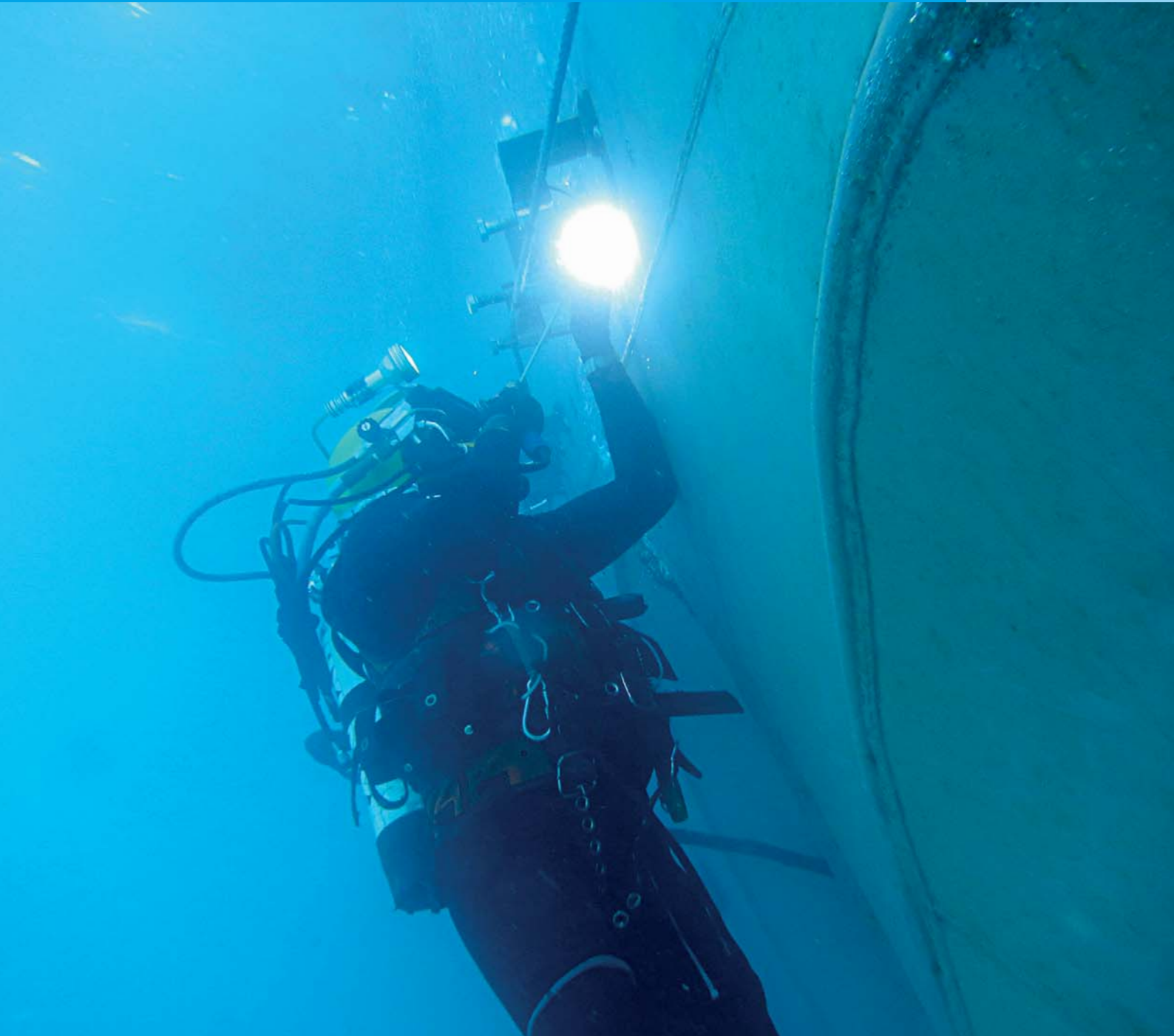


HYDREX[®]

UNDERWATER TECHNOLOGY

Magazine

Number 227



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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.



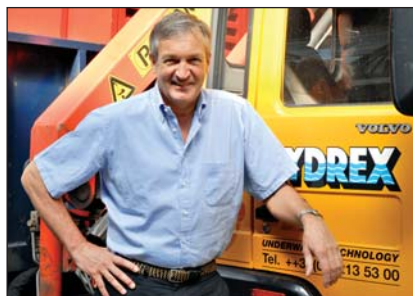
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Editorial



The last two months have been very exciting. Our headquarters in Antwerp has undergone a major expansion, including new office spaces and a totally new warehouse. This is a result of the growth Hydrex experienced recently. An article on this expansion will be published in the next issue of our magazine.

In this issue you will find an overview of our worldwide network of agents. This network expanded rapidly over the last two years and is going to strengthen our development in the coming years even further.

We have also included an article on a bow thruster removal and reinstallation that was carried out in a single operation in Australia. A third article deals with an emergency rudder repair carried out in severe winter conditions on the opposite side of the world in Sisimiut Greenland. During both repairs we worked closely together with the OEM involved to prevent a costly unplanned drydock visit.

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 and safe underwater solution.

Hydrex founder
Boud Van Rompay



Cover: Diver performing welding work on the hull.



ISO 9001 certified

Underwater services and technology approved by:



ClassNK



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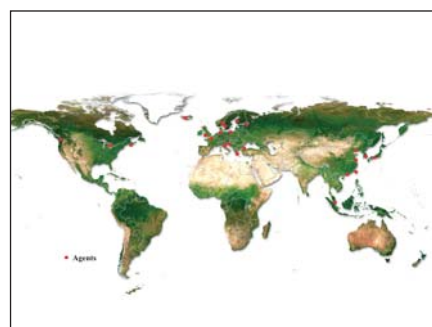
HYDREX
UNDERWATER TECHNOLOGY

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Underwater bow thruster removal and reinstallation in Australia

To save time and money for the owner of a 82-meter offshore supply vessel, Hydrex removed the bow thruster of the ship and reinstalled the unit after it was overhauled while the vessel was at anchorage in Dampier, Australia. By carrying out both parts of the operation underwater the ship could stay on the project and did not have to go to drydock.

Despite the remote location of the vessel, our technical department was able to very swiftly make all practical logistic arrangements and arrange a mobilization of the equipment. In the recent past we have carried out several operations in Australia, among which an emergency stern tube seal repair on another offshore supply vessel.

When the vessel was sailing towards Dampier, a team of diver/technicians mobilized as well. They set up a monitoring station on a workboat



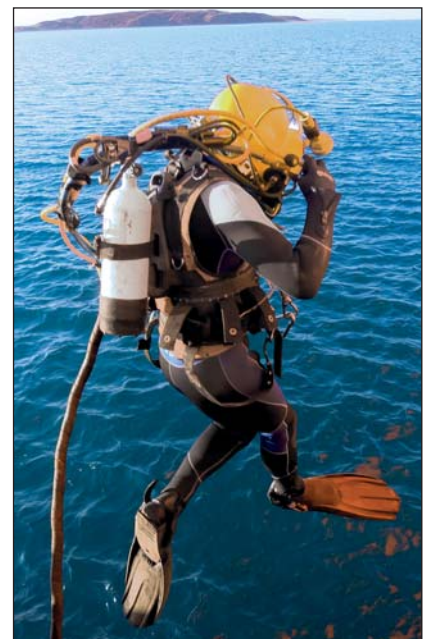
Flexible mobodcks ready for installation.

and sailed to the vessel's location. As soon as the ship was at anchorage, a small Hydrex team went on board and prepared the bow thruster engine room for the removal of the

unit so that there would be no ingress of water once the unit was taken out. In the meantime the majority of the repair team started the underwater operation. They first



Hydrex diver getting ready for underwater operation



... and taking the plunge.



Preparing the hull for installation of the flexible mobdocks.



Diver performing welding work on the hull.



Overhauled thruster ready for reinstallation.

removed the thruster tunnel grids. Next they detached the blades one by one and replaced them with blind flanges to prevent oil from leaking from the thruster.

In-house developed equipment

We have a special R&D department that is continuously looking for new ways to streamline the repair procedures used by our teams. One of the results of their research is a cradle designed especially for thruster operations. This device has been used on many thruster operations around the world. It allowed the Hydrex divers to remove the bow thruster unit from the thruster tunnel and bring it onboard the workboat in one take using the ship's crane.

The unit was then brought to a local workshop where it was overhauled by a technician team of the OEM. The Hydrex team remained on stand-by so that they could immediately start the reinstallation when the bow thruster arrived back on location. This kept both the travel cost and the time-frame needed for the operation to the absolute minimum.

The overhauled thruster unit was brought back inside the tunnel using the reverse procedure. Next, another technology developed by Hydrex in-house was used to close off the thruster tunnel: our flexible mobdocks. Mobdock is short for 'Mobile mini drydock' because they enable our diver/technicians to create a dry environment to work in, while the vessel stays afloat. These mobdocks have been used during thruster operations for 20 years now. Because



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.

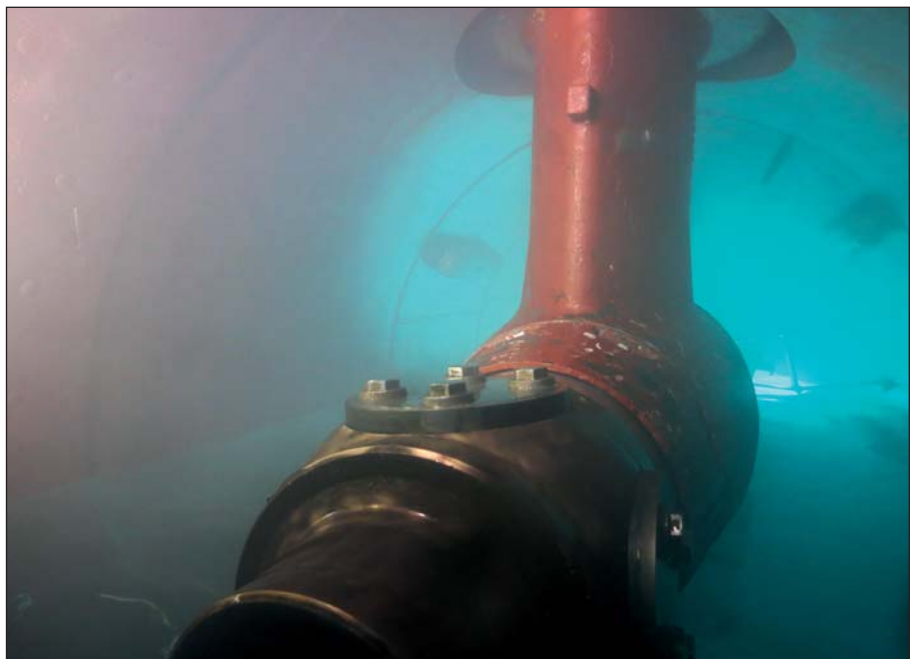
With fuel costs amounting to 40% of operational expenses and continuing to rise, reducing fuel consumption is a vital concern of ship owners. This is the reason why hull monitoring pays for itself. Underwater hull roughness, marine fouling, bent propellers and poor paint condition are all factors that 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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Bow thruster propeller blades after removal, prior to being refurbished.



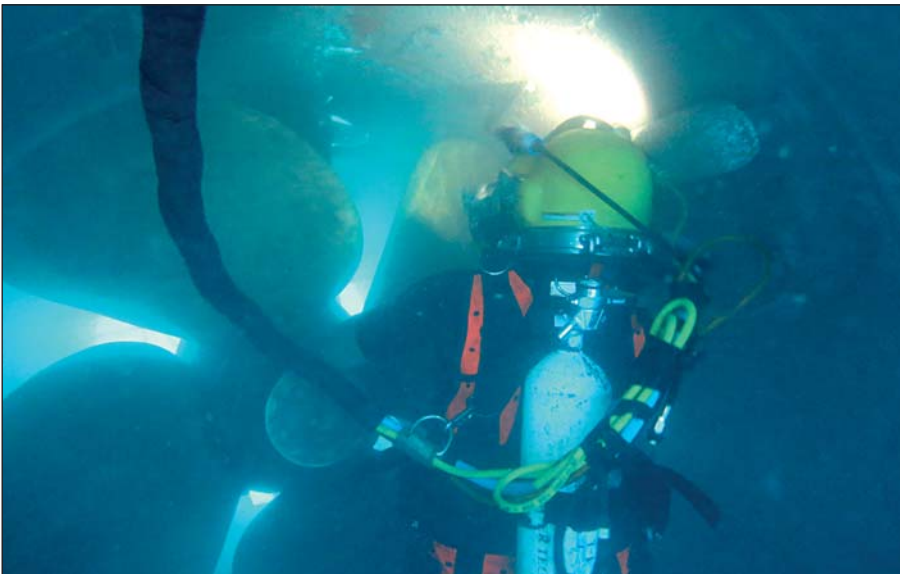
Thruster unit inside underwater habitat.



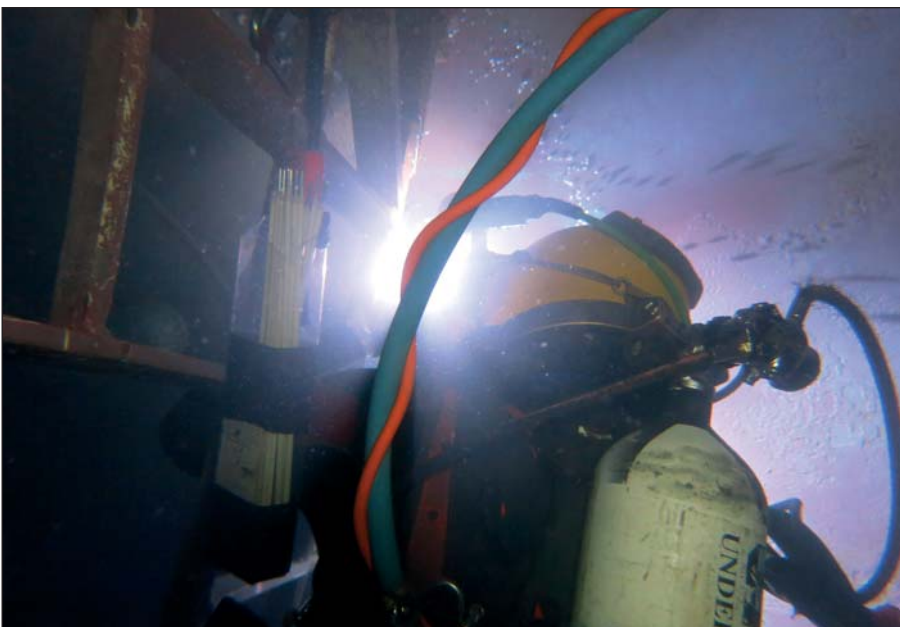
Overhauled bow thruster unit inside re-flooded tunnel.



Reinstalled and secured thruster blades.



Hydrex diver performing final inspection of reinstalled thruster blades.



Reinstallation of thruster tunnel grid.

they are flexible they can be shipped to anywhere in the world by plane very fast.

The diver/technicians repositioned the gearbox using chain blocks and secured it with bolts. All thruster propeller blades were then reinstalled one by one and the thruster unit was reconnected to the engine room.

After a successful leakage test, the team removed the flexible mob-docks. Once the tunnel was flooded, the tunnel grids were reinstalled. This concluded the operation.

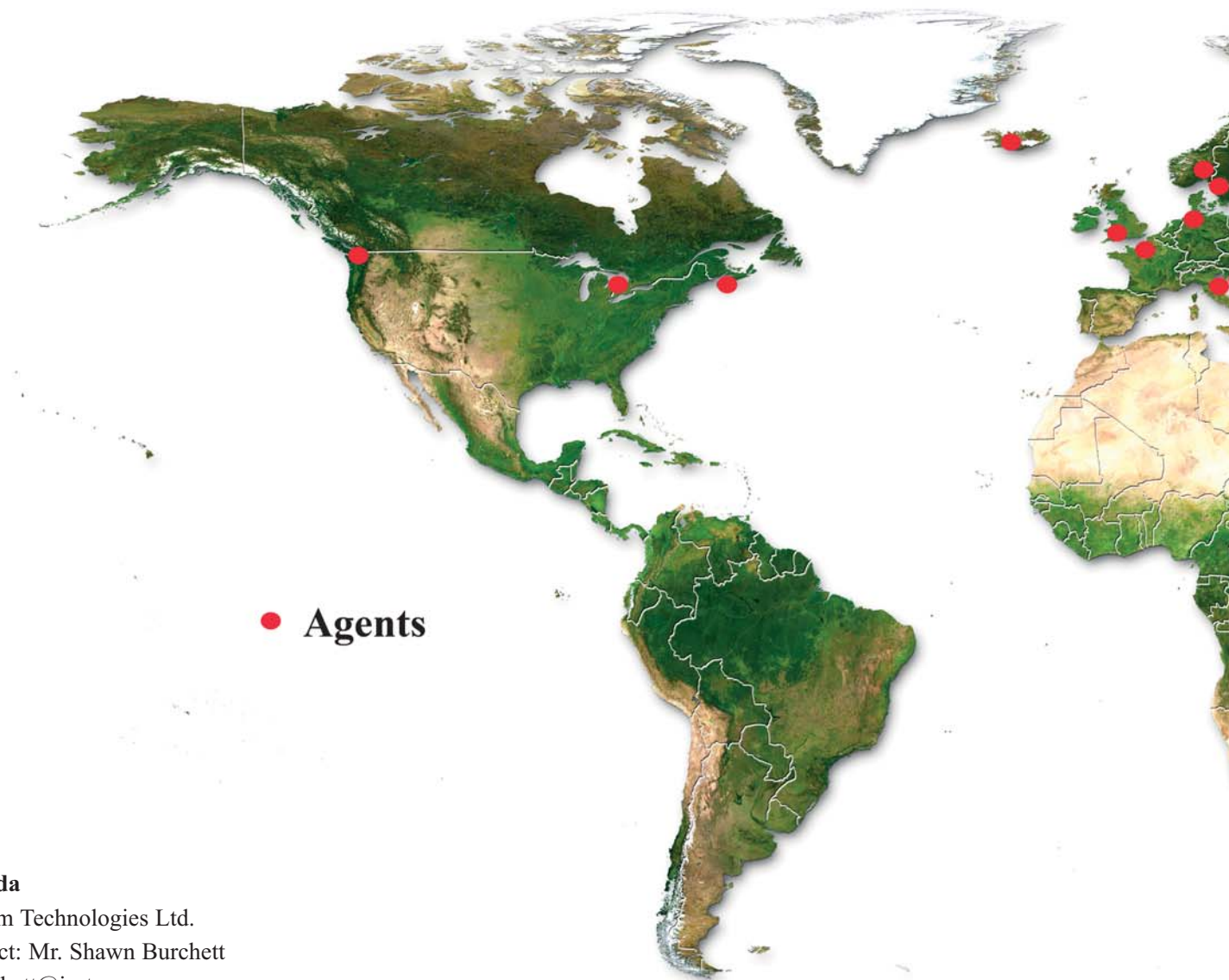
Conclusion

Performing both the removal and reinstallation of a thruster on such a short notice can only be done successfully by people who have experience with such challenges and the relevant know-how. This is why Hydrex has a technical department capable of arranging such a fast mobilization, an in-house R&D department that can take care of the engineering aspect and highly experienced diver/technicians who are trained to perform the required class-approved repair procedures.

During the entire operation we also worked closely together with the OEM, which allowed us to offer the best possible solution to our customer within the shortest possible time-frame. ■



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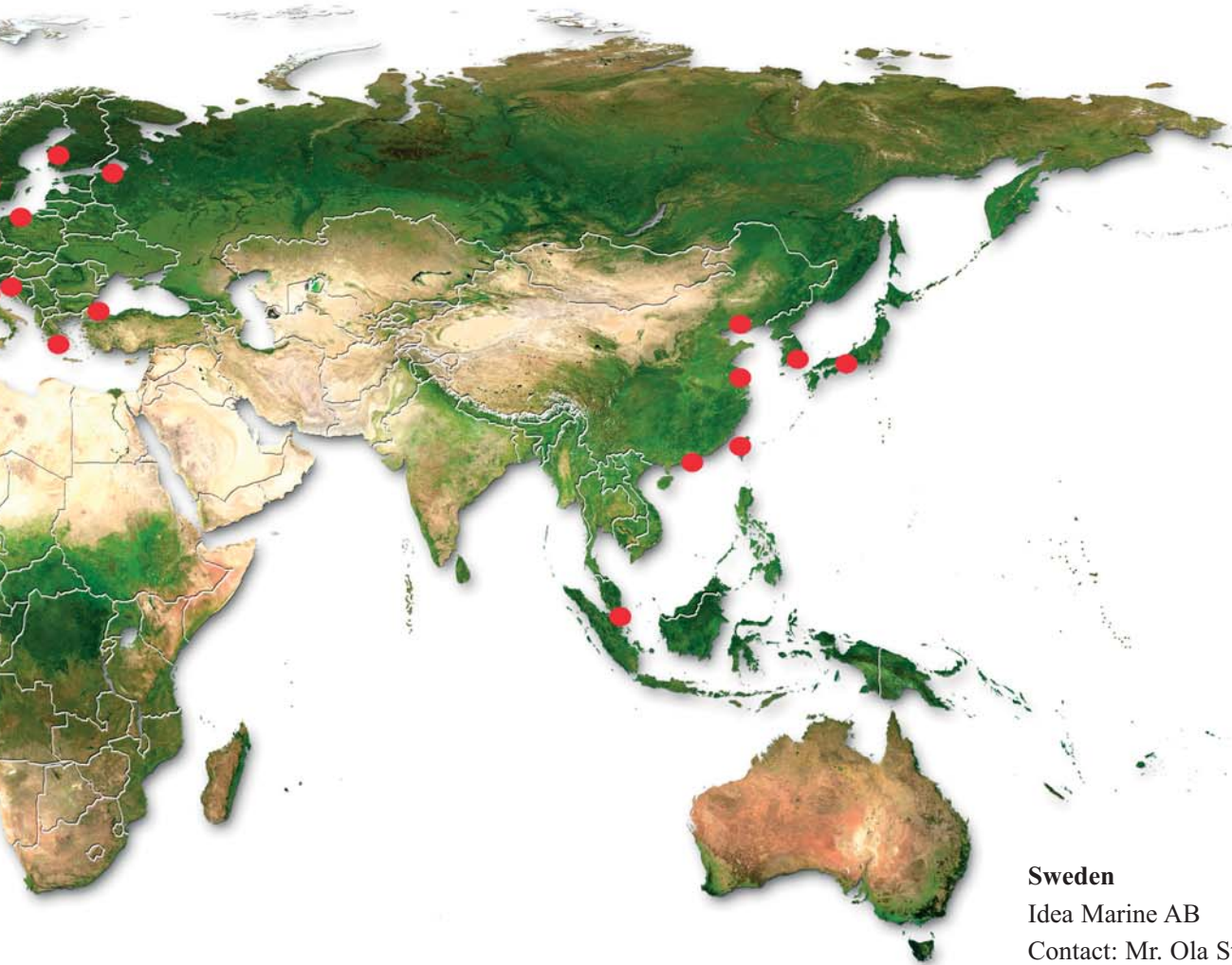
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work of agents



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Hydrex US ready to mobilize immediately



Hydrex has an office located in Clearwater in the Tampa Bay area that is ready to mobilize immediately. The office has a fast response center that is equipped with an extensive range of state of the art logistics, trucks, tools and diving support equipment. This enables Hydrex US to efficiently service vessels and offshore units calling on ports in Canada, North,

Central and South America as well as the Caribbean.

All staff members of the Hydrex office in Clearwater undergo stringent training at the Hydrex headquarters in Antwerp. They can carry out both simple and complex high quality jobs even in the harshest of circumstances.

Repairs to thrusters, propellers, rud-

ders, stern tube seals, damaged or corroded hulls and all other underwater repair as well as maintenance services are done while the vessel is afloat. This eliminates the need to drydock.

All used methods are fully approved by all major classification societies.

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Emergency rudder repair in Greenland

In the middle of October we received an enquiry for an emergency rudder repair on a 67-meter fishing vessel. The ship was operating in the region of Sisimiut, Greenland when a defect occurred on her flap rudder, making it difficult to navigate safely.

A preliminary inspection by a local diving company revealed that one of the hinges of the rudder flap had come loose. This made it impossible to correctly position the flap, which in turn made navigating difficult. To keep on sailing without a repair posed a great risk as there was a real chance that the damage would have deteriorated. Securing the rudder flap was the only possible underwater solution.

This inspection, combined with drawings received from the OEM,



The top hinge of the rudder flap had come loose.



Preparing the lightweight plates used to take exact measurements.

gave our technical department all the information they needed to make the necessary preparations. Steel plates that would be required for the repair were prepared at a local workshop while our team mobilized from our headquarters in Antwerp.

The diver/technicians arrived at the remote location of the vessel just over a day after the green light for the operation had been given. The polar weather conditions of Greenland proved to be no problem for our





Preparing the girders that would secure the rudder flap.



Hydrex diver getting ready for underwater rudder repair.



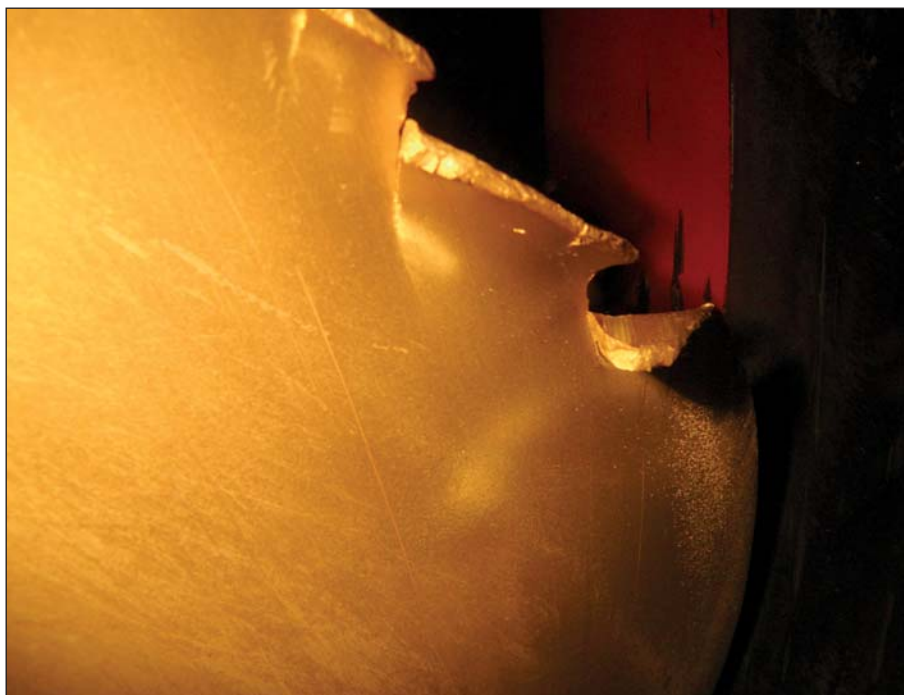
Monitoring station in polar winter conditions in Sisimiut.



Three stiffeners were installed on each side of the rudder.



Girders were used to secure the flap to the rudder.



Large cracks and nicks on several propeller blades were also repaired.

divers, as they are experienced in delivering the same high quality in difficult circumstances.

A detailed underwater inspection was performed by our divers to get the exact measurements for the girders. Next the plates were cut on-site by our team to the exact size. The rudder and its flap were then put in the neutral position. Three girders were placed on each side of the rudder, securing the flap to the rudder. The plates were welded underwater by our divers. A steering test was successfully performed, concluding the repair.

During the initial inspection by the local diving company, large cracks and nicks were discovered on the propeller of the vessel. These were grinded out by our team during the same operation. Combining several jobs like this can save an owner the cost of an extra mobilization.

**KEEPING SHIPS
IN BUSINESS**

By immediately mobilizing a team to Sisimiut to carry out a temporary repair, we allowed the owner to keep his vessel operating instead of having to plan an unexpected docking. Because of the remote location of the vessel there was no suitable drydock close by. As a result this would have meant an extended off-hire time. The ship now has a well calibrated rudder again. She can keep on sailing until the next scheduled drydock visit which is planned for the end of 2016. ■

If you have received
this magazine at the
wrong address or if your
company is going to
move, please let us know.

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or at
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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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Hydrex *permanent* hull repairs out of drydock



Hydrex carries out permanent hull repairs without interruption of operations, approved by all major classification societies.

Hydrex developed and delivers *permanent* hull repairs on vessels afloat, fully approved by all the major classification societies. No need to go to drydock. No need to redo later in drydock. Gets your ship back in business fast, saving time and money.

How is it done?

1. We start off with an inspection to determine extent of defect.
 2. Made-to-measure cofferdam secured on outside of hull to keep water out and create a dry environment during repair.
 3. Crack removal/defective plating cropped.
 4. Insert fitted.
 5. Insert tacked in place.
 6. Class approved full penetration welding from inside the ship and frame renewed as needed.
 7. Independent ultrasonic testing to verify the welding.
 8. The cofferdam is then removed.
- Each step is checked by class before proceeding.

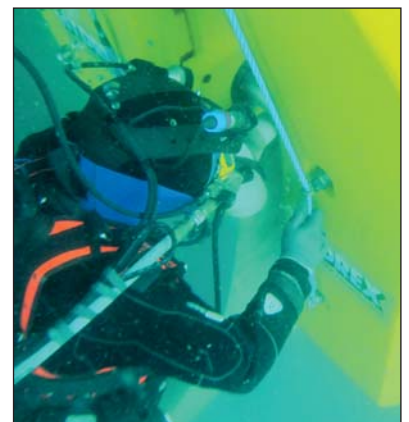
Fast underwater propeller blade straightening

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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Cofferdam placed over crack.



Opening in plate prepared inside tank.



Preparing the edge of the opening for the new insert.



Insert cut and fitted.



Insert tacked in place.



Full penetration weld.



Independent testing.



New frames welded.

Example of permanent hull repair:

Inspection of a 172-meter general cargo vessel located in Rotterdam revealed a crack in the port side water ballast tank. An insert measuring 300 x 300 x 15mm needed to be welded and the frame renewed. The Hydrex team located the crack and

installed a cofferdam large enough to cover the crack. They created a dry environment so that the plate could be cropped and the insert welded from inside the ballast tank. The cropped area was prepared, the insert fitted and then full penetration welding was carried out. Following ultrasonic testing the frame was fitted and rewelded.

This is just one example of the many permanent insert repairs carried out by Hydrex over the last few months. Don't wait to go to drydock. Get hull cracks and damage repaired now, afloat, *permanently*. It is fast, hassle-free, on-time and cost-saving. ■



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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