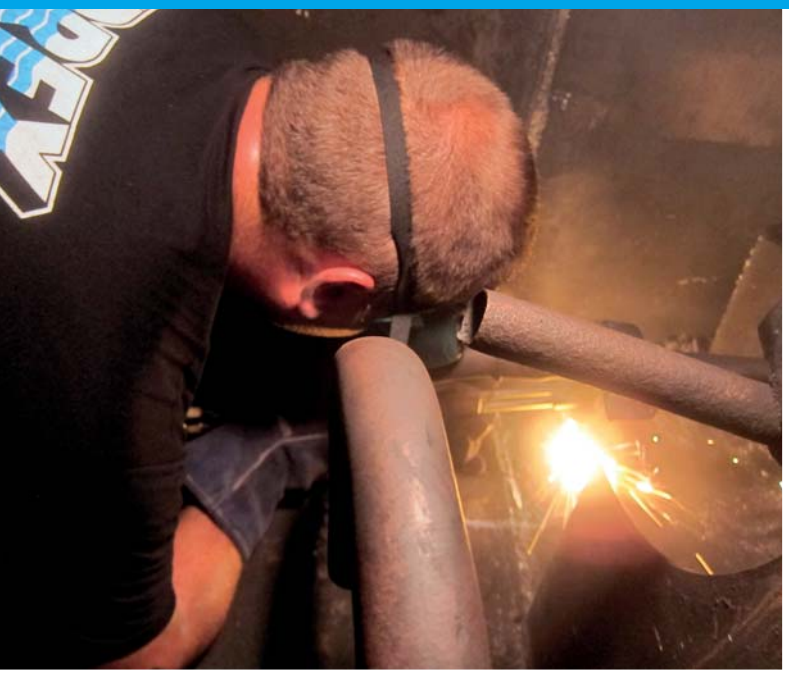
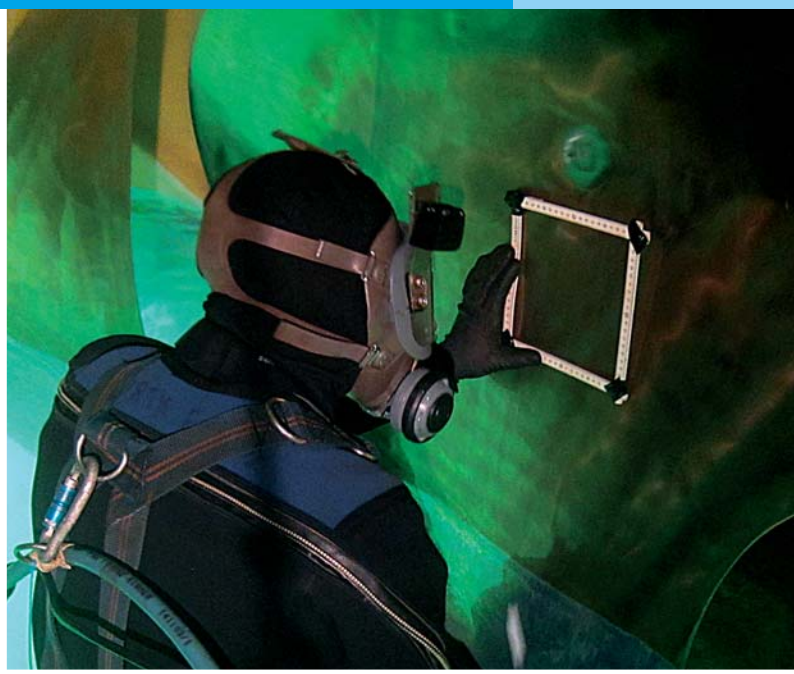
HYDREX®

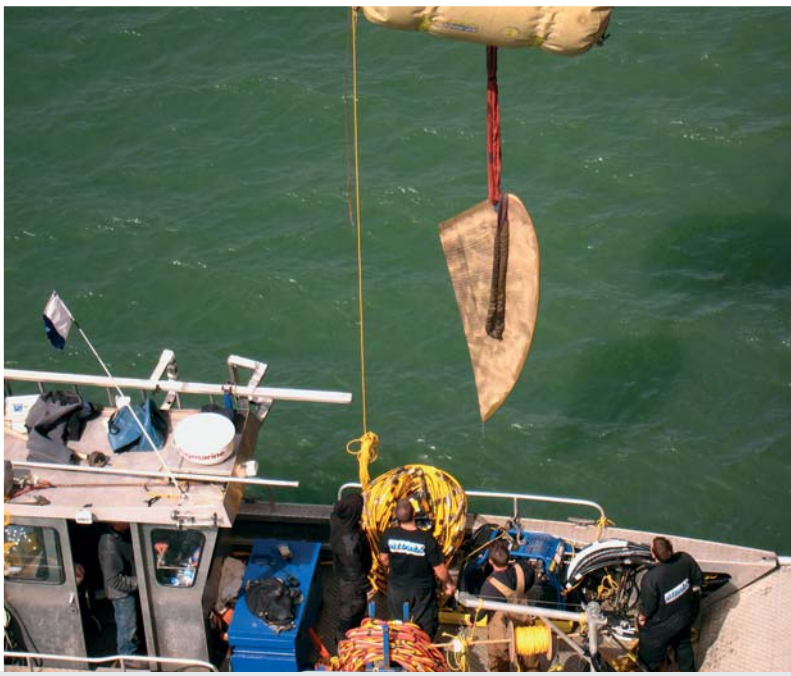
UNDERWATER TECHNOLOGY

Magazine

Number *215*







On-site propeller operations keep your ships sailing

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Editorial

The last couple of months have been very busy for Hydrex with diver/technician teams being mobilized from all our offices to perform repair and maintenance work. At the same time we have been attending several exhibitions and conferences around the world.

The biggest of these exhibitions was of course the SMM exhibition in Hamburg with over 2000 exhibitors from 58 countries and visitors from all parts of the globe. The last article in this magazine is a short account of our experience during SMM.

The first three articles of this magazine are dedicated to several underwater operations carried out by Hydrex teams. You can read about a bow thruster removal in two stages in Rotterdam that allowed a shipowner to keep his vessel on schedule, the modification of a severely damaged propeller blade in Oakland, California and a permanent hull repair carried out in less than a day in Port Everglades, Florida.

The next article talks about a revolutionary breakthrough. Hydrex is able to perform repair and maintenance work on all types of propellers on-site and underwater, but in drydock-like conditions. With the implementation of this technique our diver/technicians can perform permanent repairs to all parts of the underwater ship propulsion system on-site. Going to drydock for repairs to stern tube seals, bow thrusters, rudders or propellers is not necessary. This will allow you to keep your vessel in operation.

Best regards,

Hydrex founder
Boud Van Rompay

HYDREX N.V.
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Underwater bow thruster removal in stages avoids loss of income

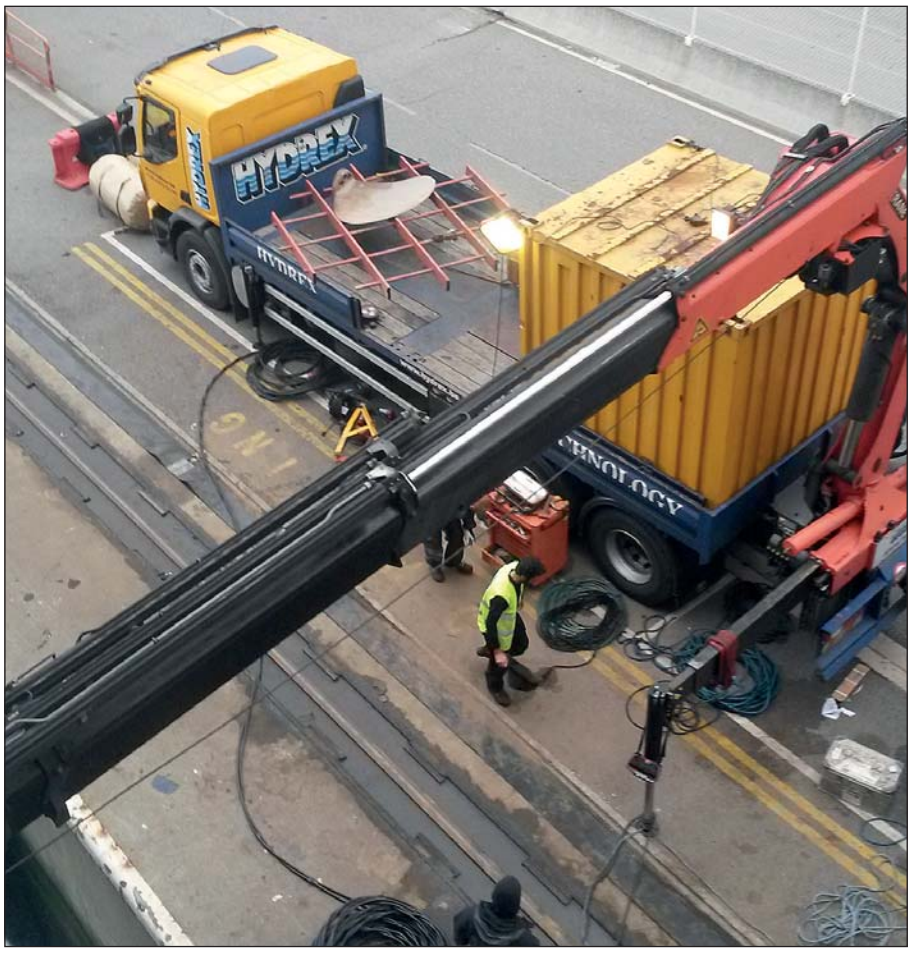
In September a Hydrex diver/technician team removed a bow thruster unit which needed to be overhauled from a 363-meter container vessel. The removal itself was carried out in Rotterdam. Earlier the team had already prepared the thruster tunnel during the ship's stop in Le Havre, France. This allowed the divers to perform the operation underwater in a very short time frame without interrupting the vessel's schedule.

Hydrex diver/technician team approaching container vessel in Rotterdam.

Preparations in Le Havre

Because of the ship's tight schedule in Rotterdam, the time required to remove the thruster unit needed to be brought back to the absolute minimum. For this reason a Hydrex team mobilized to the vessel while it was berthed in Le Havre to perform all possible preliminary work. This included removing the thruster blades one by one and preparing the engine room and the bow thruster tunnel for the operation.

When the preliminary work was complete, the team returned to the company's headquarter in Antwerp. As soon as the container vessel was entering the Rotterdam port, the team mobilized again, using one of the Hydrex workboats loaded with all the needed equipment. The Hydrex catamarans are fully equipped as dive support stations with hydraulic cranes, winches, nautical and communication equipment and a dive control room. They



Hydrex truck with thruster tunnel grid and thruster blade in Le Havre.

Bow thruster unit lifted out of the water.

Thruster tunnel grid brought to shore.

Thruster unit on Hydrex workboat.

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 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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The Hydrex team delivered the thruster unit to the manufacturer in Rotterdam.

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, which was essential during an operation like this where only a tight time frame was available.

Rapid removal of the thruster unit in Rotterdam

After the diver/technicians arrived in Rotterdam, they secured 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.

The bow thruster was then brought onboard the Hydrex workboat. Next the team securely sealed off the engine room by positioning a flange over the space connecting the thruster tunnel to the room. This made it possible for the vessel to continue to sail while the unit was onshore being overhauled.

With the bow thruster unit on deck the team sailed the Hydrex workboat to the manufacturer.

Off-hire time causes a substantial loss of money. It was therefore very important that the ship could keep its schedule. Performing the removal in two stages allowed this. This kind of flexibility can only be achieved successfully by staff who have familiarity with such operations and have 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 workboat in Rotterdam.

Underwater stern tube seal repairs with new generation flexible mobdocks

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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Fast propeller repair in U.S.A. avoids costly drydocking

Recently a team of Hydrex diver/technicians performed a propeller blade cropping on a 363-meter container vessel berthed in Oakland, California. One of the six propeller blades had partially broken off and needed to be cropped to restore the propeller's efficiency.

Propeller blade croppings are carried out with special cutting equipment developed by Hydrex.

Having developed different procedures for different kinds of damage, Hydrex teams are equipped and trained to make the best out of a bent or broken propeller. Ideally, the in-house developed cold straightening technique is used. This procedure enables Hydrex technicians to straighten damaged blades in-water, allowing commercial operations to continue without the need to drydock.

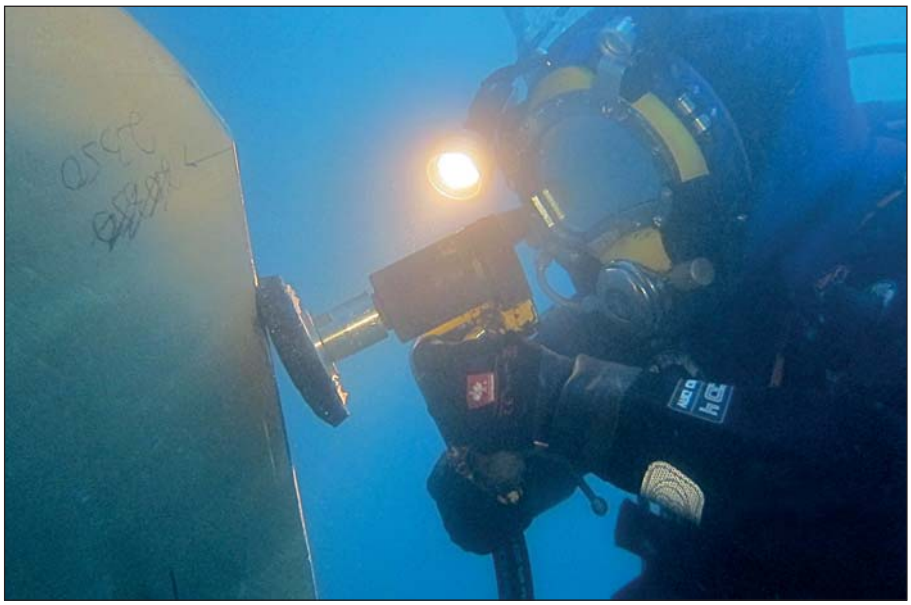
In the following example cropping was the only option as the damage to the propeller blades was too great to allow cold straightening. This kind of repair is carried out with the propeller blade cutting equipment developed by the Hydrex research department. In cases where there is an even number of blades an identical piece will be cropped from the opposite blade to restore the hydrodynamic stability of the propeller. By doing so, the best possible efficiency is obtained.

Underwater blade cropping restores efficiency

One of the six blades of the container vessel had broken off. An on-site solution was needed to restore the propeller's balance and efficiency. A team was therefore mobilized from the Hydrex office in Tampa to

The damaged blade was cropped.

An identical part of the opposing blade was also cropped to restore the propeller's balance.



Hydrex technician polishing a cropped propeller blades to minimize any loss of efficiency.

Diver getting ready for underwater operation.

the ship's location.

After the equipment arrived at the vessel's location the team started the operation with a detailed survey of the affected propeller blade. The team then used the information acquired during the inspection to calculate and determine the correct measurements needed to modify the trailing edges of the propeller blade. Next the divers cropped the blade and ground its edge to give it the correct radius. The opposing blade was modified using the exact same cutting line, to give the propeller back its balance.

When the cropping was complete, the Hydrex technicians polished the blades to make sure that any remaining loss of efficiency would be minimal.

Conclusion

Our R&D department is constantly looking into ways to enhance the available propeller repair techniques even further to improve our services. New types of both the straightening and 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. Both types of repairs can be carried out rapidly and efficiently on-site and underwater, allowing the ship to return to commercial operations without the need to drydock. ■

Permanent underwater hull repairs carried out in less than a day

A Hydrex team mobilized from our office in Clearwater, Florida, to a 170-meter roro vessel berthed close by in Port Everglades to perform underwater hull repairs. Despite the relatively small scale of this operation, it was nonetheless vital for the shipowner. It allowed him to keep his vessel out of drydock and avoid having to go off hire.

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 and inserts in the vessel's shell plating and they are approved by the major classification societies.

Hydrex certified welder during insert repair in Port Everglades.

Permanent insert repair in Port Everglades

A cavitation hole needed to be repaired in the bottom plating of the ship. A Hydrex diver/technician team therefore carried out a detailed inspection of both the onboard as well as the water side of the affected plating.

Next the team installed a cofferdam over the area. The cofferdam was modified to fit perfectly over the rounded shape of the hull.

This allowed them to remove the longitudinal frame covering the damage. The diver/technicians could then cut away the damage and the surrounding area. Next they positioned a new insert plate, measuring 300 x 300 mm. The insert was then secured following the Hydrex class-approved procedure for insert plates, using a full penetration weld.

An independent tester carried out ultrasonic testing and the repair was approved by the classification surveyor who was present during the

The damaged area was cut away.

A new insert plate measuring 300 x 300 mm was positioned.

The new insert was secured with a full penetration weld.

operation. The diver/technicians then refitted the frame and removed the cofferdam, concluding the repair.

Conclusion

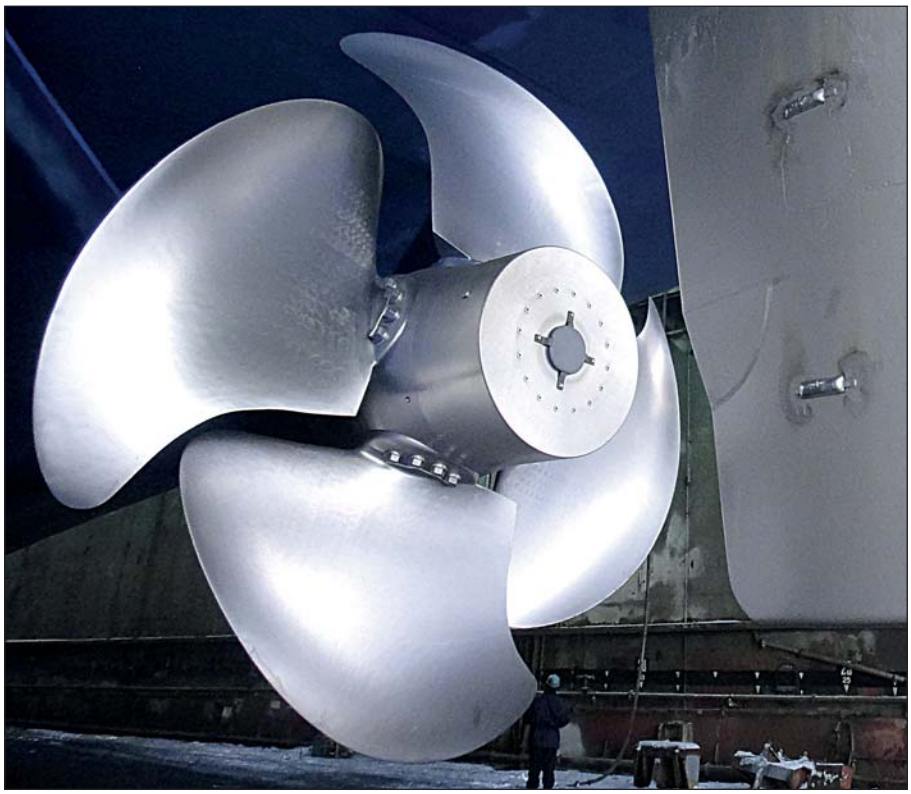
Repairs of this kind can only be done rapidly and successfully by trained divers/technicians who are familiar with the procedures and who have the relevant know-how to resolve all of the technical difficulties encountered during underwater operations.

Throughout the operation divers stayed in close communication with each other and with the technical department in the office. This allowed them to finish this job within the shortest possible time frame without any compromise of the high quality standards for which Hydrex is known. ■

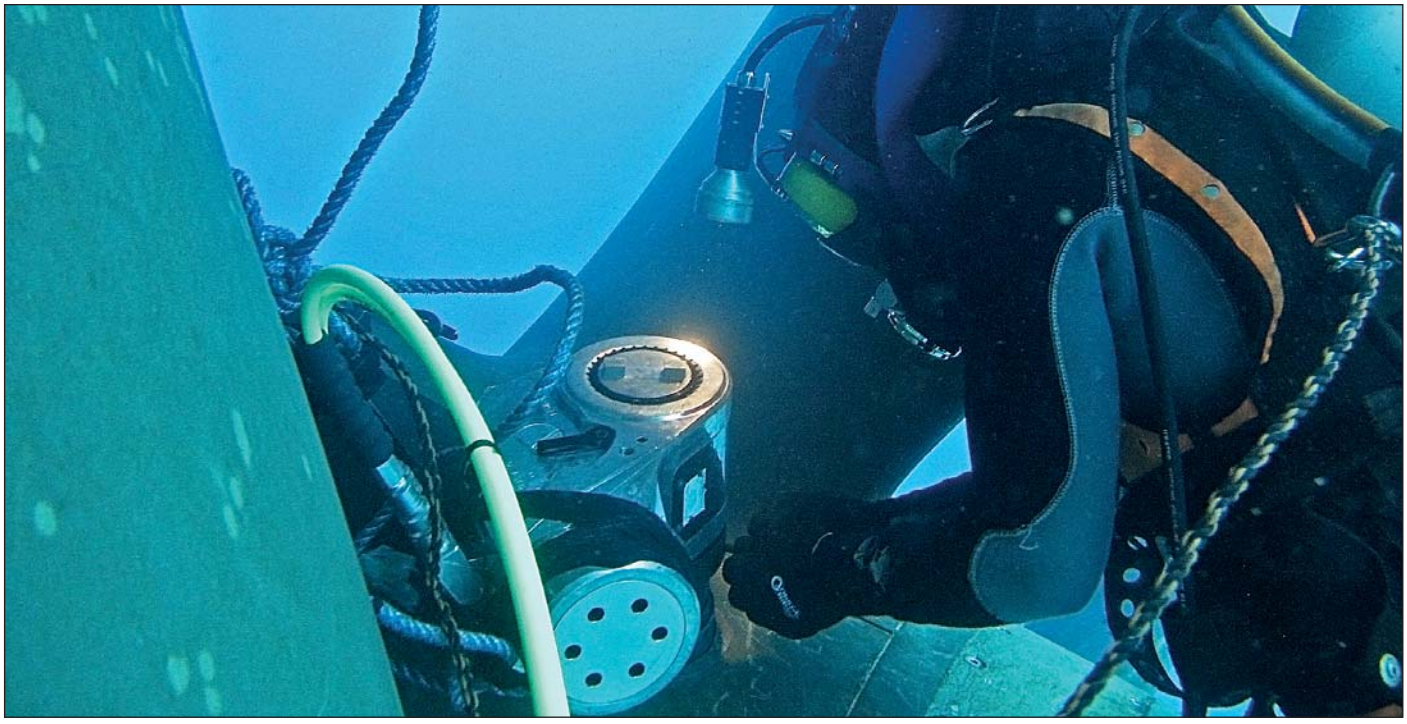
World premiere: permanent underwater repairs to all types of propellers now possible

Over the years the Hydrex R&D department has continuously improved underwater repair techniques 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 the ship needing to go to drydock.

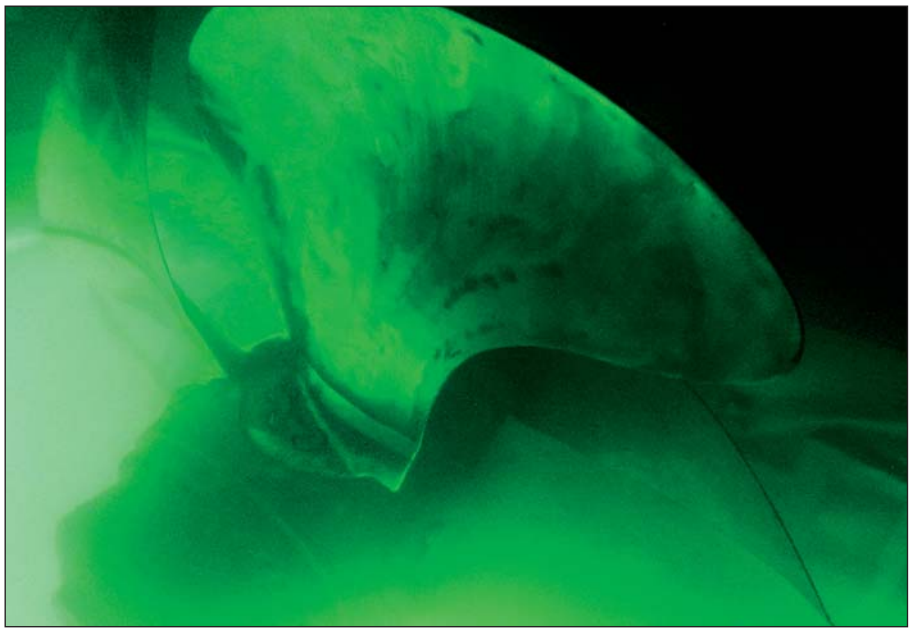
The final step has now been taken by the development of a repair system that allows Hydrex to perform permanent underwater repairs to every type of propeller in dry conditions. All kinds of repair or maintenance work can be carried out to propellers, twin propellers, variable pitch propellers, azipod and collapsible thrusters.



Permanent repair and maintenance work to all types of propellers can now be carried out underwater.



Previously only basic repairs could be carried out on-site.

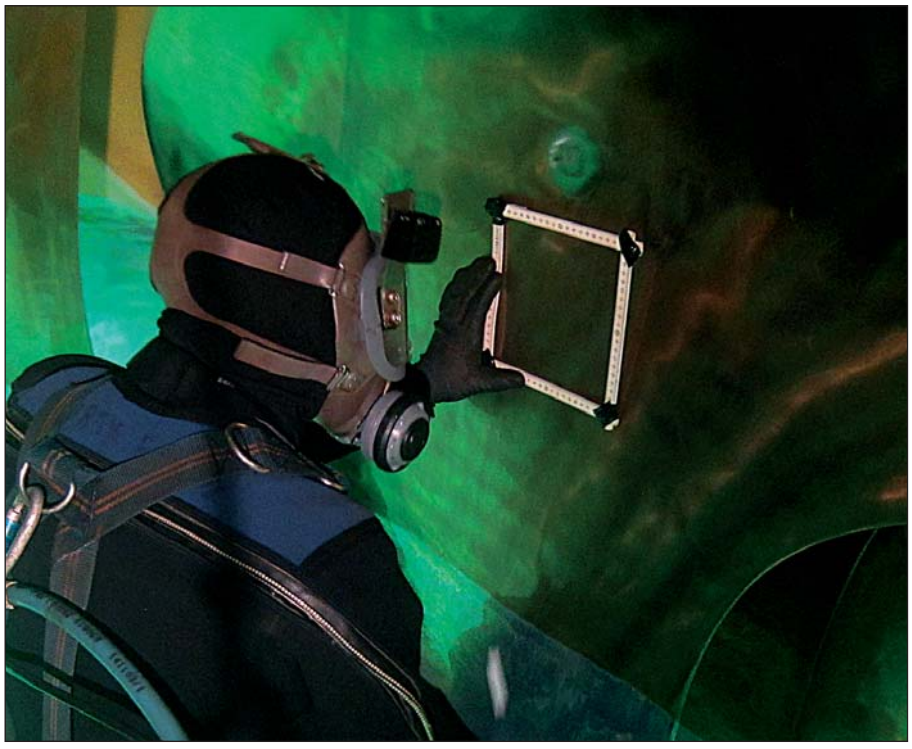


Hydrex can perform underwater work to the propeller or thruster in drydock-like conditions.

This is especially important news for supply vessels, navy ships or any vessel under contract or on a location far away from available drydock possibilities. Staying on hire for underwater repairs will save precious time and money.

This new repair system can be transported by air transport to any location around the world from the Hydrex fast response centers within a very short time frame. It can be assembled very quickly (12 hours) on-site.

With the implementation of this technique our diver/technicians can now perform permanent repairs to all parts of the underwater ship propulsion system in drydock-like conditions. ■



Hydrex diver/technician performing a propeller blade inspection underwater, in a dry environment.

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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Hydrex at SMM 2014

The 25th shipbuilding, machinery and marine technology (SMM) international trade fair in Hamburg was attended by more than 50,000 trade visitors from all parts of the world. The 2,100 exhibitors, including Hydrex, spread out over 90,000 square meters, were very satisfied with the fair.

According to the closing report on the trade show, "With its 26 national pavilions and exhibitors from 67 different countries, this year's fair was more international than ever. For the first time, companies from Egypt, Lebanon and Sri Lanka participated in the fair, and Dubai set up its first-ever national pavilion. The Asian market was well-represented, as well. Major players from Korea, Japan and China showcased their impressive portfolios."

"The innovation topic featured prominently on the agenda of this year's SMM, which presented the entire bandwidth of maritime innovation. The exhibits covered a wide spectrum, from large-scale ship engineering and shipbuilding products to ship outfitting and equipment supplies, and from cargo handling systems and maritime technologies to specialised services."

Hydrex and Ecospeed

With several new products and techniques on display, the Hydrex/ Ecospeed booth fitted in perfectly with the innovative aspect of SMM. As part of the Dutch pavilion, the booth was a popular spot for visitors.

The Hydrex booth was well manned by Production Executives Dave Bleyenberg and Manuel Hof, International Sales Manager Rob Wolthuizen and CEO Boud Van Rompay.

Many existing customers, Hydrex agents, technical people and interested newcomers to Hydrex and Ecospeed dropped by. They enjoyed the friendly, comfortable and informative atmosphere of the Hydrex booth. Much new business was conducted.

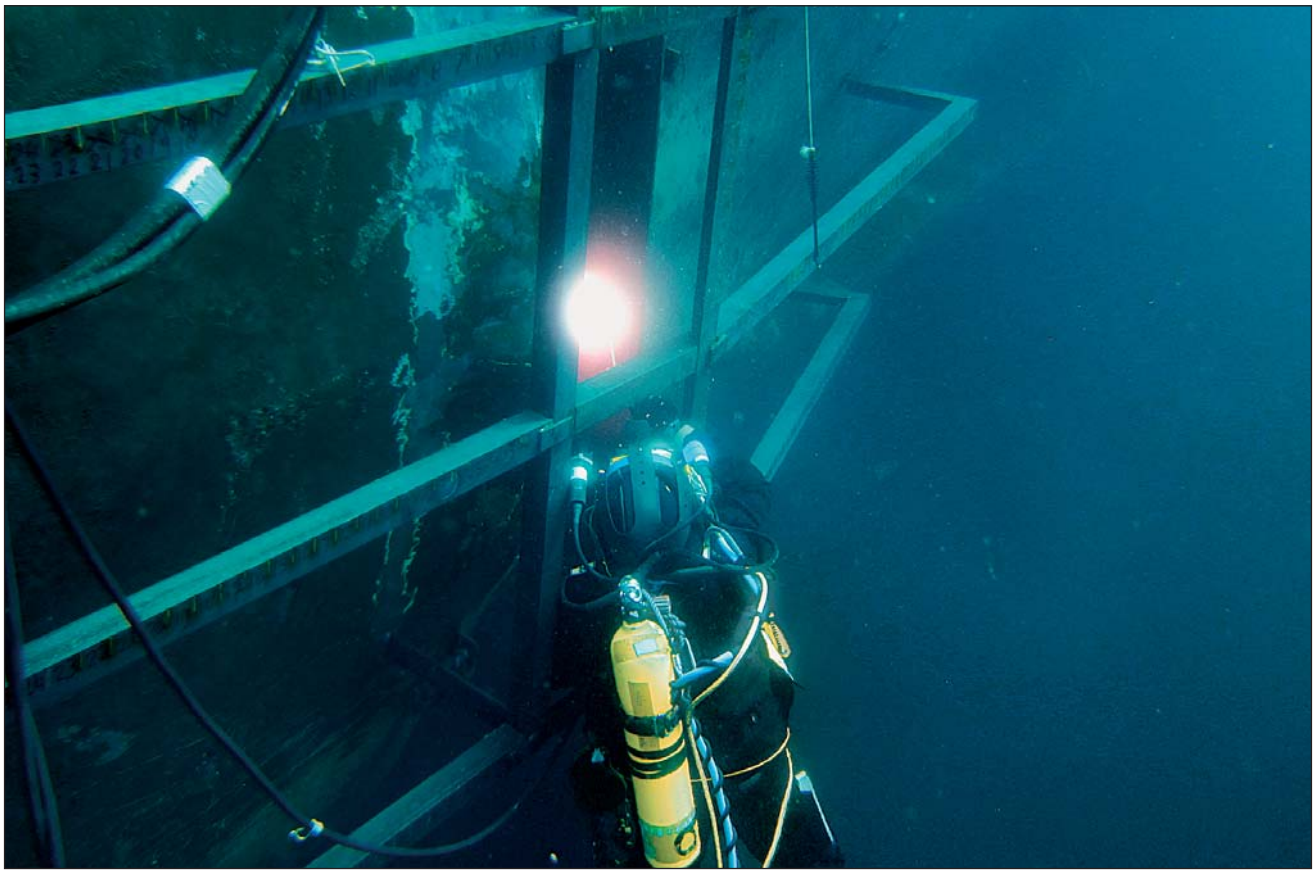
In the background Koen Smouts, Hydrex Equipment Officer, and his team performed flawlessly and efficiently in setting up and taking down the Hydrex booth and making sure that it had everything that was needed, was comfortable and well stocked. This was not an easy feat when the logistic lines from Antwerp to Hamburg are considered, but one that is typical of any Hydrex mobilization for any job anywhere in the world.

Summary

All in all SMM 2014 was a great success and we would like to thank all of you who visited us there for coming. We look forward to working with you on an ongoing basis. ■

The Hydrex booth showcased some brand new products and techniques. Propeller buffing was one of them.

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.

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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) 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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