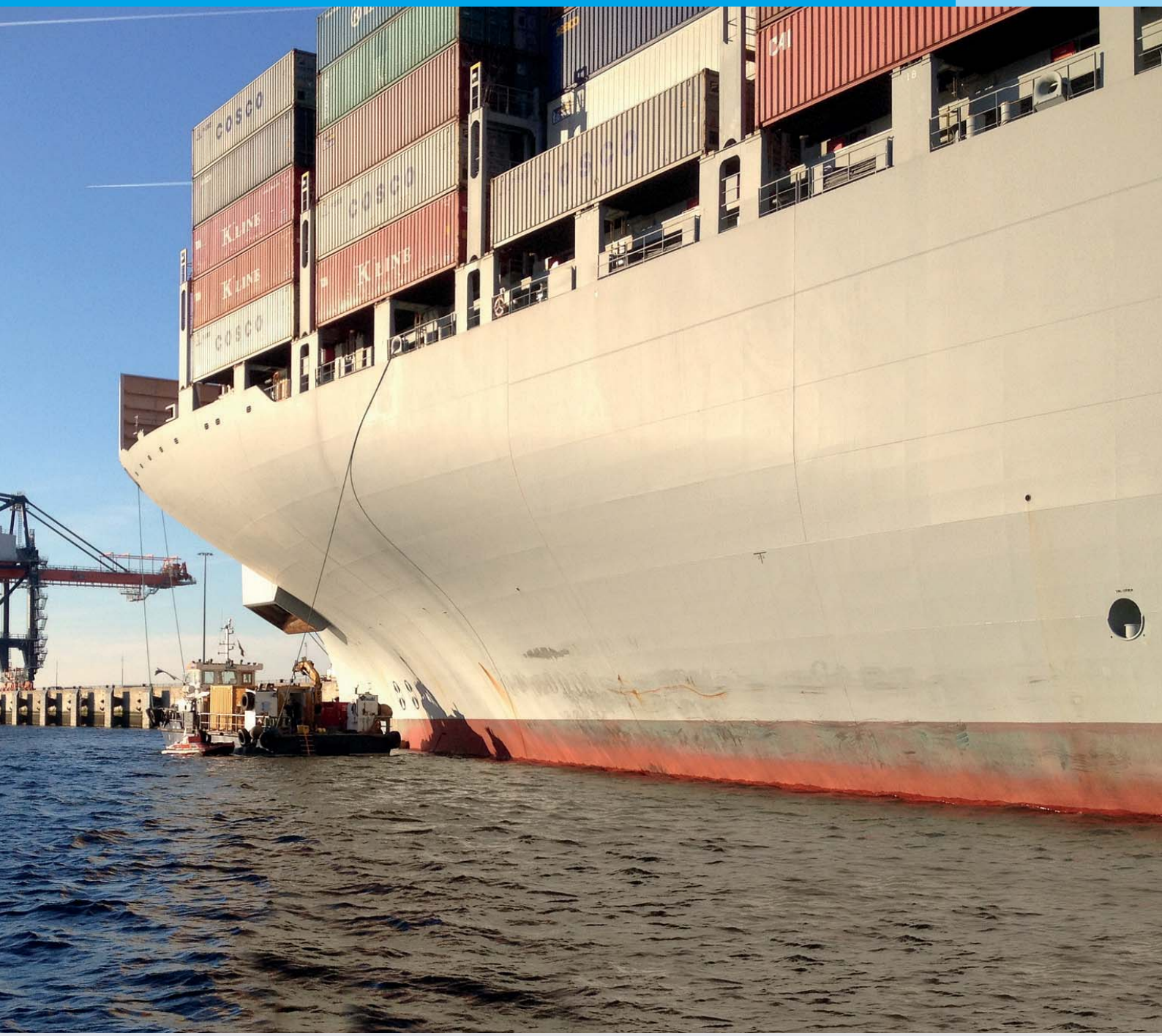
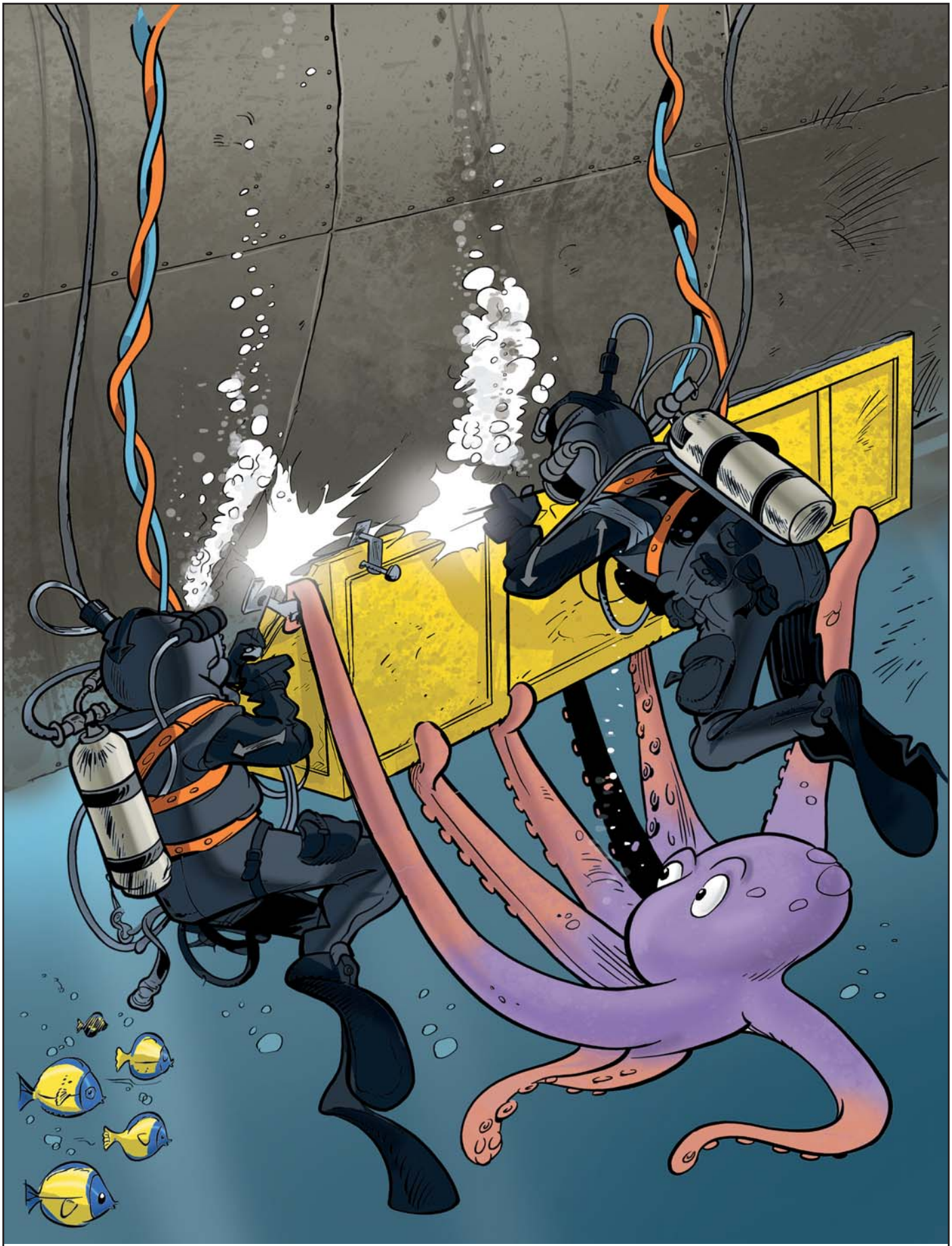
HYDREX®

UNDERWATER TECHNOLOGY

Magazine

Number *203*





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www.hydrex.be

Editorial

In this magazine we give you a summary of some of the on-site repairs that were carried out by our diver/technician teams last month.

These include a permanent insert repair carried out on a 170-meter roro vessel berthed in Port Everglades, Florida, an underwater stern thruster replacement in Cameroon on an offshore supply vessel, and a bow thruster blade replacement on a 366-meter container vessel in Rotterdam.

Hydrex offers turnkey underwater repair and maintenance solutions to shipowners wherever and whenever they are needed. Our large, 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 any location around the globe to carry out necessary repair work without the need to drydock.

If you would like to learn more about Hydrex services, please visit our website (www.hydrex.be) or call us 24/7 with your underwater repair needs, routine or emergency. We can offer turnkey solutions that include the engineering as well as the practical part of any operation.

Our technical department is ready to find a tailor-made solution for your specific problem.

Best regards,

Hydrex founder
Boud Van Rompay

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On Time Worldwide High Quality Underwater Services

ISO 9001 certified

Underwater services and technology approved by:

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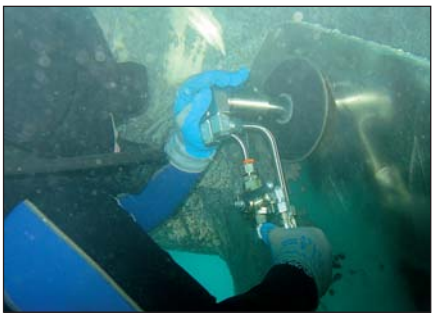


Fast underwater bow thruster blade replacement in Rotterdam

In September Hydrex has carried out bow thruster blade replacements on a 366-meter container ship in Rotterdam. The speedy repair was done during unloading. Our divers performed the operation underwater using one of our own workboats based at the Antwerp depot. This made it possible for the owner to keep his vessel out of drydock.

The new propeller blades packed and ready for transport from the Hydrex depot.

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

Hydrex workboat leaving for Rotterdam.

The owner of the ships had the luxury of being able to schedule the blade replacements well in advance. This allowed the Hydrex technical department to get a team on the road before the vessel arrived. As a consequence, the diver/technicians were ready to start the operation as soon as the ship was berthed.

The new blades were prepared for installation on the deck of the workboat. Meanwhile the rest of the Hydrex team readied the bow thruster tunnel for the replacement.

The Hydrex flexible mobdocks were then installed on both sides of the thruster tunnel. Next the team could evacuate all water from the tunnel. In this manner a dry working environment was created.

The diver/technicians then removed the first blade of the bow thruster. They brought it to the surface. A

Water being removed from the thruster tunnel.

replacement blade was then lowered into the water and taken to the thruster tunnel. The team positioned the new blade on the bow thruster and secured it with bolts. This procedure was repeated for the other blades.

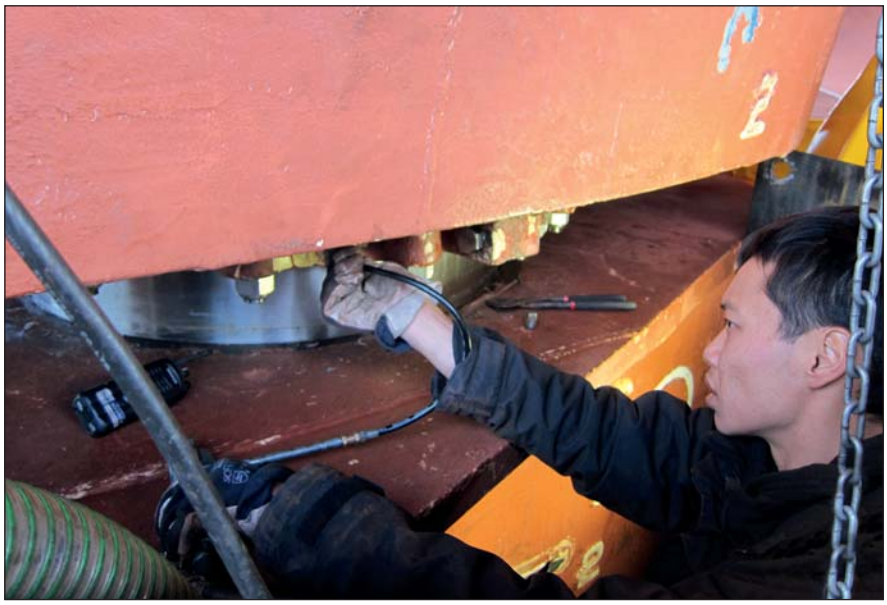
After the blades had been replaced, the divers removed the flexible mobdocks, which finished the repair.

During the replacements a local representative of the bow thruster manufacturer was present. He supervised the operations and gave his approval.

In cases like these, timing is of the highest importance. Hydrex team

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 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 onsite, 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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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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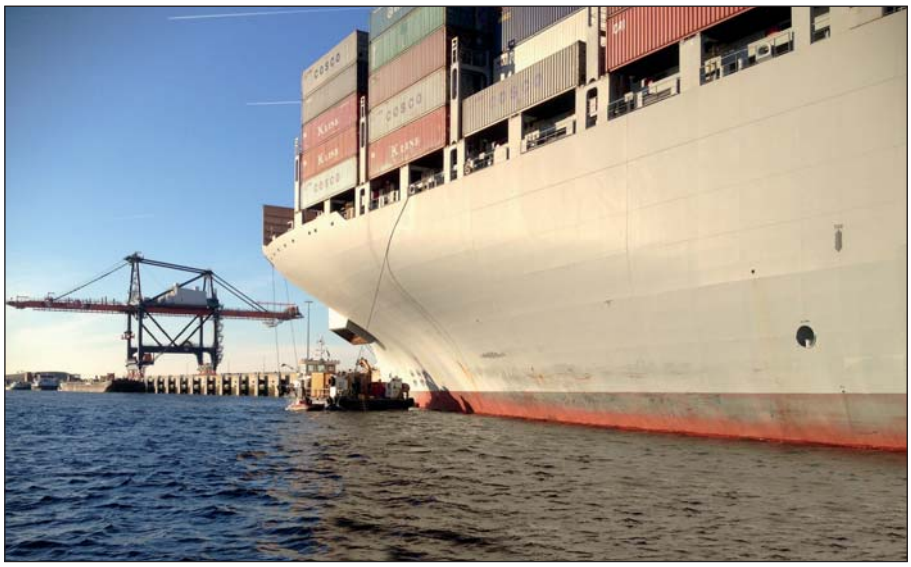

Hydrex workboat next to the container vessel.

New blade on workboat, with old blades behind it.

members are trained to carry out the approved procedures within a short time frame. Only a very skilled and efficient team can perform this kind of operation without mistakes or delays. The bow thruster blade replacements in Rotterdam were carried out during loading/unloading. The operation was concluded well before the end of these commercial activities. This allowed the container vessels to leave Rotterdam again perfectly on schedule. ■

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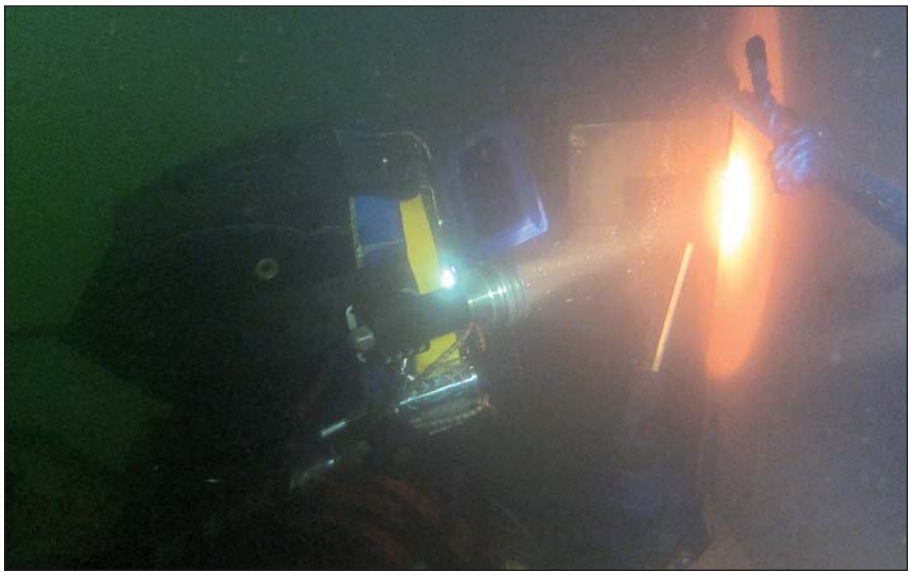
Underwater stern thruster removal and reinstallation in Cameroon

To save time and money for the owner of a 69-meter offshore supply vessel, Hydrex removed the stern thruster of the ship and installed a new unit during the vessel's stop in Limbee, Cameroon. By carrying out both parts of the operation underwater the ship could continue its commercial activities and did not have to go to drydock.



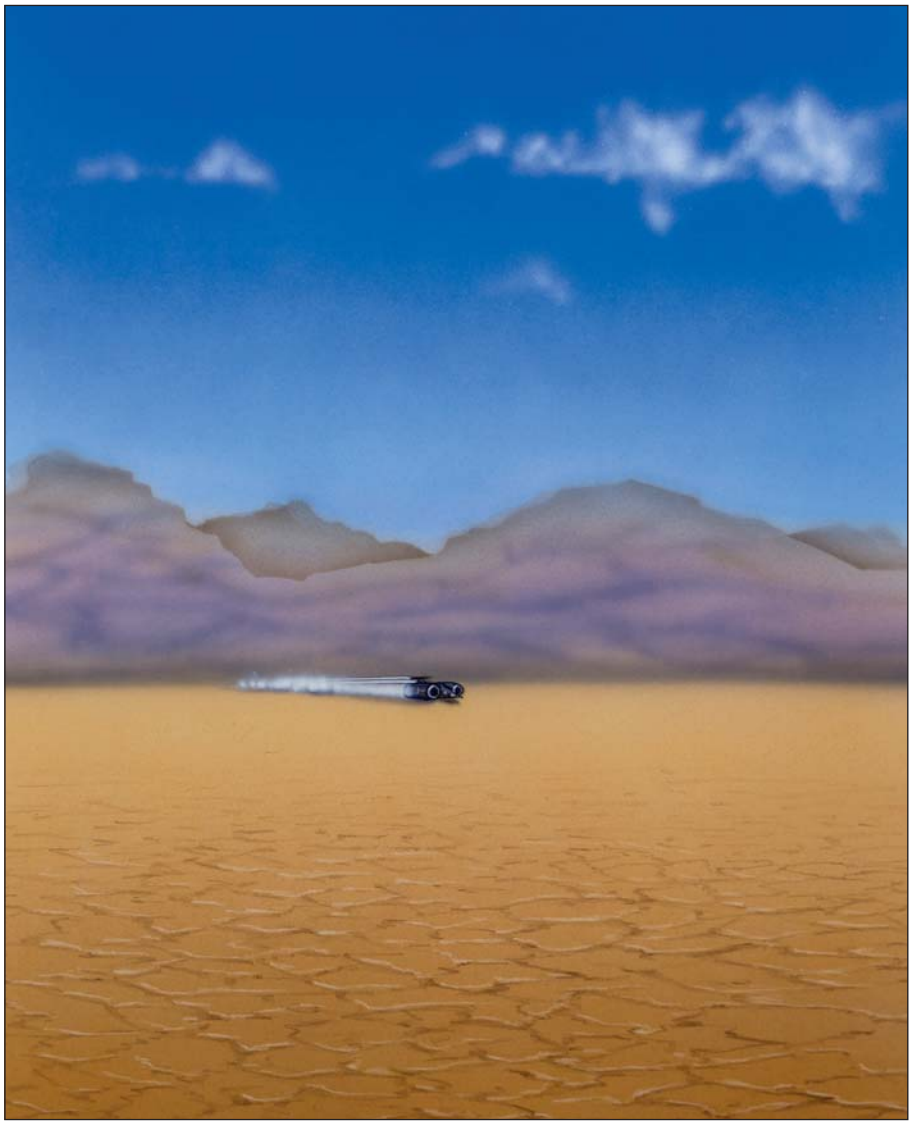
Diver preparing the bow thruster tunnel for the operation.

The removal and reinstallation took place in September, but earlier a Hydrex diver/technician team performed a full underwater inspection of the stern thruster unit. This was done during a previous stop in Cameroon. The inspection revealed that the thruster was damaged too severely for an on-site repair and needed to be replaced with a new one.

The inspection allowed the Hydrex technical department to prepare every step in detail to make sure that the team could carry out both the removal of the old stern thruster unit and the installation of the new unit during a single operation.

When the vessel was sailing towards Limbee again at the end of August, a team mobilized to the ship's destination together with all the necessary equipment. They set up a monitoring station next to the berthed ship.

One by one the diver/technicians then detached the blades and replaced them with blind flanges to prevent oil from leaking from the thruster. In the meantime, initial preparations were made in the stern



New generation cold straightening equipment

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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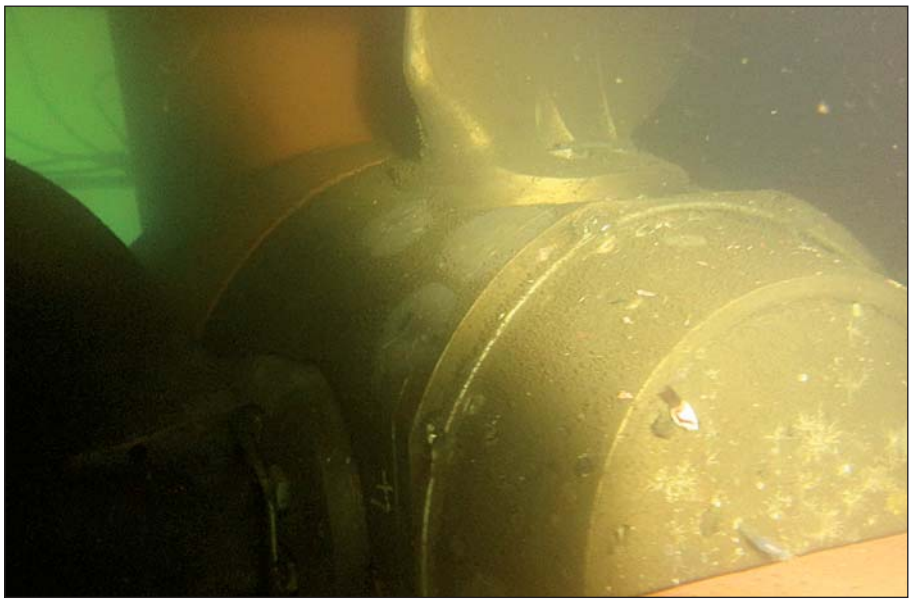
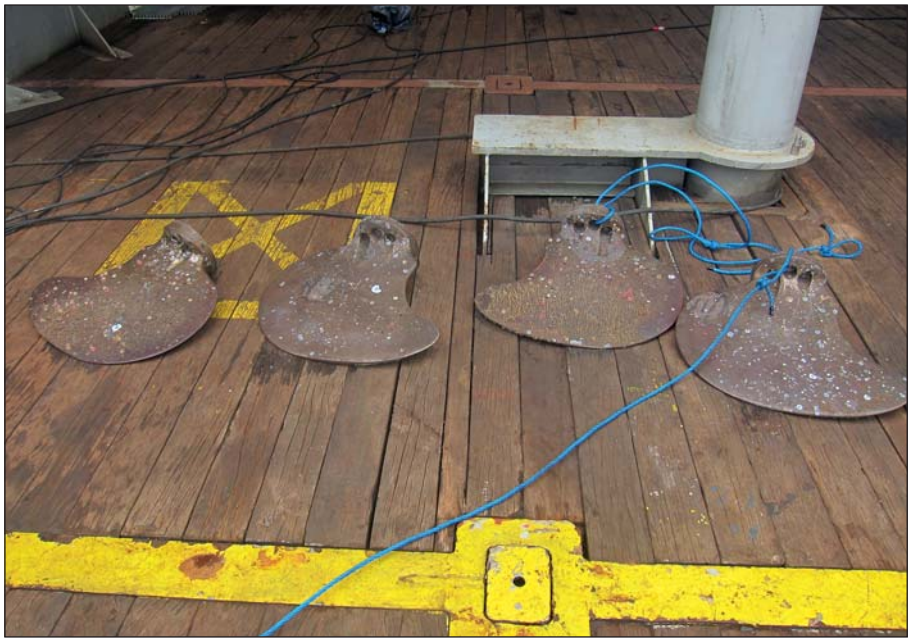


The old thruster unit prior to removal.

Old thruster unit lifted out of the water.



The old thruster blades.

The new bow thruster unit arriving on-site…

and ready for installation.

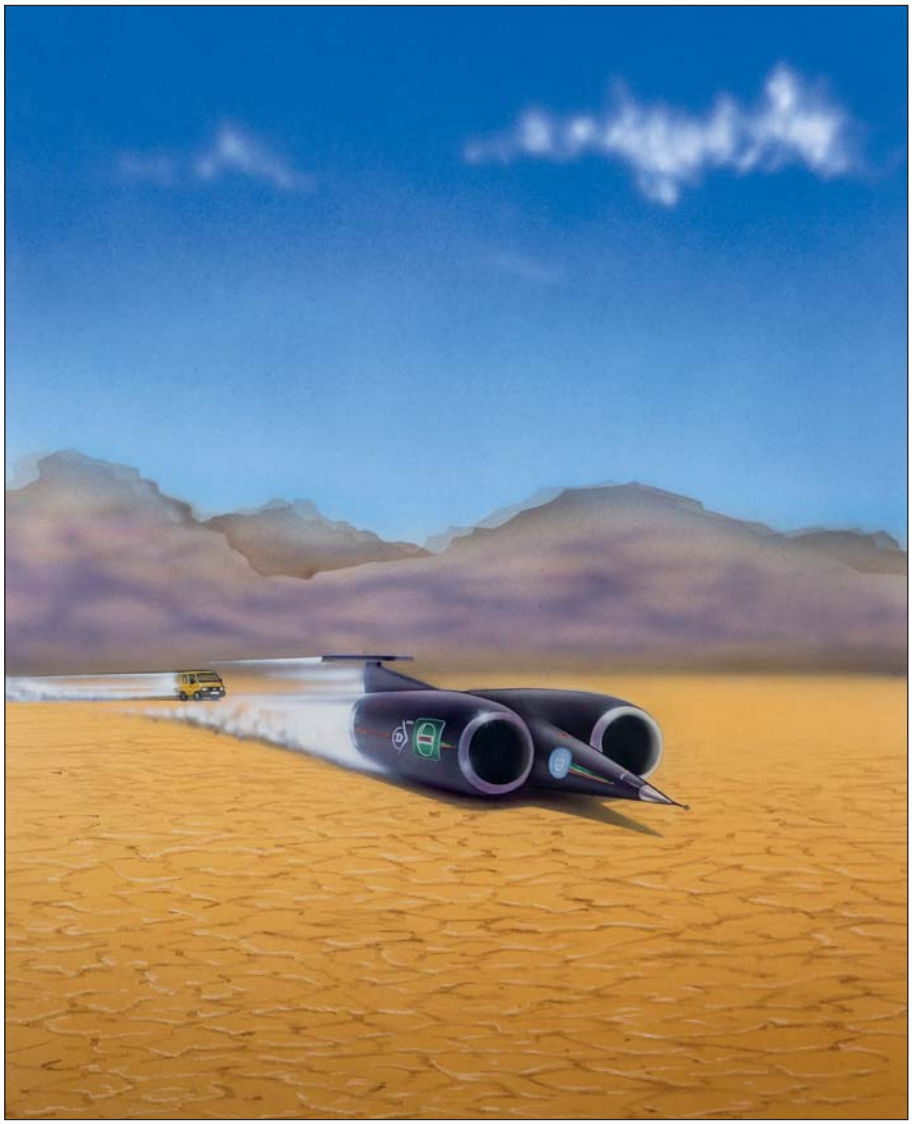
thruster engine room for the removal of the unit so that there would be no ingress of water once the unit was taken out.

The team then disconnected the stern thruster from the thruster room and carefully lowered it in the tunnel. The divers extracted it from the tunnel and brought it to the surface.

Simultaneously the team installed a blind flange to seal off the thruster tunnel from the engine room.

For ease of handling, the new stern thruster unit was put on a cradle. The divers then lowered it into the water and brought it inside the tunnel.

Next the diver/technicians sealed off the thruster tunnel with the Hydrex flexible mobdocks and emptied all water from it. This created a dry working environment in which they could complete the reinstallation of the stern thruster unit in the best



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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Hydrex diver getting ready for underwater operation.

Diver/technician during the installation of the new bow thruster blades.

possible conditions. They repositioned the gearbox using chain blocks and secured it with bolts. The thruster propeller blades were then reinstalled one by one and the thruster unit was reconnected to the engine room.

Summary

Performing both the removal and reinstallation of a stern thruster on a tight schedule takes a lot of planning. This can only be done successfully by people who have familiarity with such challenges and the relevant know-how. The Hydrex team also worked in shifts around the clock to finish the job within the available time frame. This gave the owner the possibility of keeping his vessel on-hire and avoid a costly and time consuming unscheduled drydock visit. ■


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Permanent underwater hull repairs carried out in less than a day

Last month 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.

The damaged area was cut away.

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

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. For this reason all Hydrex technical staff from all offices undergo stringent training, enabling them to perform a wide range of operations. Hydrex diver/technician teams carry out these on-site hull repairs all over the world.

Throughout the operation diver/technicians 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. ■

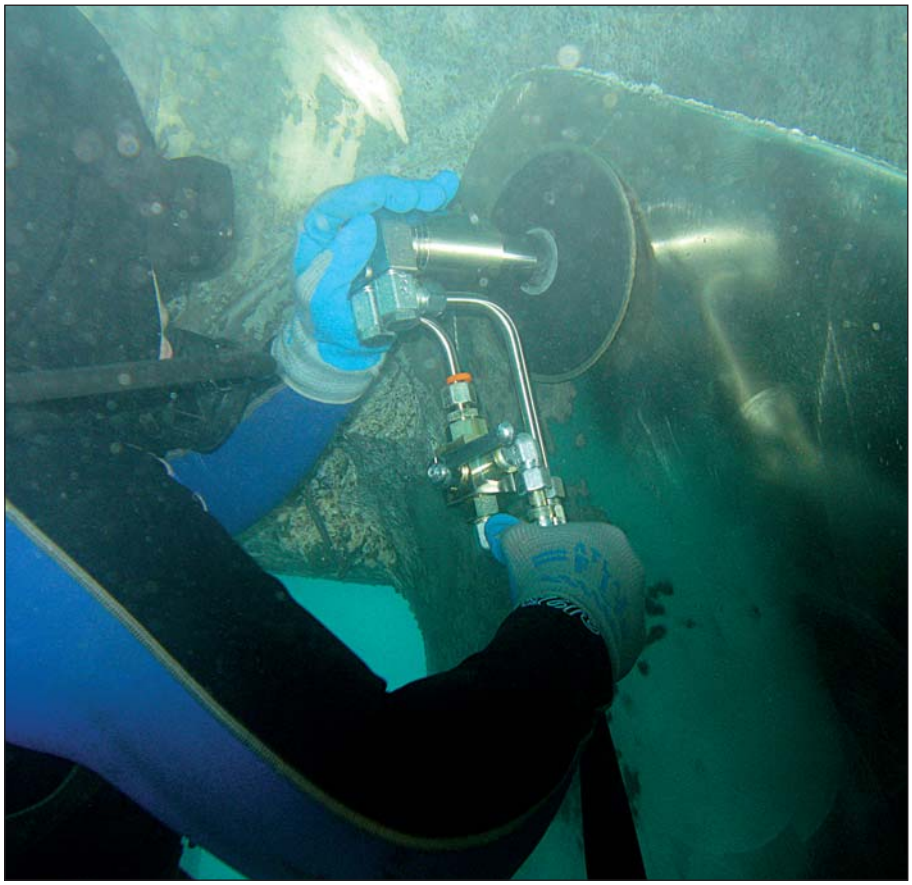
New generation propeller cleaning offers large cost savings

The effect of a rough propeller on the vessel's fuel consumption is significant. 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.

Mr. Eric Fjellström, Chief Engineer of M/V Carmen said that "you can also clearly tell the difference in ships' performance after Hydrex has done its thing [propeller cleaning]."

Badly done polishing with a polishing disc or grinding wheel can in itself create a rougher surface than that of the new propeller, leaving scratches which not only increase the propeller's roughness but also invite easier attachment of fouling organisms.



Propeller cleaning represents a fast, high return on investment.

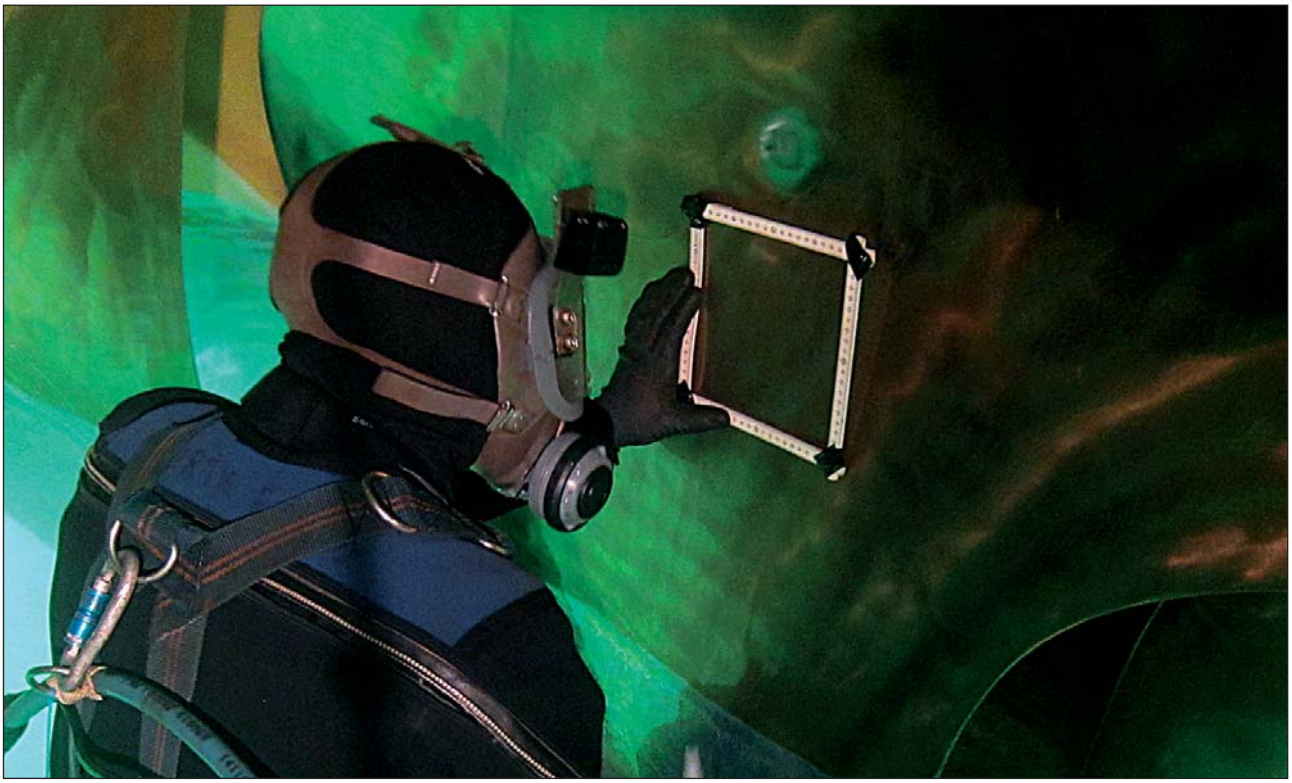
Propeller cleanings are carried out using underwater equipment designed and developed in-house.

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. Such light cleaning can be accomplished rapidly and efficiently.

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.

More information on the advantages of propeller cleanings can be found in Hydrex White Paper No. 10: *Ship Propeller Maintenance: Polish or Clean?*, which is available for download for free at www.shiphullperformance.org ■

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.

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. ■

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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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