HYDREX®
UNDERWATER TECHNOLOGY

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Start saving fuel with your propeller cone fin now

We regularly install propeller cone fins on different types of vessels. We can carry out these operations underwater, out of drydock, all over the world without interrupting the ship's schedule.

Propeller cap energy saving devices can recover energy loss of a propeller hub vortex in the propeller's slipstream. This decreases fuel consumption from 3% up to 5% according to the manufacturers and reduces cavitation on rudders and hulls.

As a result of our underwater installation, the owner of the vessel can start enjoying the fuel savings right away. Not having to wait for the next scheduled drydocking can win him up to four years of fuel savings. Since he will have earned back the cost of the underwater installation in only a few weeks, the savings are considerable.

Afloat rudder repairs

For Hydrex's 50th anniversary we are looking back at the history and a few memorable case studies of each of the services we offer to our customers. This month we are focusing on rudder repairs.

We perform repairs on any type of rudder at anchorage or while the vessel is berthed, without interrupting cargo operations. In most cases these repairs are permanent and do not require follow up. In a few cases, the repairs are temporary and subject to further action when the ship is next in drydock. This is determined by class.

The following case studies give an account of some of the more important underwater rudder repairs performed by Hydrex. They showcase the wide variety of repair solutions we can offer to shipowners.

The top hinge of the rudder flap had come loose.

Emergency flap rudder repair in Greenland

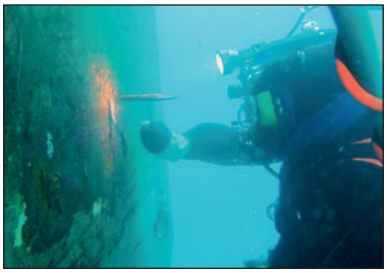
In mid-October 2015, we received an enquiry for an emergency rudder repair on a 67-meter fishing vessel. The ship was operating in the region of Sisimiut, Greenland when a defect occurred on her flap rudder, making it difficult to navigate safely.

A preliminary inspection by a local diving company revealed that one of the hinges of the rudder flap had come loose. To keep on sailing without a repair posed a great risk as there was a real chance that the damage would worsen. Securing the rudder flap was the only possible underwater solution.

This inspection, combined with drawings received from the OEM, 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.

Preparing the girders that would secure the rudder flap.

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 you much money in the long run.

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 to see if actions are required.

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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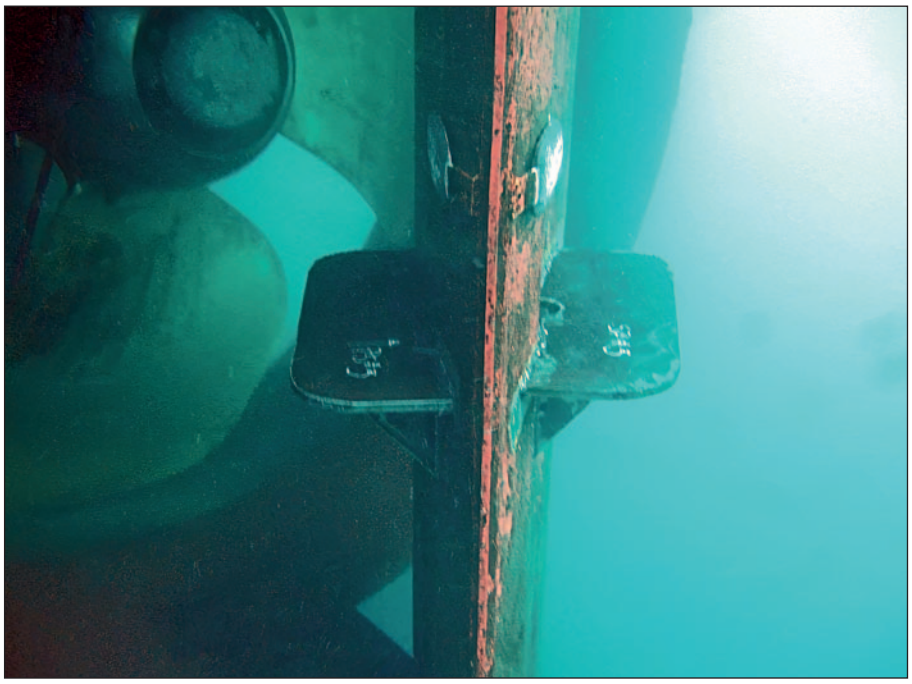
Hydrex diver getting ready for underwater repair.

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

A second 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 it. 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

Monitoring station in polar winter conditions in Sisimiut.



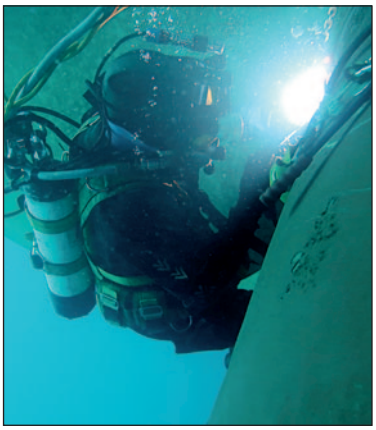
Three stiffeners were installed on each side of the rudder.

Girders were used to secure the flap to the rudder.

ground out by our team during the same operation. Combining several jobs like this can save an owner the cost of an extra mobilization.

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 offhire time. With a well calibrated rudder the ship could keep on sailing until the next scheduled drydock visit. ■

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 many 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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Rudder cover crack repair in Rotterdam

An underwater inspection revealed cracks in the welding seams of both rudder cover plates of a 144-meter tanker. To prevent the pintle nut from corroding, the classification society demanded that the owner have the damage repaired as soon as possible. When the tanker was on its way to Rotterdam, we were contacted to find an on-site solution that would prevent an unscheduled and unwelcome trip to drydock.

Hydrex equipment next to tanker in Rotterdam.

The classification society had given the owner a very strict deadline. It was therefore essential that our technical department come up with a repair plan that could be carried out very quickly. A diver/technician team immediately mobilized to the vessel's destination so they could start the operation as soon as the ship arrived in Rotterdam.

Because the tanker was empty, the vessel could be trimmed enough to allow a rudder repair above water. The team first carried out a detailed inspection of the rudder cover plates. This enabled them to make a full assessment of the damage and communicate the information to our technical department. A dye check of the cracks quickly revealed that the damage of the cover plate welding seams was so severe that replacing both plates in their entirety was the best option.

One of the original rudder cover plates after the vessel was trimmed.

The team removed the plates and beveled the edges of the rudder plate to fit the new inserts. In the meantime, fabrication of two new plates was arranged by our technical department. They needed to be the right shape to fit the curve of the rudder perfectly. They were collected from the supplier and cut to the right size in our fast response center where a large stock of equipment is available for emergency repairs like this.

The plates were then transported to the vessel. Our team fitted them in the rudder plate and secured them

A dye check revealed the extent of the cracks.

Fully welded new cover plate.

Preparing the rudder for installation of the new cover plates.

with full penetration welds. Ultrasonic and magnetic particles tests were successfully carried out by an independent inspector, finalizing the repair. Seven bolt-on anodes were also installed on each side of the rudder.

The entire operation was supervised and approved by a surveyor of the classification society and the condition of class was lifted. Our team worked in shifts to finish the repair in the shortest possible time. When they left the tanker, the satisfied owner could sail his vessel again without having to worry about costly off-hire time. ■

Beveling the edge of the rudder plate to fit the new cover plate.

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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or at
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KEEPING SHIPS IN BUSINESS

The solution to scrubber corrosion

More and more ships are being fitted with Exhaust Gas Cleaning Systems (EGCS or, more commonly, scrubbers) so that they can use cheaper, heavy fuel without violating regulations. But there is a problem: inadequately protected mild steel is easily corroded by the scrubbers' highly acidic wastewater. Corrosion of the scrubber overboard pipe is a threat to the integrity of the hull. This often occurs between drydocking. The question is how to effect a repair without going to drydock or going off-hire.

Corroded scrubber pipes can cause severe leaks.

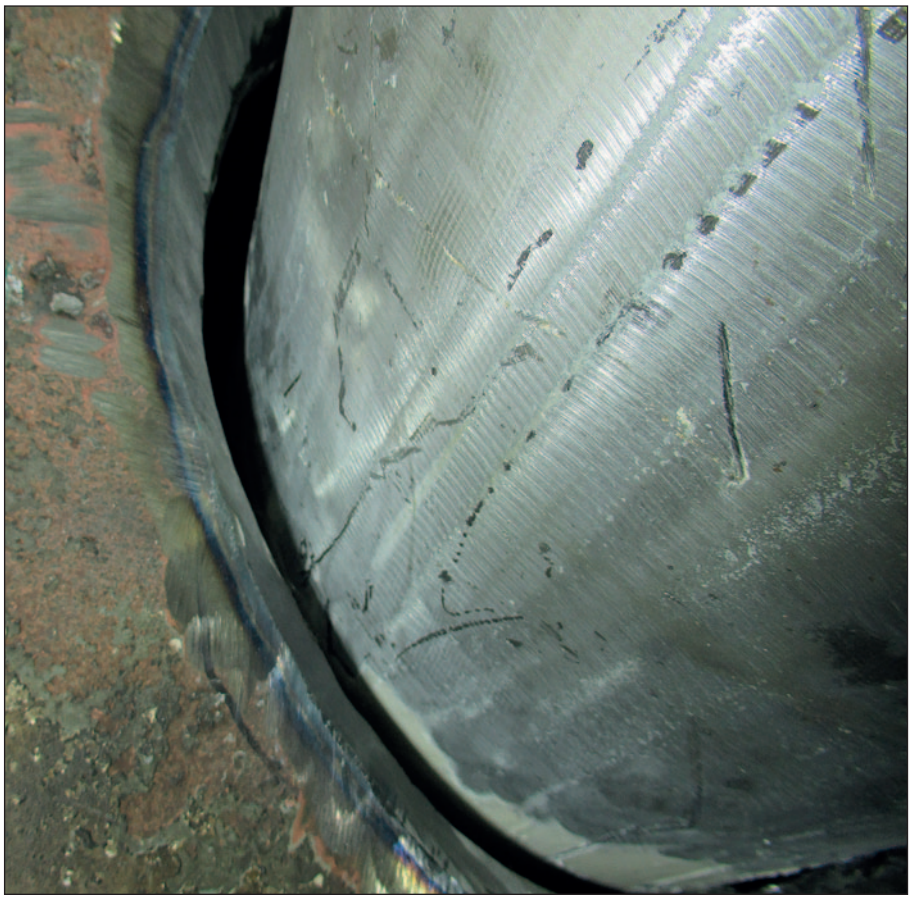
Hydrex and sister company Subsea Industries solved this problem in 2019. We developed procedures to replace the final section of pipe with the ship afloat and without interrupting its schedule. We also developed a proprietary and patented method of preventing the same trouble from recurring.

This technique has been implemented successfully on well over 100 scrubber overboard pipes for some thirty different shipping companies to date – container ships, bulkers, tankers and reefers.

Preparation on board one of our workboats for a scrubber pipe operation.

Coating the carbon steel with Subsea Industries' patented, chemical resistant Ecospeed coating prevents further corrosion. The procedure has been approved by the major classification societies. So as not to interrupt a ship's schedule, the repairs can be carried out in several stages at different ports of call if necessary. This applies particularly to container ships.

Hydrex technician cutting away the old pipe.



Scrubber pipe secured and ready for full penetration weld.

Hydrex has the operation down to a fine art of coordinated and invariable steps and procedures. Mild steel replacement pipes are prefabricated and protected with Ecospeed. Stainless steel is not used, so as to avoid dissimilar-metal galvanic corrosion between hull and pipe.

The results have been successful in every case where coated carbon steel pipes were used to replace the corroded overboard pipes.

Avoid costly damage

Our teams have also replaced pipes preemptively. These pipes were already starting to corrode, and a leak would have been a matter of

The frame and brackets are cut through to make way for the new pipe.

New scrubber pipe after welding.

New scrubber pipe coated with Ecospeed.

time. By performing the replacement before the leak occurred, our divers prevented a costly unscheduled repair later.

While it is easy to carry out the repairs with the ship afloat, Ecospeed protection of the scrubber when it is first installed preempts any problems with corrosion when the scrubber is in use.

If you have any questions regarding a possible scrubber repair, do not hesitate to contact us. We are at your disposal 24/7 and ready to mobilize almost immediately. ■

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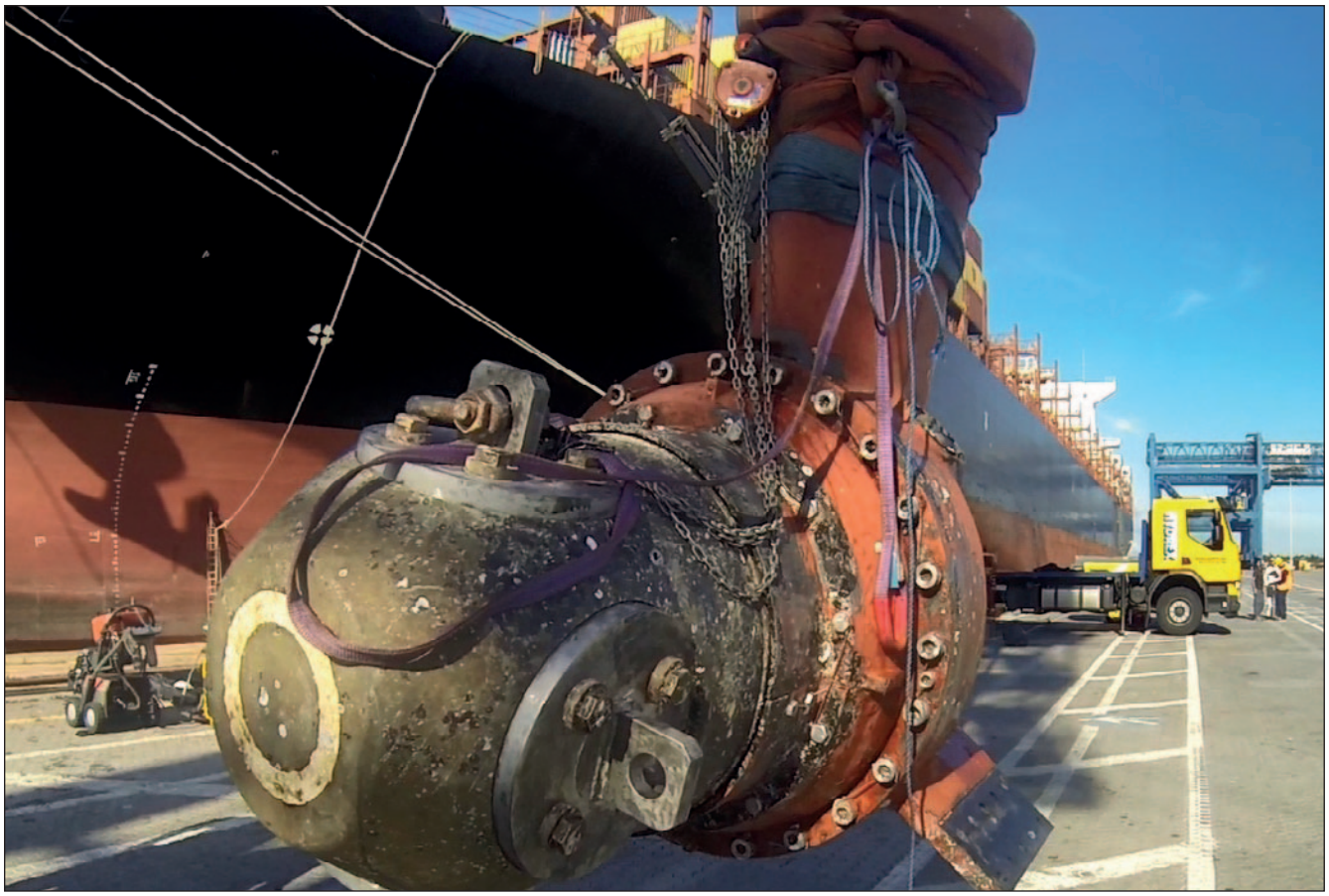
All welding work is done following our class approved procedures.

In-water bow thruster repairs



Our 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 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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