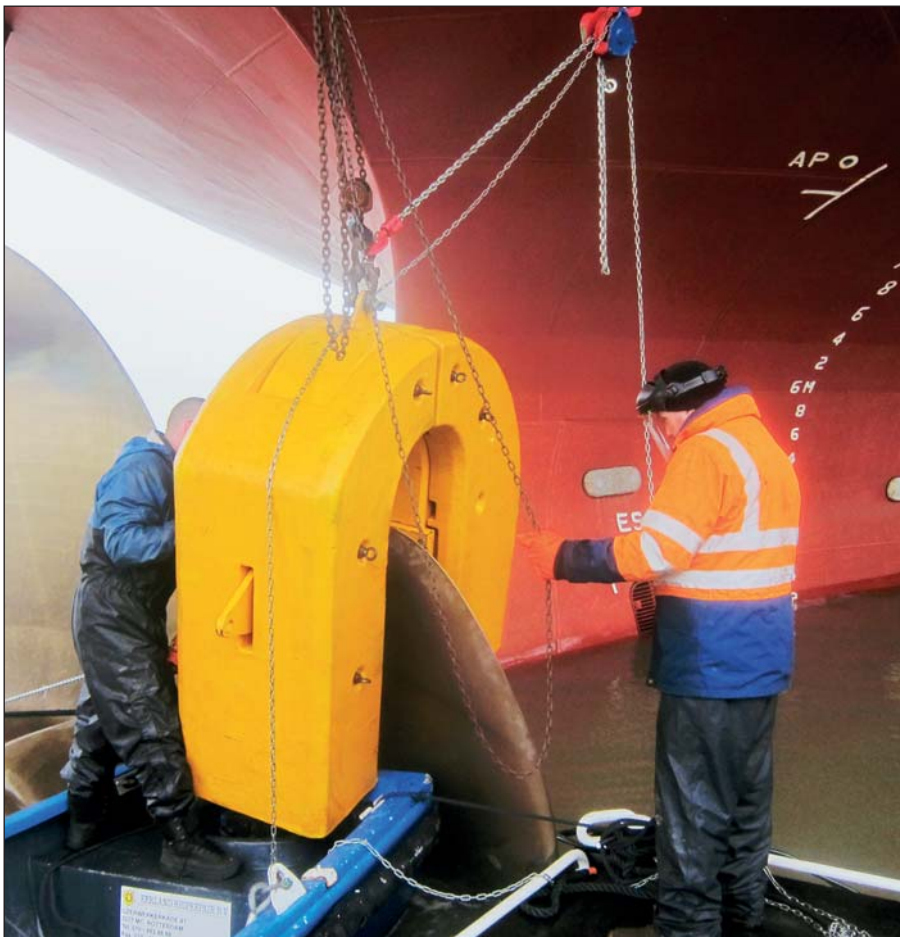
to return to commercial operations without the need to drydock. Optimum efficiency of the propellers can be restored by bringing the blades back close to their original form. The cold straightening machine has been in use for quite some time now but the Hydrex research department has been looking into ways to enhance the technique even further to improve our services. A new model of the straightening machine was recently put into service. It is compatible with the existing model and is used to restore more severely bent propeller blades.

If straightening is not an option, the affected area on the blade will be cropped to restore the hydrodynamic balance. This is done to achieve the greatest possible efficiency for the vessel. This kind of repair is carried out with the propeller blade cutting equipment that was also developed by the Hydrex research department. First a detailed underwater inspection is performed by a Hydrex diver/technician team to obtain the exact parameters of the damage which are then used for a detailed calculation of the ideal cutting line. This allows the customer to know in advance what the result of the operation will be.

We also have the tools to carry out detailed crack inspections on propeller blades. An informed decision can then be made concerning any required follow-up action. Catching problems early can save much time and money

Restoring optimum propeller performance

Hydrex not only offers repair services, but can also help customers when they have the need for preventive or other special custom projects. For example, preventive modifica-



Hydrex cold straightening machine during operation in Rotterdam.



Hydrex diver cropping a propeller blade with the Hydrex cropping equipment.

tions were made in Bremerhaven to the blades of three ice-going sister vessels. When several of this customer's vessels suffered damage and the propellers needed cropping after

the winter, the owner wanted to find a way to prevent this from occurring to his other container vessels. When the next winter promised to be equally harsh, he wanted to give the blades extra strength and make them less susceptible to damage from ice or other debris. This was done by modifying the blades to a very specific design that made them less prone to damage while keeping the performance of the propeller as close to optimum as possible. The operation was performed in close communication with the manufacturer of the propellers.

By performing these repair and maintenance operations underwater and on-site Hydrex saves ship owners precious time and money. It allows ships to return to commercial operations without the need to drydock. ■

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.

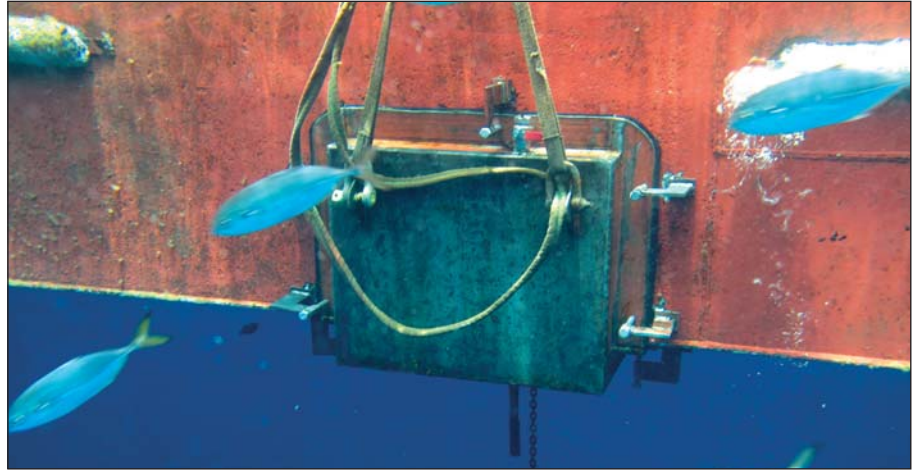
The equipment can be mobilized within hours to any port in the world and is available for rapid mobilization from the Hydrex headquarters in Antwerp.

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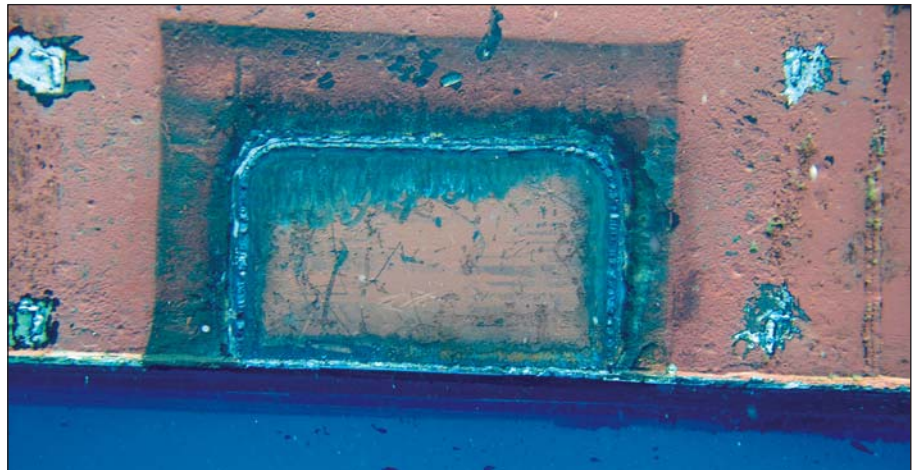
Insert repairs prevent drydocking

Hydrex diver/technician teams carried out underwater insert repairs in Marseille and Togo to help ship owners avoid going off-hire and keep their vessels in the water until the next scheduled drydocking.

One of the repairs was performed on a general cargo vessel while it was berthed in Marseille. An inspection performed shortly after arrival at the location indicated that an insert of 800mm x 400mm was needed to repair the damage that had occurred on the flat bottom of the vessel. The actual operation started with the preparation of the insert and the installation of an external cofferdam over the affected area. Next a frame was cut away to enable our team to remove the damaged bottom plating and to fit the new insert plate which was subsequently secured with full penetration welding.



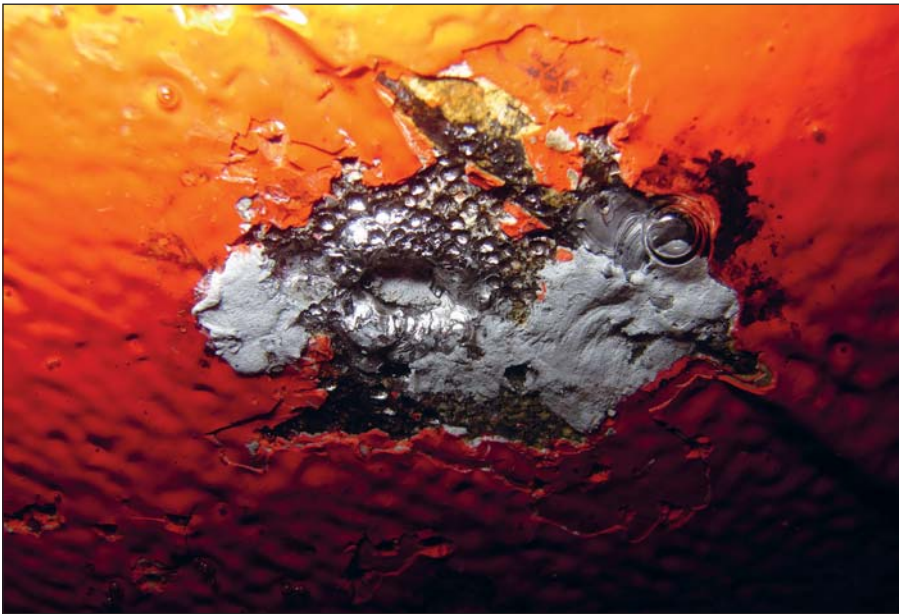
Tailor-made cofferdam installed on flat bottom plate of barge.



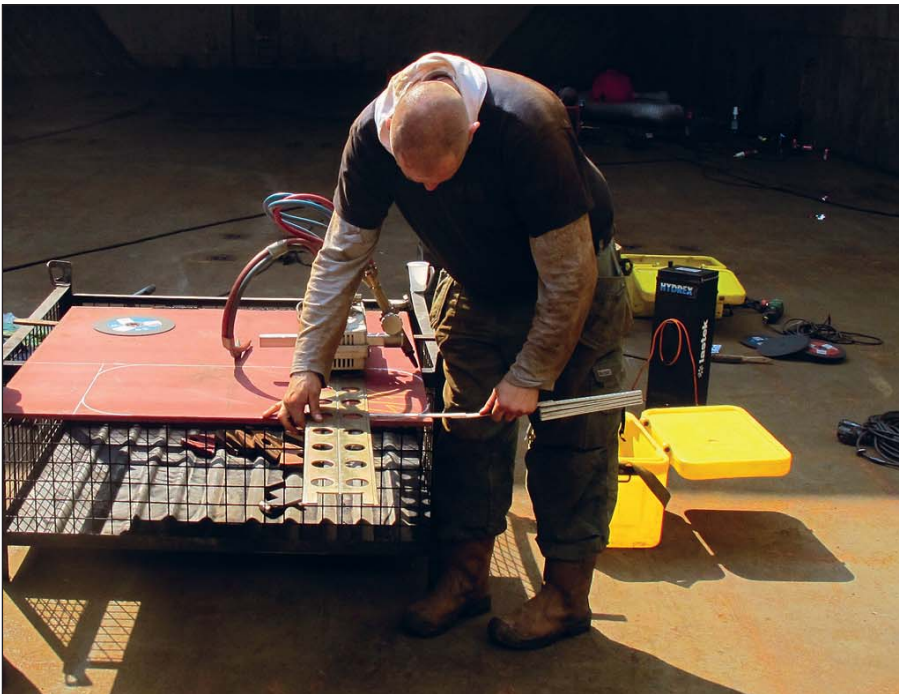
Outboard side of new insert plate.



Crack in flat bottom plating of barge in Togo.



Damage in flat bottom plate of general cargo vessel.



Preparation of insert plate for repair on general cargo vessel.

At around the same time Hydrex was contacted to carry out an insert repair in accordance with RINA on a barge in Port of Lome, Togo. During an inspection of the inside and outside of the affected area, two cracks were found in the flat bottom plating. A tailor-made cofferdam was then installed on the outboard side of the cracks, after which the affected areas were cut away and two inserts were installed, one measuring 300mm x 319mm and the other 500mm x 300mm. A full penetration weld was executed on both inserts from the inboard side in accordance with the Hydrex approved welding procedures. Finally the integrity of the insert repair was verified by ultrasonic testing.

Both operations were carried out without delay for the owners who could sail their vessels again free of cracks and without the need to go to drydock. ■



Framework reinstalled over new insert plate.



New insert repair after full penetration weld.

Emergency repairs allow vessels to keep sailing

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



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



We can mobilize teams to locations around the world.

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.



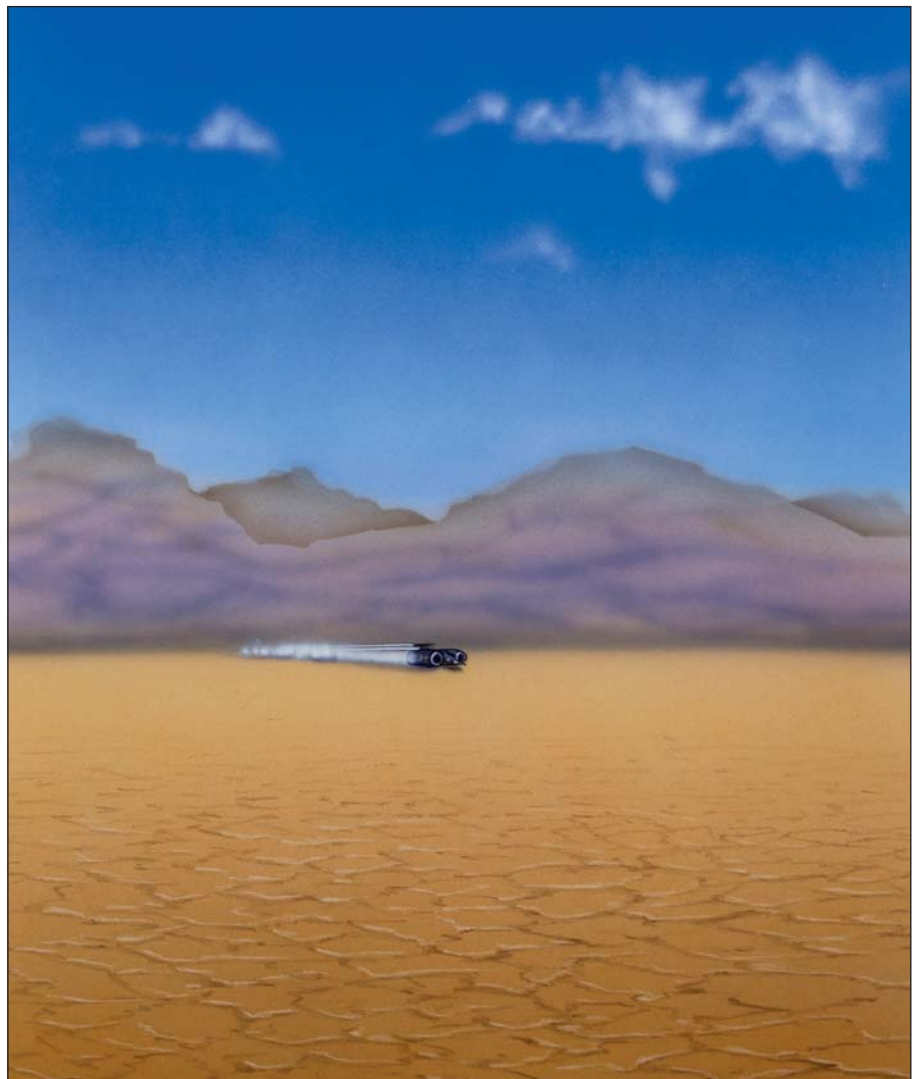
Hydrex divers can carry out operations on-site and within the shortest possible time frame.

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



In most cases a permanent repair can be performed and no follow-up is needed.



Stern tube seal repairs



Using our flexible mobdock method to create a dry underwater environment, we have carried out stern tube seal repairs and replacements underwater for some years now in cooperation with top specialist suppliers.

This technology brings drydock

conditions to the ship rather than having to take the ship to drydock, saving a considerable amount of time and money in doing so.

This class accepted method is performed by our diving teams under our warranty. It can be used while the ship is carrying out its

usual cargo or other commercial operations in port.

Visit the special stern tube seal repair section on our website for more information and examples of the many seal repairs we have performed in recent years.



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Dive support workboats offer many logistic possibilities for Hydrex customers

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.

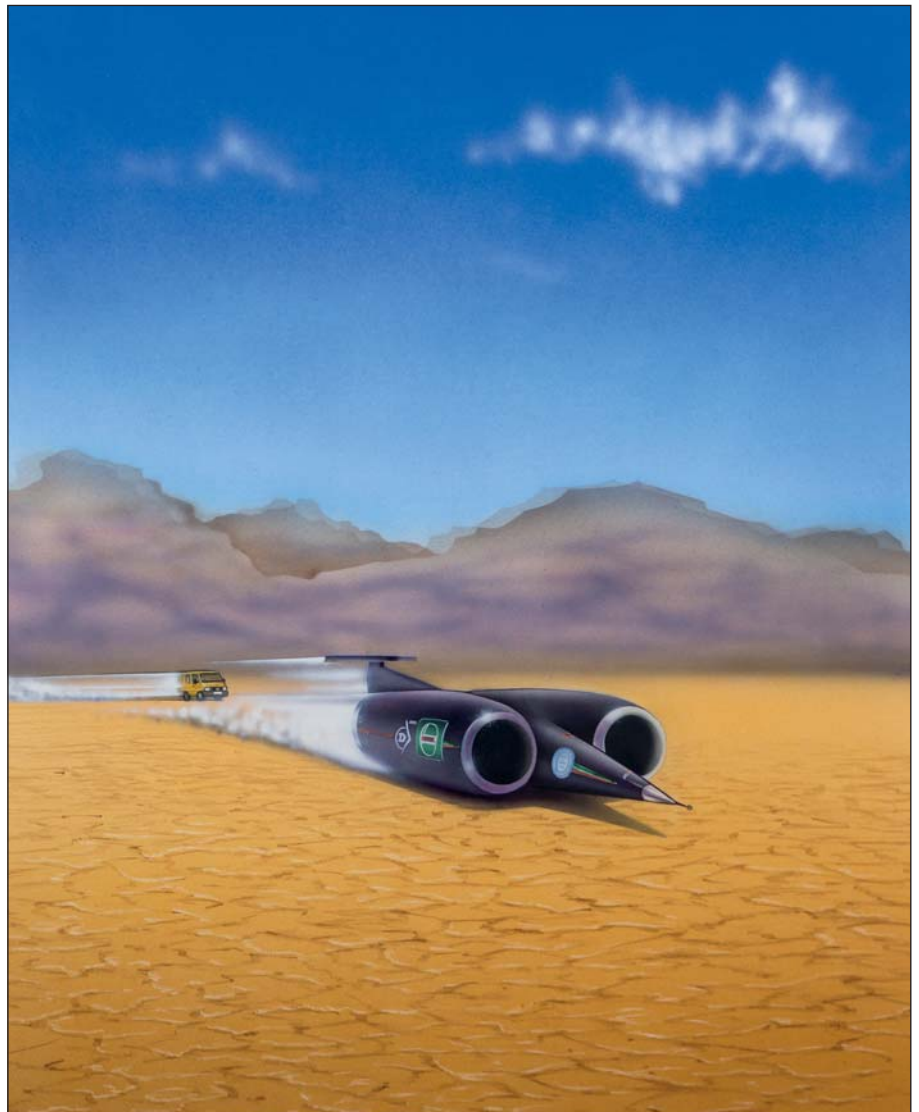
The workboats are usually docked right outside the Antwerp office, where a wide range of state-of-the-



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.

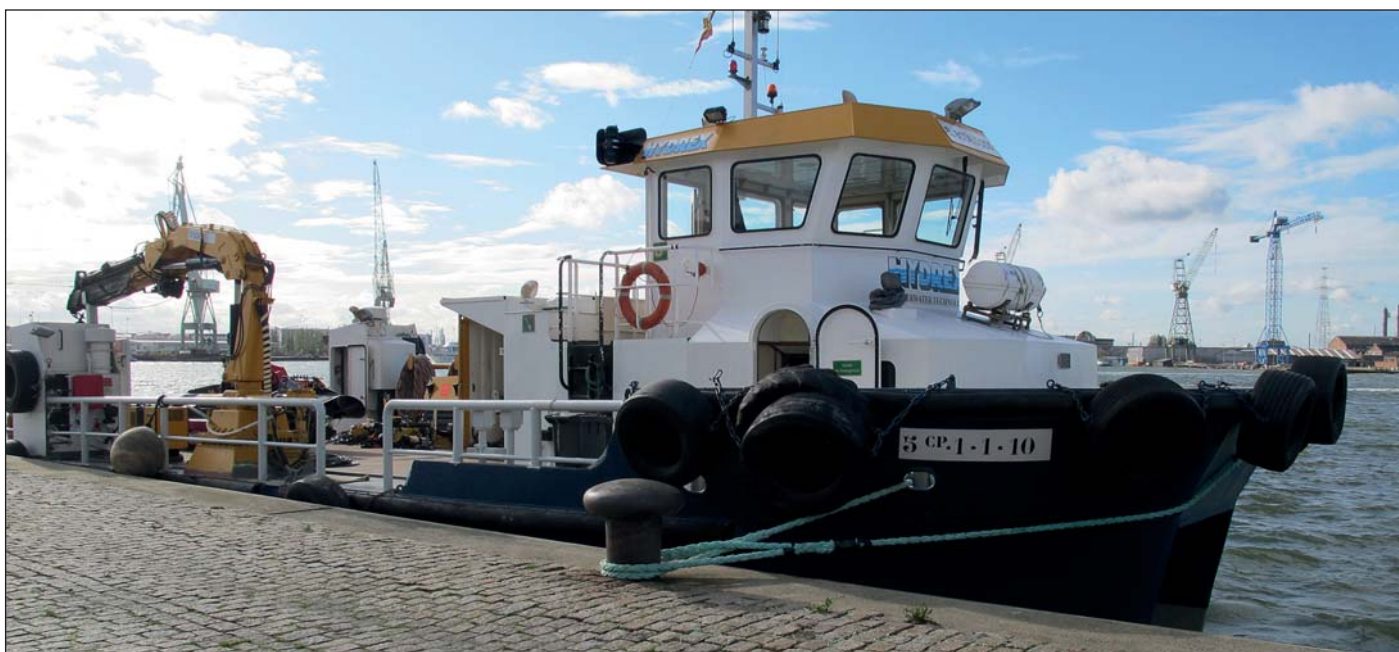
art equipment and tools is available at all times.

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. ■

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



**KEEPING SHIPS
IN BUSINESS**



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 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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