



UNDERWATER TECHNOLOGY

Magazine

Number 251



Always on time

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



Welcome to the last Hydrex magazine of 2017. We wish you all the best for the holiday season and the coming year.

No two repairs are the same in real life, even if they look the same on paper. For this reason our diver/technician teams are trained to smoothly adapt to constantly changing circumstances. This allows them to arrive on-site, start the operation and keep it going until it is finished without unnecessary loss of time for our customers.

Hydrex also takes the worst case scenario into account when setting up a repair plan. In those instances when it does occur, being prepared for it saves our customers a lot of money.

Rest assured that we will be ready to assist you 24/7 in 2018, so do not hesitate to call us 24/7 with your underwater repair needs, routine or emergency.

Hydrex founder
Boud Van Rompay



Cover: Always on time.



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Underwater services and
technology approved by:



ClassNK

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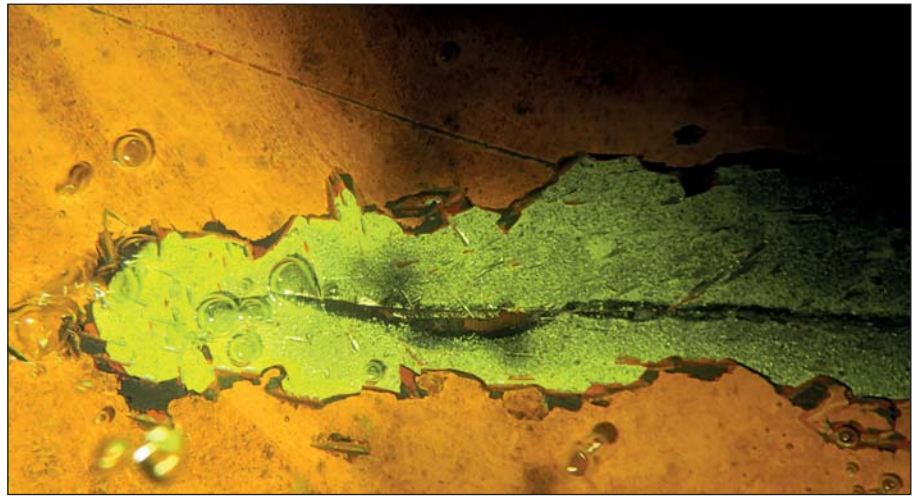


Permanent underwater insert repair on tanker in Amsterdam

We were contacted to carry out a permanent insert repair on board a 145-meter chemical tanker that had suffered a crack in its port side grey water tank. The work was carried out during the vessel's stop in Amsterdam.

After arriving on site, our team of diver/technicians started with an on-board and underwater inspection of the damaged area. This revealed that the crack was 480 mm long and had split in two at the port side end. In close communication with the superintendent of the vessel and the attending class surveyor, it was decided that a 700 x 300 mm insert would need to be installed.

Our team then used a special frame to take the measurements required to fabricate a mobdock that would perfectly fit the rounded shape of the hull. The steel mobdock and the



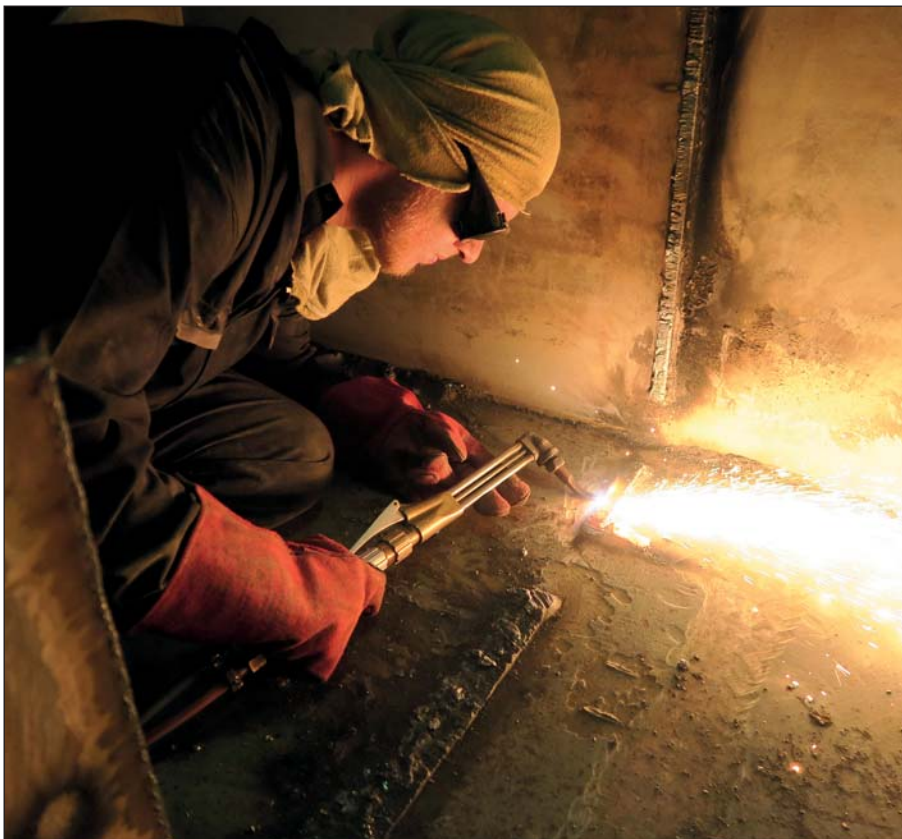
Crack in grey water tank seen from the outside ... and the inside.



A special mobdock was constructed that would perfectly fit the shape of the hull.

new insert plate were then fabricated at the Hydrex headquarters in Antwerp. Because our fast-response center is fully stocked at all times, both were ready and at the ship's location very quickly.

After the mobdock had been installed, the frame above the crack was removed by the team. This allowed our diver/technicians to cut away the crack and the surrounding area. The new insert plate was then positioned and welded with full penetration weld following our class-approved procedure.

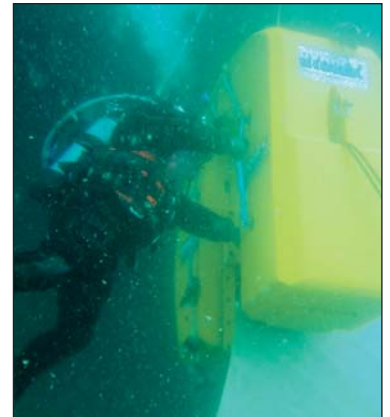


Removal of the damaged area.



Preparing the edges of the area for the insert.

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 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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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 OEMs.

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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New insert positioned and secured.



Welding the insert.



Insert after full penetration weld.



Independent testing of the repair.



New insert after reinstallation of the frame covering the area.



Full penetration weld as seen from the outside of the hull.

An independent NDT inspector approved the insert repair and the classification surveyor who was present during the operation gave his green light. The frame covering the affected area was then reinstalled, concluding the operation.

By removing the large crack and installing a new insert this area of the ship will not require further repairs during her next drydocking. The vessel could sail on time as the repair was carried out well within the stipulated time frame. ■

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**KEEPING SHIPS
IN BUSINESS**



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



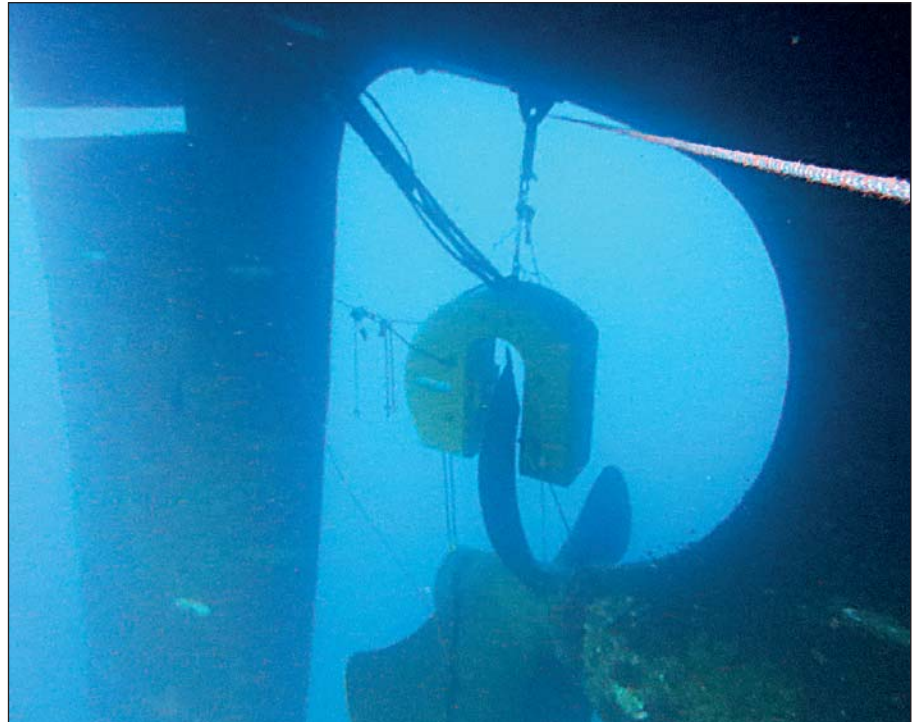
Propeller repairs restore efficiency and save money

When damage to propellers occurs due to impact with ice and other debris, we 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, we can restore the propeller's balance, resulting in a green light from the class.

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 our teams this allows a vessel to keep its schedule.

Prior to a propeller repair a detailed underwater inspection is carried out by our divers. They are certified to



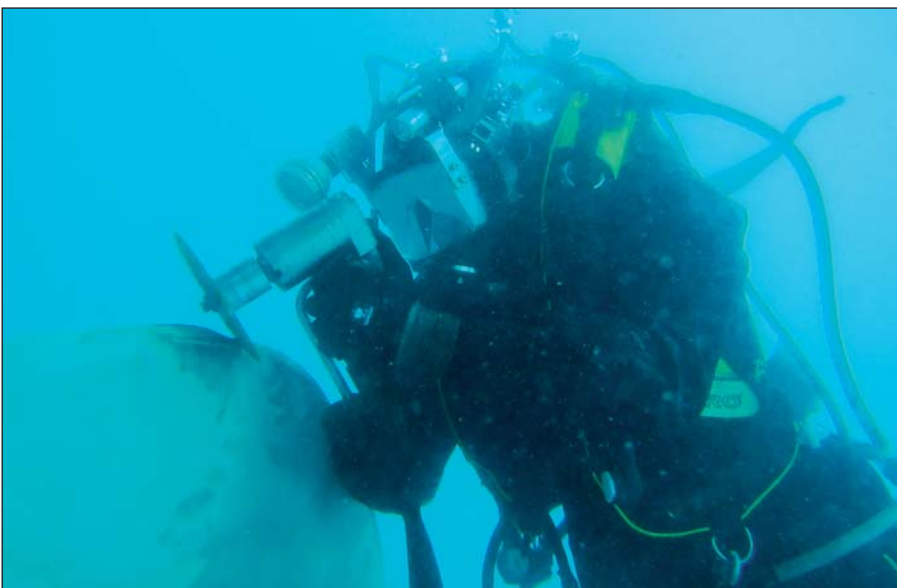
Cold-straightening equipment positioned over bent blade.

make a full assessment of the condition of the propeller. The exact dimensions and position of the damage can then be communicated to the technical department supervising the operation. This is essen-

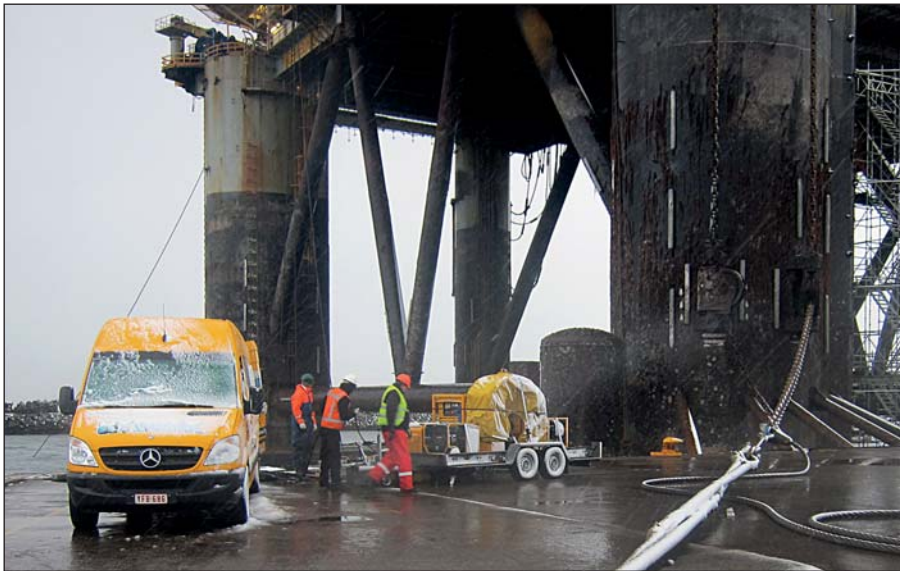
tial because the calculations need to be perfectly accurate to achieve an ideal result with the repair. Hydrex team members have experience in dealing with many different situations and circumstances. They are trained to think with the staff in the technical department. As diver/technician experts, they can assist in working out the best solution and have the skill and experience needed to implement the 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 to return to commercial operations without the need to drydock. Optimum efficiency of the propellers



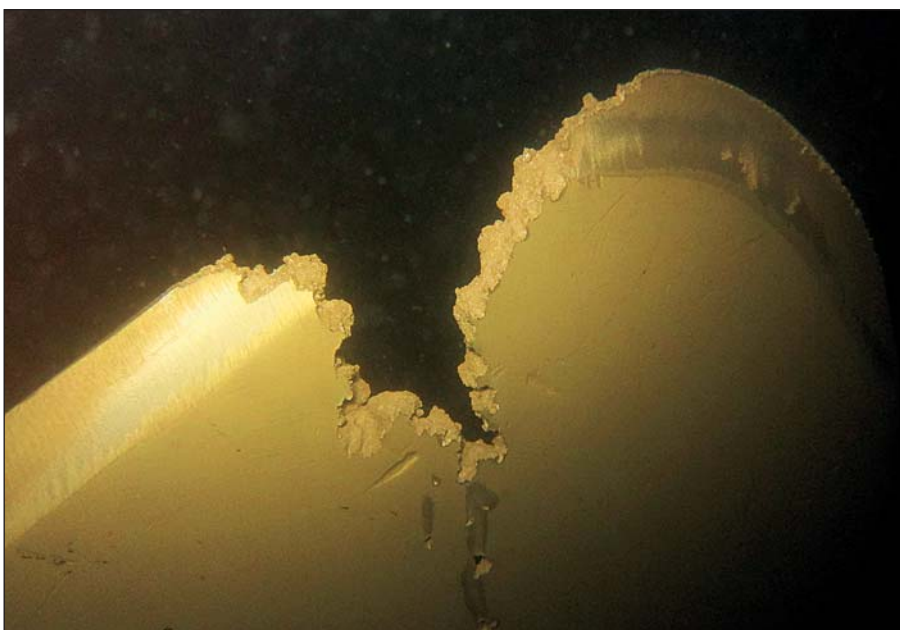
Hydrex/diver technician carrying out grinding work on the trailing edge of a damaged propeller blade.



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



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



After cropping, the edges of the blade are smoothed to bring the propeller's efficiency back to its optimum condition.

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 our research department has been looking into ways to improve the technique even further. 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. This is done to achieve the greatest possible efficiency. This kind of repair is carried out with our propeller blade cutting equipment. First a detailed underwater inspection is performed by a Hydrex diver/technician team to obtain the exact extent of the damage which is 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

Aside from our repair services we can also help customers when they have the need for preventative or other special custom projects. For example, preventative modifications were made in Bremerhaven to the blades of three ice-going ships. 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



Hydrex cold straightening machine during operation above water.



Hydrex diver cropping a propeller blade.

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 for dry-docking. ■

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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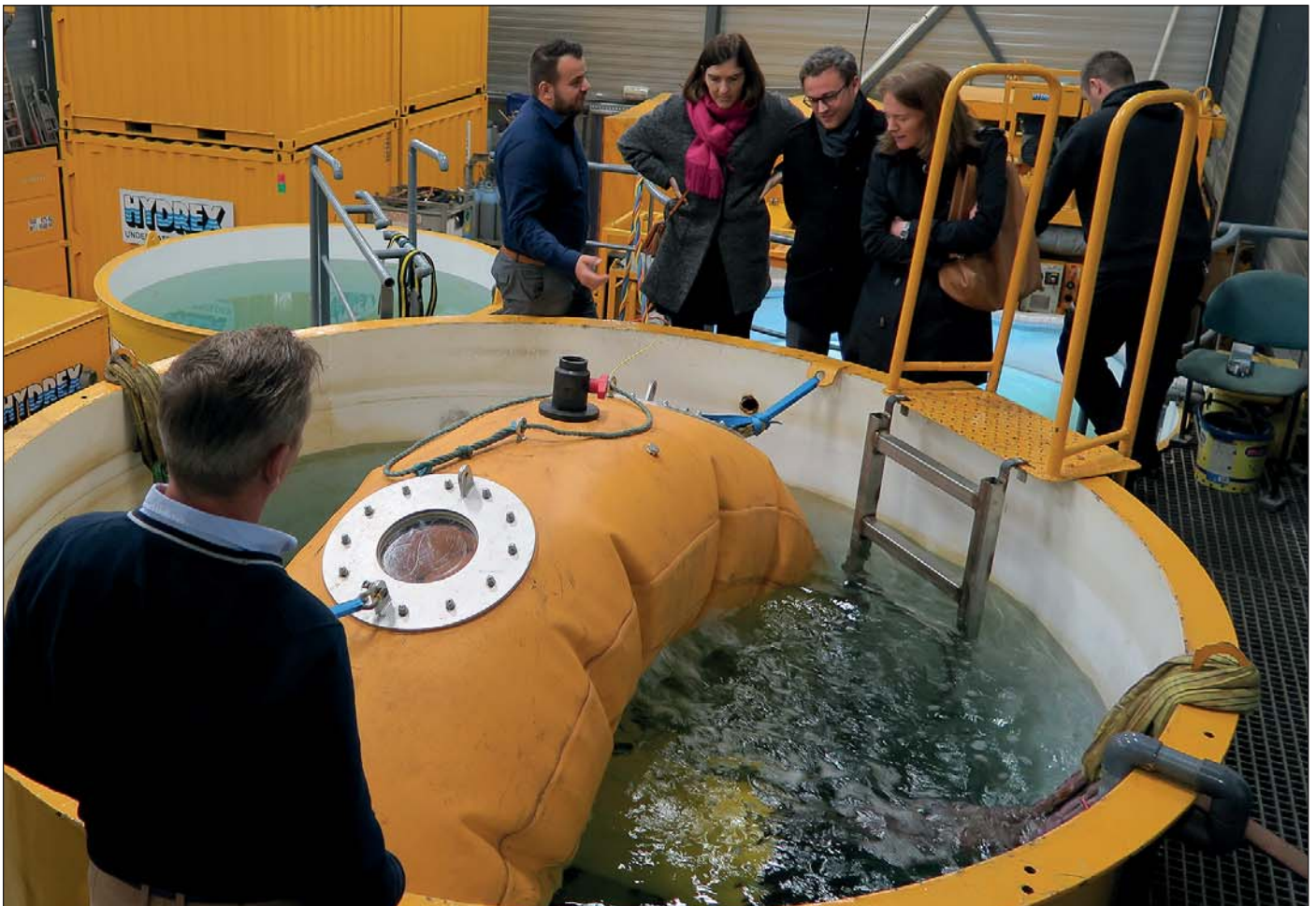
Constant innovation does not go unnoticed

Last month a delegation of the Flemish business association and the Antwerp city council visited the Hydrex headquarters in Antwerp. The visit was part of a yearly event called 'Day of the entrepreneur' during which the most innovative companies in Flanders are put in the spotlight.

Ever since Hydrex was founded in 1974 we have been at the forefront of technological developments in our field of expertise. Over the years our in-house R&D department has kept improving the equipment and techniques our teams use for the wide range of services we offer.



Hydrex founder and CEO Boud Van Rompay gave a short introduction on Hydrex and Subsea Industries.



Hydrex Sales Officer Steven De Keyzer explaining our flexible mobdock technology to the visitors.



Boud Van Rompay explaining the benefits of the hard coating systems developed by Hydrex sister company Subsea Industries.



Hydrex diver leaving one of our dive tanks during a demonstration.

The visit last month offered us the perfect opportunity to showcase some of these technological breakthroughs to an audience outside of the maritime sector. This was done with several demonstrations in our fast-response center and our three training and test tanks.

A good example of a technique we pioneered are our flexible mobdocks (mini mobile drydock). These make it possible for us to perform permanent dry repairs on seals, thrusters and almost any other part of the underwater vessel on short notice without going to drydock. Another example is our cold straightening equipment. New versions of this machine are regularly put into practice, increasing the range of damage we can repair without cropping.

Over the last few years our R&D department has also designed several technological innovations. Some will drastically improve the efficiency of repair and maintenance work while others will help clean up the oceans and protect the environment.

In all cases the research and development is aimed at reducing cost and off-hire time for customers while maintaining the highest safety and quality standards of repair and maintenance. ■





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 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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