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Meticulous attention to detail on every job

KEEPING SHIPS IN BUSINESS

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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.

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HYDREX
UNDERWATER TECHNOLOGY

Underwater stern tube seal repairs in Australia and Colombia

Recently we mobilized our diver/technician teams to vessels in Colombia and Australia to carry out stern tube seal replacements. In Cartagena the repair was carried out on a 294-meter tanker, and in Burnie, Tasmania, on a 195-meter ro-ro vessel.

We have developed a flexible mob-dock repair method that enables the underwater replacement of all types and sizes of shaft seals. This technology has been successfully used for many years. It allows ship owners to keep their vessel sailing, saving precious time and money.

Damaged stern tube seals will result in increasing amounts of oil leaking or water ingress as the damage worsens. By replacing the seals when the damage is first discovered,



The Hydrex team was ready to start the operation in Tasmania as soon as the ro-ro ship arrived.

we keep the downtime low. The ship can keep its schedule because seal repairs can be performed during cargo operations. We do this by creating a dry underwater working environment around the shaft.

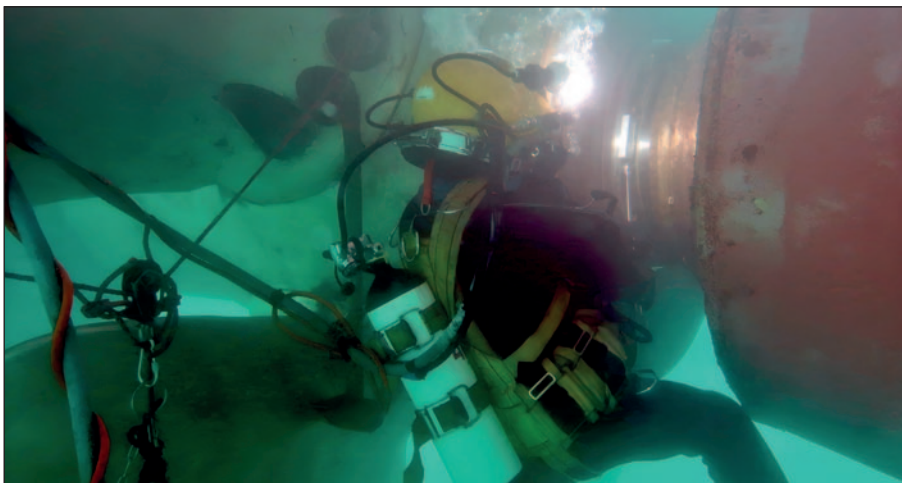
It is not always straightforward to replace seals, because there can be considerable variation in the configurations of the stern tube itself. There can also be complications with the liners, which can be worn



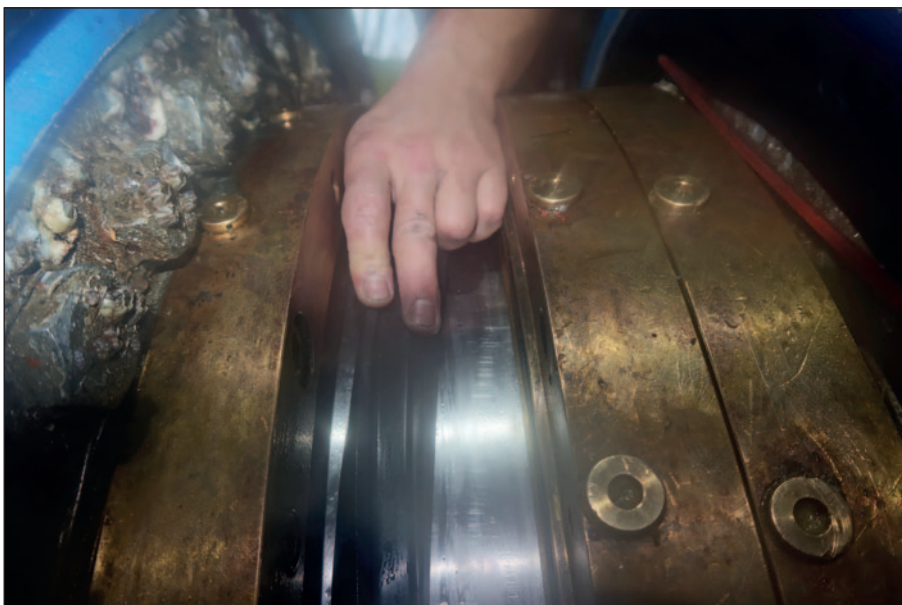
Cleaning the assembly prior to the seal replacement.



One of our diver/technicians working inside our flexible mobdock in Australia.



Hydrex diver working during installation of the mobdock.



The damaged seals were replaced one by one.

down and show grooves. All this is routinely handled by our teams on the jobs.

All shaft seal repairs we offer are performed in cooperation with the OEM. This allows us to supply the correct OEM seals and handle all types of seals from all manufacturers.

Remote location no problem for Hydrex

Despite the remote location of both vessels, our technical department was able to make all practical logistic arrangements and organize the mobilization of the equipment very swiftly. In the recent past we have carried out several other seal operations in Australia, as well as Trinidad and Tobago.

The same procedure was followed for both repairs: After arriving on-site, the diving team first set up a monitoring station next to the vessel. The operation then started with a thorough underwater inspection of the stern tube seal assembly.



Preparing the seal assembly for wear-down readings.



Welding work on the rope guard.



Hydrex diver/technician during seal operation in Colombia.

Next the divers cleaned the assembly and installed the flexible mobdock, thereby creating a dry underwater environment so that they could work in drydock-like conditions.

The split ring was then disconnected and brought to the surface to be cleaned. After cleaning the entire assembly, the divers removed the first seal and replaced it with a new one which was then bonded. This was done in cooperation with the supervising OEM technician. The procedure was repeated with the other seals.

A successful operation was concluded with leakage tests, the removal of the flexible mobdock and the reinstallation of the rope guard.

Conclusion

Taking advantage of our flexible mobdock technique, our men were able to carry out the repairs on-site and underwater. Because all the required material is ready to be transported at all times, no time was lost making preparations.

With Hydrex organizing everything from start to finish, the owners did not have to worry about making any arrangements for the repair. ■

If ever you need assistance with the underwater part of your vessel, give us a call. We can then tell you if the repair is feasible and start working on its handling.

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Propeller repair in the Baltic avoids costly drydocking

Two parts of the tip of one of the four propeller blades of a 190-meter bulker were damaged. They needed to be cropped to restore the propeller's efficiency. We therefore sent a team of diver/technicians to the ship's location in Germany to carry out the repair afloat.

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 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, since the type of damage to the propeller blade did



One of the propeller blades of a bulker was missing parts of its tip.

not allow cold straightening. This kind of repair is carried out with the propeller blade cutting equipment developed by our research department. In cases like this, where there is an even number of blades, an identical piece will be cropped from the opposite blade to restore the hydrodynamic balance of the pro-

PELLER. By doing so, the best possible efficiency is obtained.

Single-day operation restores efficiency

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 opposite 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.



Hydrex team and equipment arriving on-site.



Cutting the opposite blade of the damaged blade to keep the balance.



The cropped blades were polished to achieve the best possible efficiency.



Cropped and polished propeller blade.



Testing one of the cropped blades for cracks.

Conclusion

Over fifty years of experience with propeller repairs have given us the tools and know-how to offer fast repair and modification services to vessels around the world. All types of operations can be carried out fast, fluently and efficiently afloat and underwater.

In this case the repair took less than a day. This ensured there was no unwelcome delay to the vessel's schedule. ■

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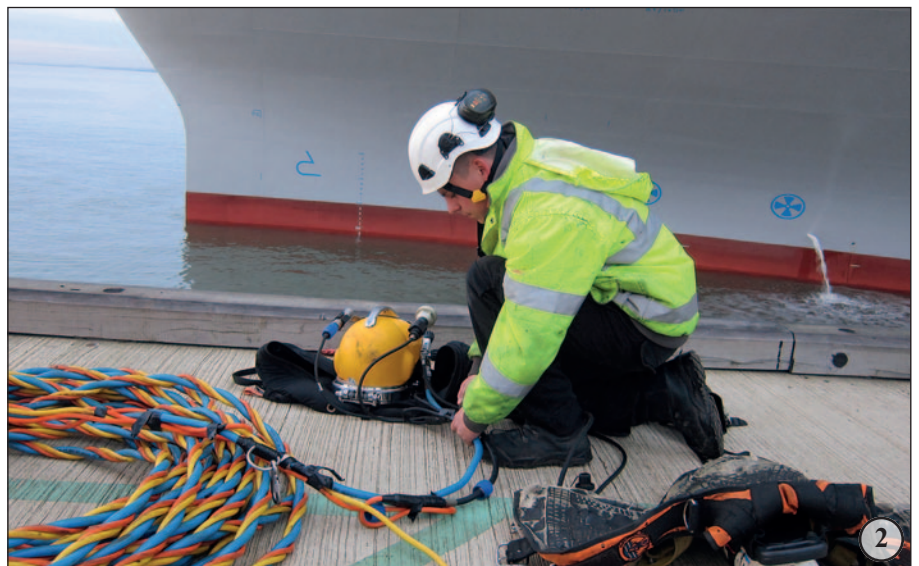


Meticulous attention to detail on every job

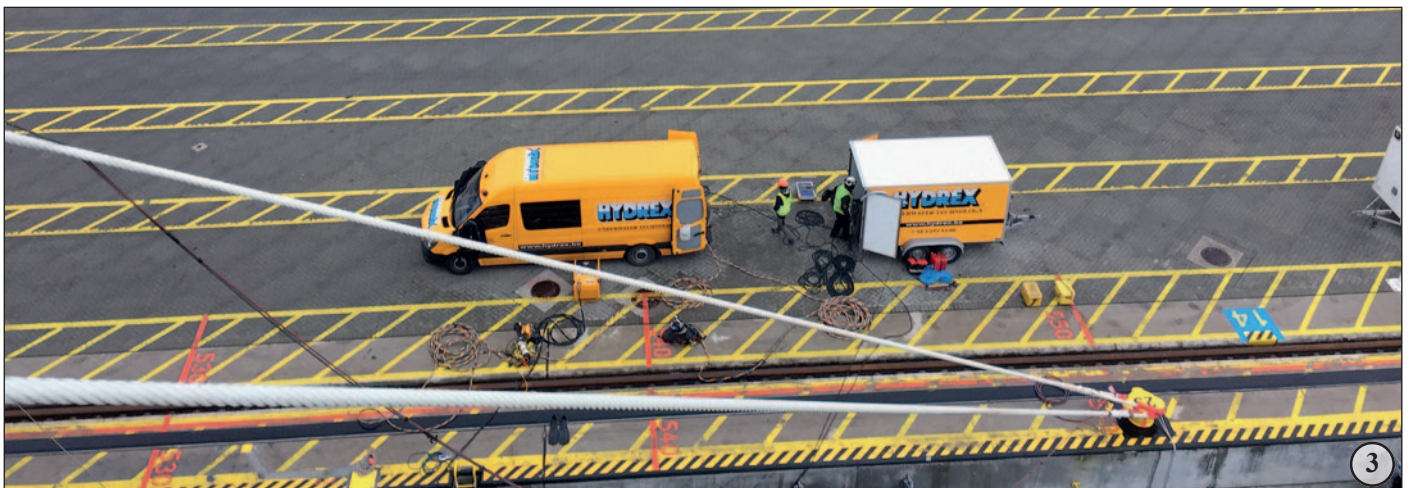
1. A swift reaction remains one of the most important elements of our services. Our fast response centers are designed for immediate action whenever needed. A wide range of additional state-of-the-art equipment and tools is available at all times in our fast response center and can be loaded onto our workboats or vans immediately.

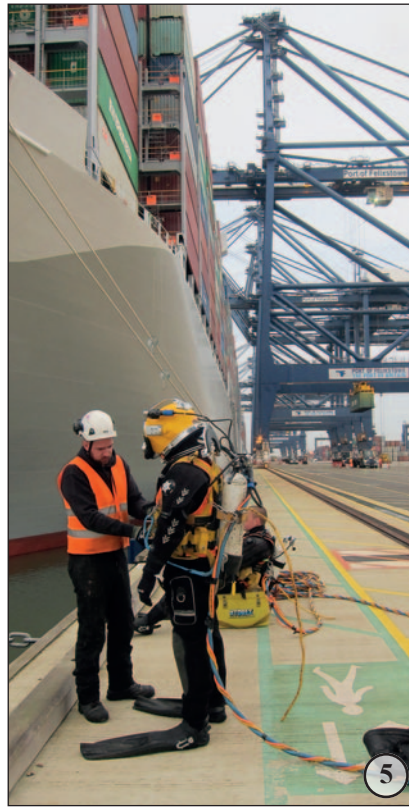


2. Hydrex team member making a final check of the diving equipment before an underwater operation. Safety is one of the most important elements of any job we carry out and making sure every piece of equipment is in perfect shape at all times is essential in achieving this.



3. Every few years our entire fleet of vehicles is refurbished or replaced if needed. Trucks and vans are repainted and new vehicle graphics are applied. The inside of the vans is also updated regularly to turn them into state-of-the-art mobile monitoring stations.

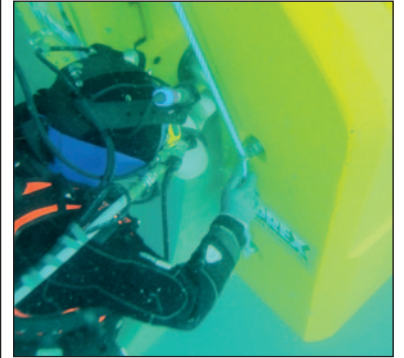




4. All underwater operations are followed from the shore by the team leader. All our vans and workboats are equipped as monitoring stations at all times. This allows us to mobilize immediately.
5. We want to offer the highest quality of service to our customers. To achieve this we need staff who are familiar with a

- wide range of operations as well as the relevant know-how. Our diver/technicians are trained and qualified to perform all class-approved repair procedures.
6. When their training is completed, our diver/welders can carry out both simple and complex jobs and achieve this uniformly without loss of time, quality or safety.

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.





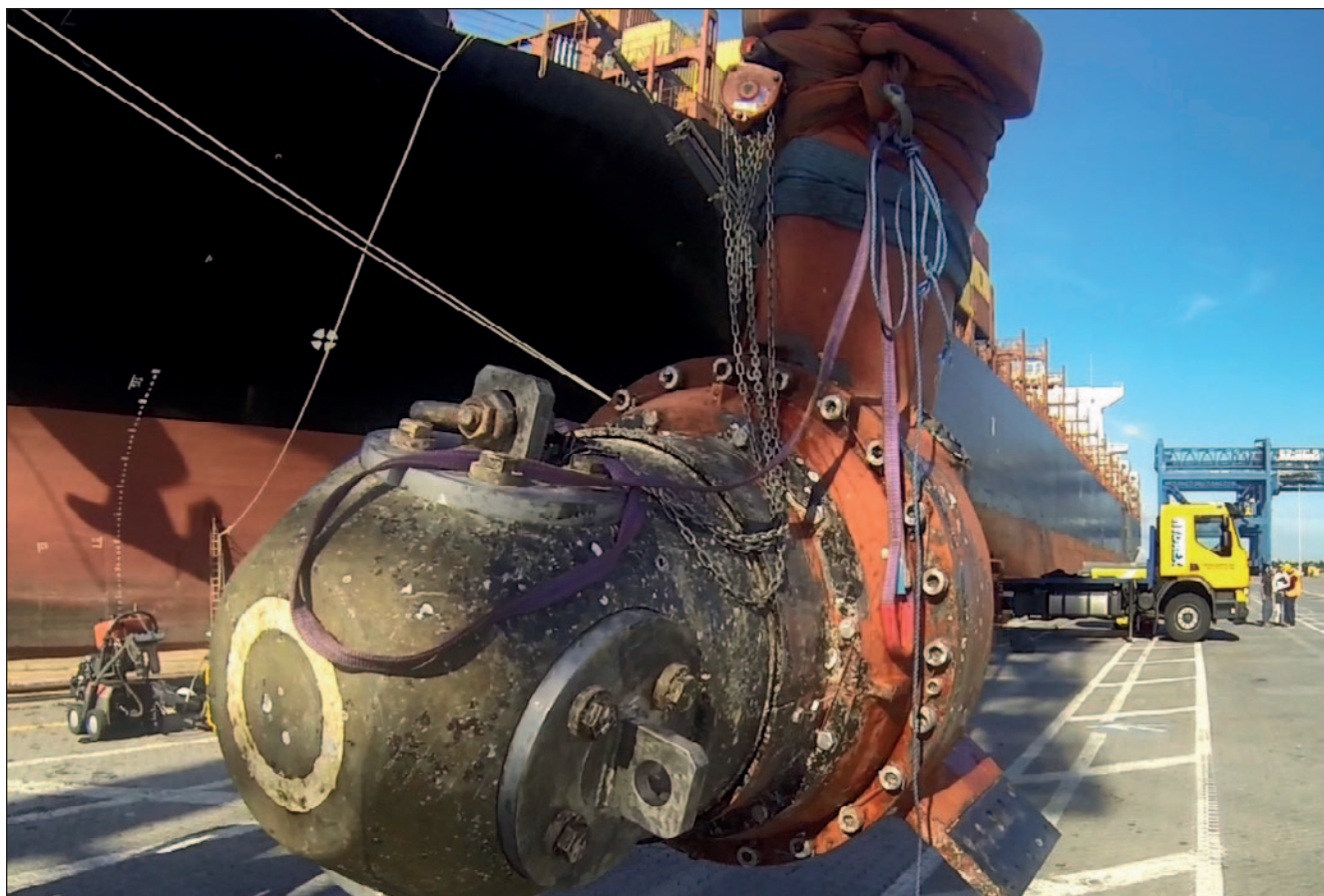
7. All welding work is carried out by certified Hydrex welders. They follow both external courses and in-house training. Underwater welding as well as dry welding can be trained at our fast response centers.

8. Our team members have to be flexible during an operation. They have to be able to respond to changes if the need arises. This is very important because they are the ears and eyes of our technical department during an operation.

9. Working in shifts is just one of the many ways in which we can adapt to a customer's needs. We know how important a schedule is for a ship and we make sure any operation is completed in the shortest possible time-frame.

10. One of our divers getting ready for underwater operation during a nightshift. By doing this our teams can work around the clock to save precious time for a ship owner.

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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