HYDREX®

UNDERWATER TECHNOLOGY

NEWS

LETTER | 270

Contents

KEEPING SHIPS IN BUSINESS

ISO 9001 certified

Underwater services and technology approved by:

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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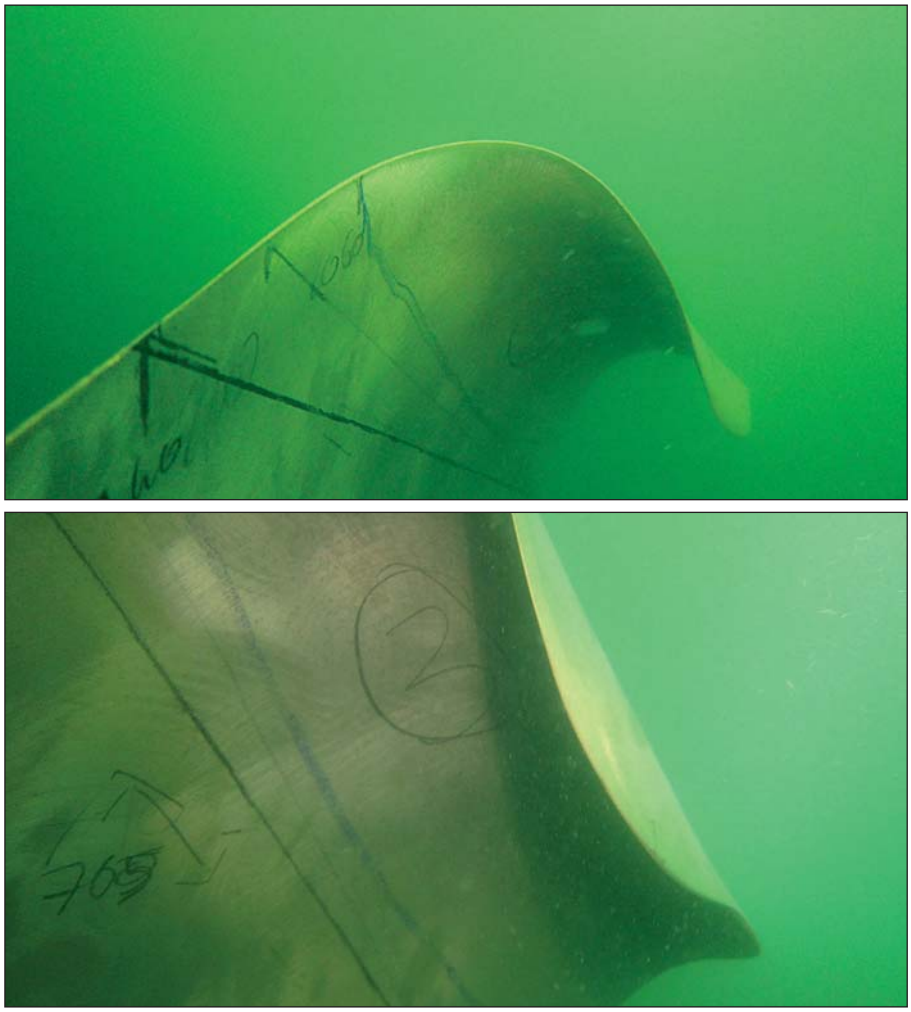
Propeller blade modifications in the Netherlands, Singapore and Vietnam

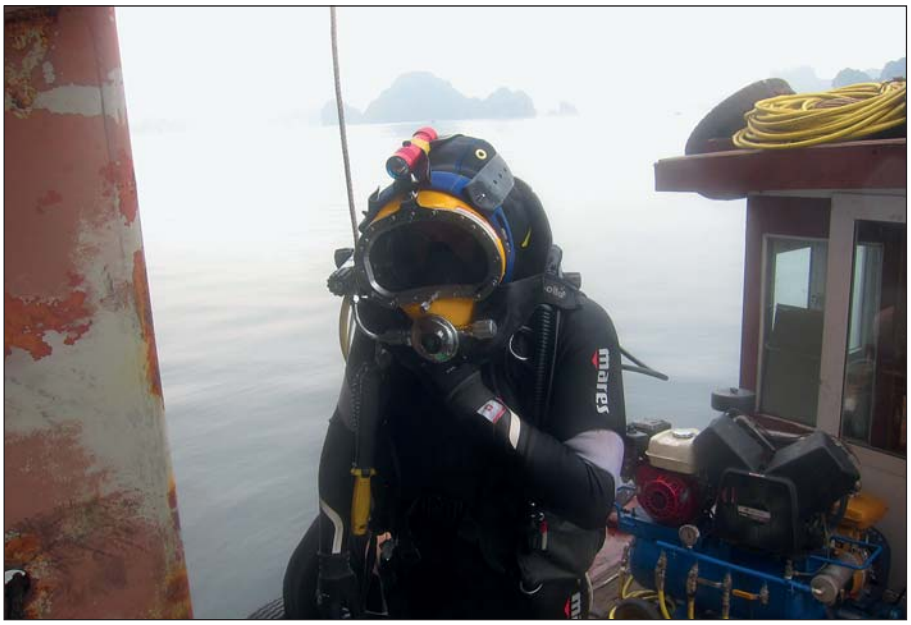
Recently teams of Hydrex diver/technicians performed propeller blade modifications on several tankers and bulk carriers. In Singapore, Cẩm Phả and Amsterdam propeller cropping was the only option for the damaged blades while in Rotterdam the bent areas on a bulk carrier's propeller blades could be straightened.

Having developed different procedures for different kinds of damage, our 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 us to straighten damaged blades in-water, allowing commercial operations to continue without the need to drydock.

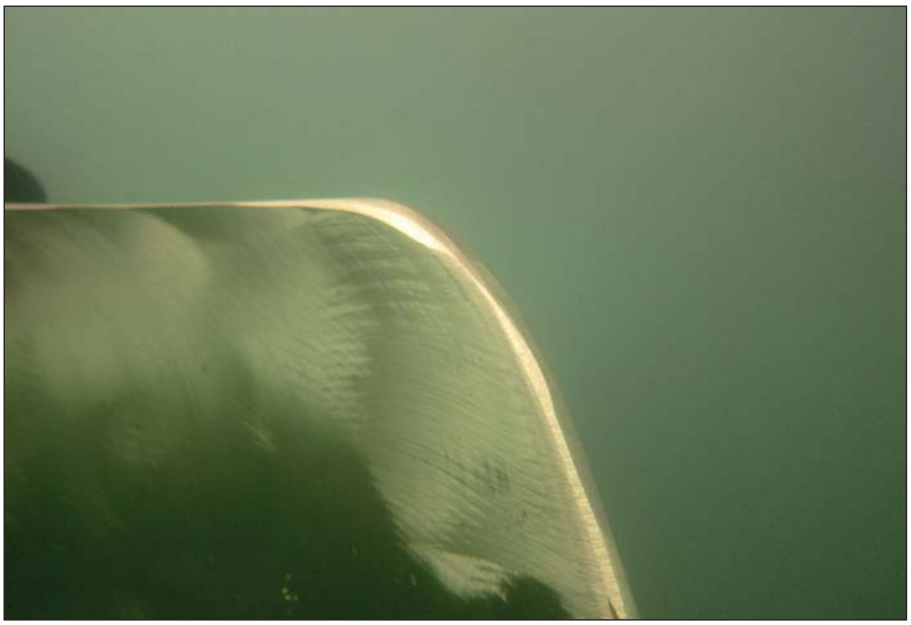
In the first three examples in this article cropping was the only option as the damage to the propeller blades was too great to allow cold straightening. This kind of repair is carried out with the propeller blade cutting equipment developed by our research department. In cases where there is an even 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.



Bent propeller blades of bulk carrier in Vietnam.



Hydrex diver getting ready for operation in Vietnam.



Cropped and polished propeller blade of bulk carrier.

Two of the cropped pieces of propeller blade in Vietnam.

Underwater blade cropping

The four blades of a 190-meter bulk carrier's propeller were severely bent. An on-site solution was needed to restore the propeller's balance and efficiency. A team was therefore mobilized to Cẩm Phả, Vietnam to bring the damaged blades back as close as possible to their original condition.

After the equipment arrived at the vessel's location our men started the operation with a detailed survey of the affected propeller blades. The inspection revealed that the four blades were bent over angles of 90 to almost 180 degrees.

The team then used the information acquired during the inspection to calculate and determine the exact measurements needed to modify the trailing edges of the propeller blades.

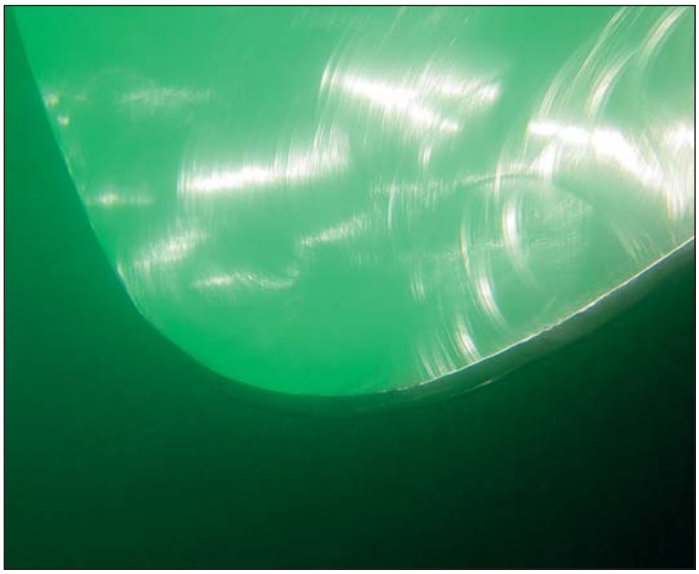
Next the divers cropped the blades and ground their edges to give them the correct radius. When the cropping was complete, they polished the blades to make sure that any remaining loss of efficiency would be minimal.

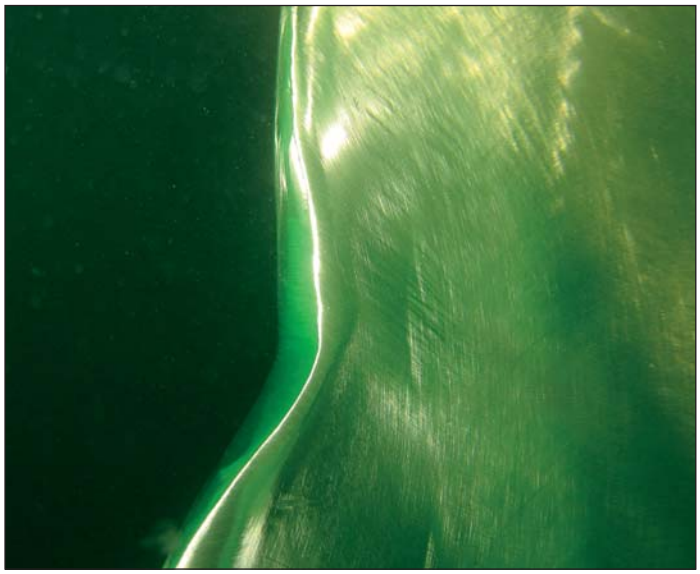
In Singapore only two of the four blades of a 183-meter tanker needed to be cropped using this technique. The other two propeller blades had suffered small cracks and dents along their trailing edges. Because the damage to these blades was limited, cropping was not required. Our divers grinded away the cracks and polished the edges of the blades to prevent further cracking.

A 220-meter tanker in Amsterdam had lost the tip of one of its propeller blades. The opposite blade had not been damaged, but it was also cropped to keep the propeller's balance.

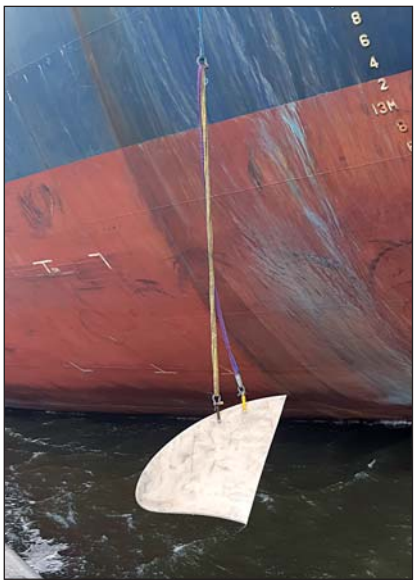
Cropped and polished propeller blade of bulk carrier.

The damaged blades were cropped to restore the propeller's efficiency.





Cropped and polished propeller blades of tanker in Singapore.



The opposite blade was also cropped in Amsterdam to keep the balance.

Cropping the damaged blade in Amsterdam.

Hydrex truck next to bulk carried in Rotterdam.

Four of the five blades in Rotterdam had suffered impact.

Dye test after the bents had been straightened.

Fast propeller operation in Rotterdam

Four of the five blades of a 182-meter bulk carrier had small bent areas on the tip and trailing edge. These were straightened one by one during the ship's stop in Rotterdam.

As the other vessels in this article, the bulk carrier could continue its schedule without going off-hire to drydock and with the performance of the propeller restored.

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 fast, fluently and efficiently on-site and underwater, allowing the ship to return to commercial operations without the need to drydock. ■

Contact us for more information on underwater propeller repairs. We are at your disposal 24/7.

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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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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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Unprecedented repair in Dunkirk in 1991/1992

Since Hydrex was founded in 1974, we have always found ways to carry out on-site repairs not deemed possible. Sometimes by developing a new technology which then becomes the standard, sometimes by finding tailor-made solutions for very specific problems.

For our 45th anniversary we will be traveling back in time to some of the operations that amazed the customer, the class and all parties involved. This month we will be looking back at a very complex repair performed by our diver/technicians in Dunkirk in December 1991-February 1992.

After sustaining extensive damage to her bulbous bow, a large vessel needed temporary repairs to get back to her home base. The ship was about to sail for China when she ran into a breakwater in the port of Dunkirk and severely damaged her bulbous bow.

We took on the job of designing and constructing a shell to cover the damaged bulbous bow and then make it a watertight fit so the vessel could sail from Europe to China. The temporary bulbous bow was around 100 square meters.

This operation was the biggest underwater welding operation of its kind ever done at that time. ■


Hydrexnews

Hydrex repairs severely damaged bulbous bow of the Ademontasa

This article was first published in October 1994.

Hydrex repairs severely damaged bulbous bow of the *Ademontasa*

On December 20th, 1991 the bulker *Ademontasa* (GRT 2671) collided with a breakwater in the port of Dunkirk. At that time the *Ademontasa* was owned by the Chinese state shipping company and sailed for Hong Kong. Local divers immediately inspected the damaged ship but were unable to resolve the problem. That's why the port agent called on Hydrex to help.

On December 24th, three divers went into the water armed with video equipment to assess the extent of damage. The bulbous bow was found to be seriously damaged.

Hydrex took on the job of designing and constructing a shell to cover the damaged bulbous bow.

Four teams worked in shifts for 12 days and nights.

Our solution involved fitting a bulb doubler over the damaged bulbous bow of the Ademontasa.

After consulting with the inspection team, our project management succeeded in developing a solution which was then proposed to the shipowner. Five days later the shipping company decided to entrust us with the repairs.

Experience

It was impossible to repair the ship in drydock. The ship was loaded with 60.000 tonnes of grain and the port of Dunkirk did not have the capacity to unload such large quantities. Moreover, it was not allowed to sail to another port. The only solution was underwater repair work. Hydrex had some experience with the method it proposed, having already repaired the *Marudio* and the *Olau Britannia* in a similar way.

On January 6th, 1992, our divers set to work. Det Norske Veritas was responsible for the supervision. Our solution involved fitting a bulb doubler over the damaged bulbous bow of the *Ademontasa* and welding it into position. To ensure that this bulb doubler would fit perfectly, a temporary structure was set up inside the ship.

The divers built a rigid cage underwater which was welded over the damage. This template was then taken

Constructing the replacement bulbous bow.

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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Putting it in place.

Additional reinforcement beams were welded into place.

to the Arno shipyard in Dunkirk where the doubler was constructed. The building process took about six days.

Meanwhile the Hydrex divers were not idle. Temporary seals were applied and everything was made ready for the plate to be fitted. At the same time the damage inside the ship was assessed.

Excellent results

The new bow was made of 8mm thick steel and fitted with flaps to increase the flexibility and length of the welded seams. Thanks to the extra welding gaps in the flaps, the bulb doubler could be attached even more securely to the bow.

Four teams worked in shifts for 12 days and nights. First the plate was welded until the ship was completely watertight. Then a special concrete mixture was applied between the damaged bow and the bulb doubler. Finally, additional reinforcement beams were welded into place inside the ship.

In early February the ship was fully repaired and able to continue her voyage. ■

Hydrex gets approval for propeller buffing in Belgium and the Netherlands

In close communication with the Dutch Ministry of Infrastructure and Water Management, we have developed a new method to clean propeller blades underwater. This method complies with the strict environmental regulations in Belgium and the Netherlands. As a result, we have been given permission to clean propeller blades in both countries.

We have obtained permits to clean propeller blades in Belgium and the Netherlands.

The traditional approach in the propeller maintenance industry is to polish the blades with a grinding disk which can be quite damaging to the propeller. By the very fact of using a grinding disk, a substantial amount of metal is removed from the blades. This makes polishing a source of marine pollution which is a problem in ports.

It is for this reason that a large number of ports, including those in Belgium and the Netherlands, have banned the underwater cleaning on propeller blades. Exceptions are only made for those companies that can pass the very stringent tests carried out by the concerning authorities.

Propeller blade cleaning is fast and easy and has no effect on the underwater environment.

Approved propeller blade cleaning is carried out by our divers using underwater equipment developed in-house by our R&D department. This process is fast and easy and has no effect on the underwater environment.

If you would like to learn more about this subject, feel free to contact us at + 32 3 213 53 00 or hydrex@hydrex.be. ■

Always on time

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 performs 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 we 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.

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