

# **HYDREX<sup>®</sup>**

## **UNDERWATER TECHNOLOGY**

Magazine

Number 295



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# In-water bow thruster repairs



**O**ur 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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# Editorial



**O**ur flexible mobdocks can be deployed worldwide to carry out a wide variety of operations. Our teams have been performing mobdock repairs for the last 20 years, but the scope of what we can do underwater still surprises many customers. We successfully execute very complex operations while the ship stays afloat.

With our mobdocks we create a dry environment underwater for our divers to work in. The fact that they are lightweight allows for a fast mobilization and ready adaptability to many situations. This approach avoids the need to send the vessel to drydock as all operations can be carried out at the ship's location, saving great expense as well as operational

time for the vessel.

We can carry out underwater repairs on all types of running gear, but the most common mobdock operations are shaft seal and thruster repairs or replacements. For these repairs we work together with OEMs.

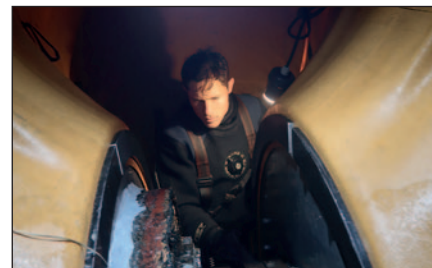
Please contact us if you would like more information on seal or thruster repairs, or any other underwater operation. My team will gladly help you find the best possible solution.

Hydrex founder  
Boud Van Rompay  
bvr@hydrex.be

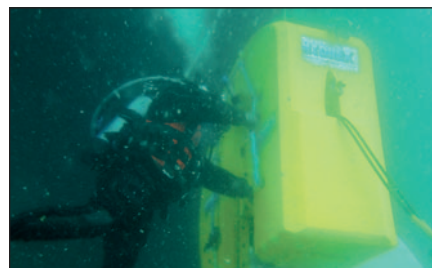
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# Stern tube seal repairs close to home and far away

**R**ecently we mobilized our diver/technician teams to vessels in the Netherlands and Australia to carry out stern tube seal replacements. In Flushing the repair was carried out on a 200-meter car carrier, and in Port Burnie, Tasmania, on a 188-meter ro-ro vessel.

Both ships were leaking oil, making an on-site repair necessary. Using a Hydrex flexible mobdock we were able to carry out these operations on-site and underwater, saving the owners an expensive and time-consuming trip to drydock.

## Remote location no problem for Hydrex

Despite the remote location of the ro-ro vessel, our technical department was able to make all practical



*One of our divers working on the rope guard of car carrier in Tasmania.*

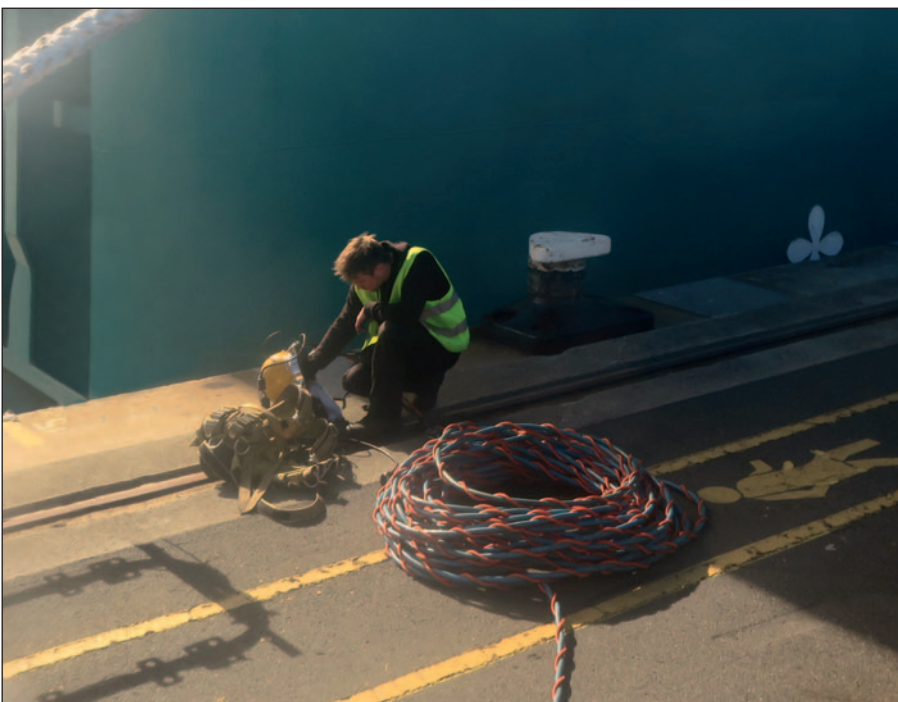
logistic arrangements and organize a mobilization of the equipment very swiftly. In the recent past we have carried out several operations in

Australia, including repairs on this ro-ro ship's sister vessel.

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.

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



*Final check of the diving equipment prior to underwater operation.*





*New seals after bonding.*

procedure was repeated with the other three seals.

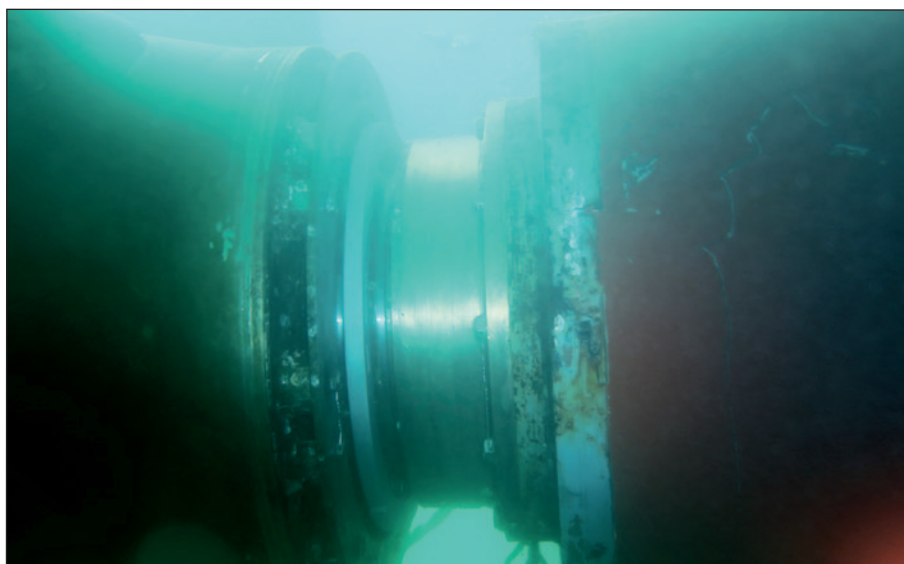
A successful operation was concluded with leakage tests, the removal of the flexible mobdock and the reinstallation of the rope guard.

### **Easy mobilization to Flushing with dedicated workboat**

A team traveled from Antwerp to the ro-ro car carrier's Netherlands location on one of our workboats. These workboats are fully equipped as dive support stations with hydraulic



**Port Burnie  
Tasmania**



*Seal assembly prior to rope guard reinstallation.*

cranes, winches, nautical and communication equipment, and a dive control room. They are stationed in Antwerp and Rotterdam and can be used for a wide range of operations in Belgium, the Netherlands, the United Kingdom and France.

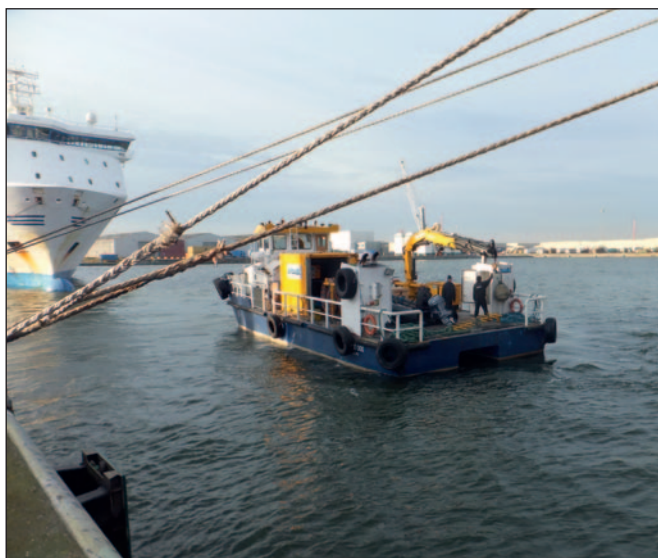
With Hydrex organizing everything from start to finish, the owner did not have to worry about making any arrangements for the repair. After the seals had been successfully







*Hydrex diver reinstalling the rope guard.*



*Our workboats are stationed in Antwerp and Rotterdam for immediate mobilization.*



*Rope guard of roro ship after removal.*

replaced he was able to sail his vessel to its next stop free of oil leaks.

### **We help keep ships afloat, operational and in business**

We offer maintenance services and repairs on all parts of the underwater ship's propulsion systems and the

hull. Operations are class approved and carried out at lay-by berths or alongside the dock while commercial activities continue. All this is done with qualified and experienced diver/technicians, state-of-the-art equipment, and advanced techniques.

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

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# Flexible mobdock technology permits permanent repairs without the need to drydock

**T**aking advantage of our flexible mobdock technique, our personnel were able to carry out the repairs in the previous article on-site and underwater. Because all the required material and equipment is always ready for immediate deployment, no time is lost making preparations.

We have developed a flexible mobdock repair method that enables the underwater replacement of all types and sizes of shaft seals. It allows ship owners to keep their vessels

sailing, saving precious time and money.

Damaged stern tube seals will cause oil leaks or an ingress of water. By replacing the seals as soon as possible, we can keep the down time to a minimum. Because seal repairs can be performed during cargo operations the ship can keep its schedule. It is not always straightforward to replace seals. The size of the stern tube itself can vary considerably. One can encounter anomalies such as liners which are worn down and

show ruts. However, all this is routinely handled by our experienced teams.

All shaft seal repairs we offer are performed in cooperation with the OEM. We usually supply the equipment, but the owner is free to supply his own OEM seals. We handle all types of seals from all manufacturers.

All our offices are equipped with the latest facilities, lightweight equipment, and tools. This, backed by experienced logistics experts, allowed for a timely arrival of the teams in both Flushing and Tasmania with everything needed to successfully complete the job. ■



*One of our diver/technicians working inside our flexible mobdock.*

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**KEEPING SHIPS  
IN BUSINESS**

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# Underwater re

## Seal repairs

We have developed a reliable technology that enables the underwater replacement of all types and sizes of shaft seals.



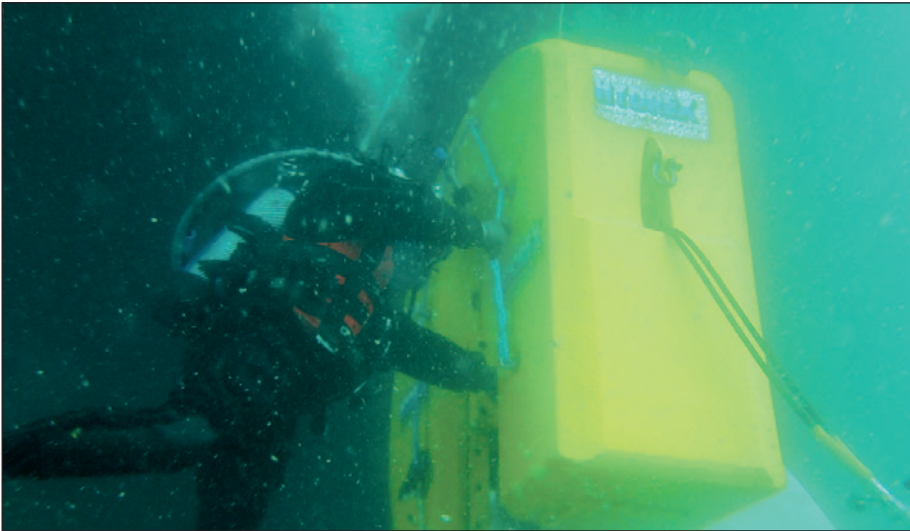
## Thruster repairs

We can assist shipowners with almost any



## Propeller repairs

When damage to propellers occurs due to impact with ice and other debris we can fix these, even if the damage is extensive.



## Rudder repairs

We can perform permanent repairs on any rudder at anchorage and cargo operations continuing



# Underwater maintenance

## Inspections

We offer a full range of hull monitoring services including IWS and class inspections. This gives owners total control of their ship's hull condition.

## Propeller buffing

We developed an efficient technology to enhance propeller blade surfaces underwater and achieve surface conditions never seen before.

## Anode installation

We can install both ICCP and sacrificial anodes. If needed we can supply the anodes.



# Repair solutions

any problem encountered with thrusters.



any type of rudder while the vessel remains  
ue.



## Hull repairs

Our on-site hull repair services include the renewal of both small and large areas of damaged hull plating.



## Scrubber repairs

We can assist shipowners at moment's notice when a scrubber pipe corrodes and needs replacing.



## Transducer installation

Our teams can very quickly replace or install speedlogs and echosounders without any hindrance to a ship's schedule.

## Blanking

We can blank overboard valves, inlets, seachests or any other underwater opening to allow for onboard repairs. This is done very quickly and on-site.

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# Scrubber pipe repairs and lasting protection



**E**xhaust scrubbers filter out all harmful toxins from exhaust gasses of marine diesel engines. These hazardous pollutants can severely corrode the pipes of the scrubber. Using the experience we have accumulated over the years allows us to assist you at moment's notice if this happens.

We offer a full package to owners that are experiencing similar damage. Not only can we replace the corroded exhaust pipe while your vessel stays on schedule, but we can make sure that you will not have to call us again in a few months time for the same problem.

Contact us for more information on scrubber pipe replacements or other underwater repairs. We are at your disposal 24/7.



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# Minor but essential maintenance operations

**I**n our magazine we often write about the larger projects that our teams perform across the globe. This may give readers the idea that we only mobilize when such major challenges come up. However, this is definitely not the case. We treat every assignment with the same professionalism and enthusiasm, whether it is the replacement of a giant azimuth thruster or an underwater propeller cleaning.

Smaller maintenance operations are performed by our divers on a daily basis and are dealt with in a skilled and proficient manner. They include:

- Installation or replacement of anodes
- Blankings
- Replacement of transducers
- Propeller cleanings
- All types of inspections

This article focusses on some examples of those smaller maintenance operations.

## Inspections

Building upon conventional technical skills and know-how while also taking advantage of the latest technology, we offer a unique hull monitoring service to our customers. This gives shipowners total control of their ship's hull condition and consequently its performance, with only a minimum of work on their part.

Underwater inspections represent a



*We are ready to assist you 24/7, all around the world.*



*Team leader following underwater operation inside monitoring station.*

small investment and, if properly done, have the potential to save an owner a great deal of money. Regular inspections carried out by competent divers and accompanied by comprehensive and accurate reports can detect and make known problems so that they can be correct-

ed early. This prevents the more costly repair which neglect and further damage would make necessary.

Because we have over 45 years of experience in both maintenance and repair services, we can carry out any required follow-up repair without

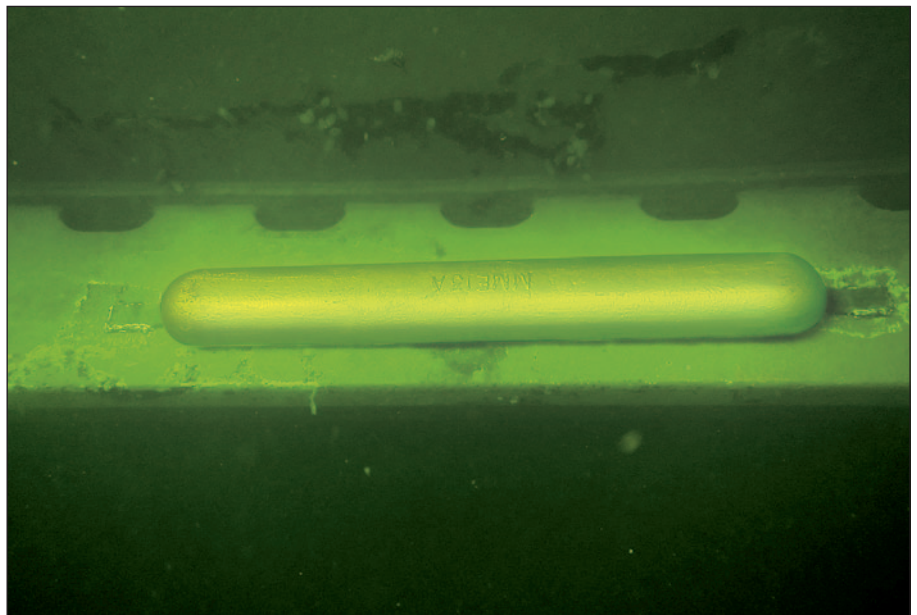
any unnecessary loss of time. Scheduling in a new date is not needed as all our diver/technicians are skilled to perform the repair work as well.

If the damage found during an inspection can be anticipated, the required equipment can be mobilized in advance. Otherwise it can be transported to the location of the vessel immediately from one of our fast response centers where a large stock is available for our teams at all times.

This was demonstrated when a routine underwater inspection revealed that a rope guard had come loose on the ship. Our team secured the rope guard without any delay for the owner.

### **Anode installation**

When an oceanographic research vessel needed 52 sacrificial anodes installed, we sent a diving team to Dunkirk, France, to perform the underwater installation.



*Any type of anodes can be installed very quickly and on-site.*

The customer had passed on all the necessary information to our technical department and after preparations in our fast response center the equipment was loaded onto one of our trucks and transported to the vessel's location.

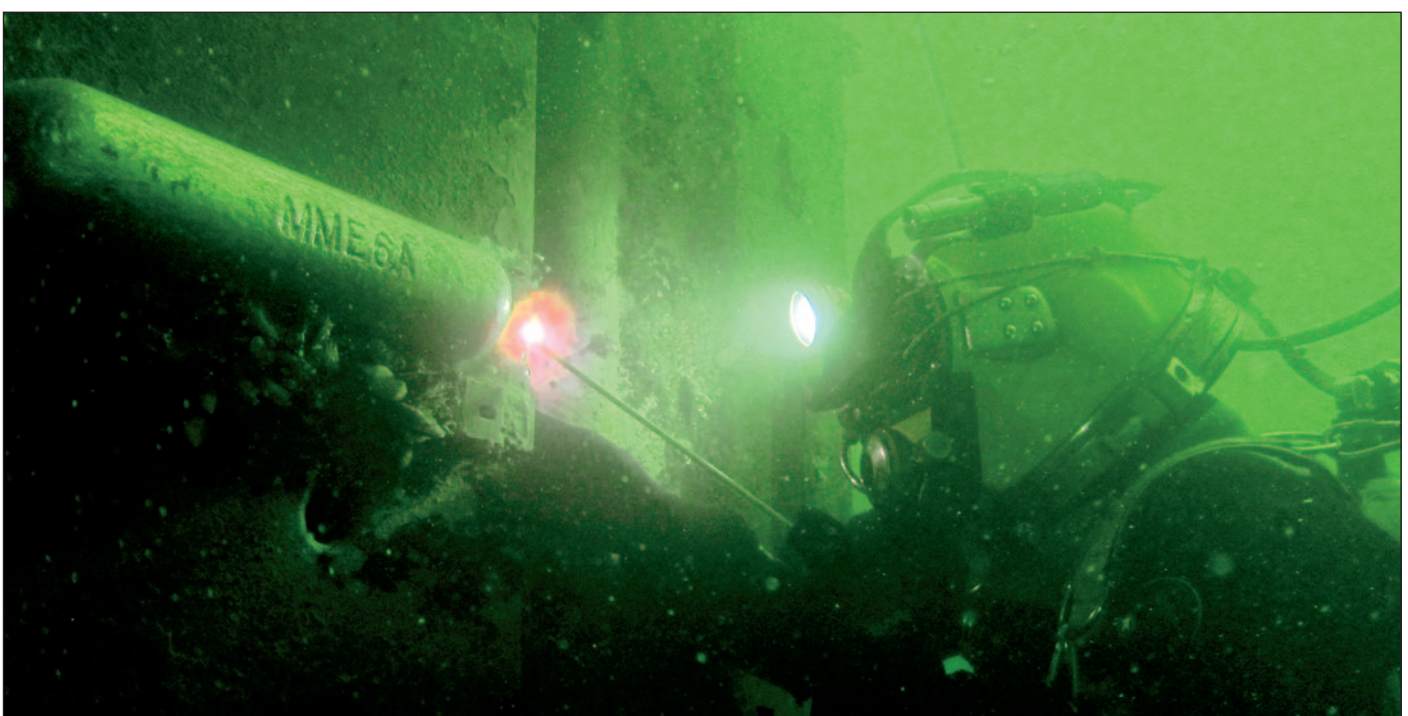
In this case the anodes were supplied by us, saving the owner the trouble of having to arrange the delivery himself.

Our diver/technician team then installed the anodes, giving the vessel protection against corrosion.

### **Blanking**

A team of our diver/welders blanked all underwater openings of four offshore vessels in Dunkirk over a period of four weeks.

Two hydrographic survey vessels, an oceanographic vessel and an off-



*Hydrex diver welding an anode.*



shore installation vessel were laid up in Dunkirk for an extended period of time and it was essential that they be kept safe during this period.

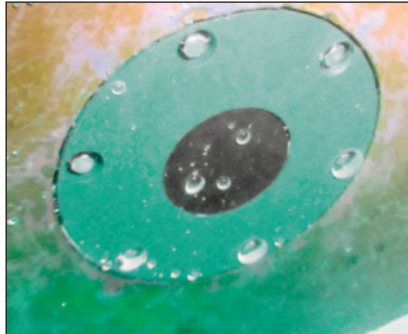
The underwater part of the ships especially needed additional protection against the constant corrosive effects of seawater. We were asked to develop a fast and complete solution to close off all the underwater openings of the vessels including sea chests, overboard valves and box coolers. Our diver/technicians installed between 30 and 40 blanks on each ship, ranging from small 10 x 10 cm up to very large 4 x 4 meter plates.

### Transducer installation

Our teams can very quickly replace any type of transducer without interruption to a ship's schedule. We can also fully install transducers should this be required. This was the case when two 193-meter general cargo vessels each needed a speed log installed during their stay in Antwerp.

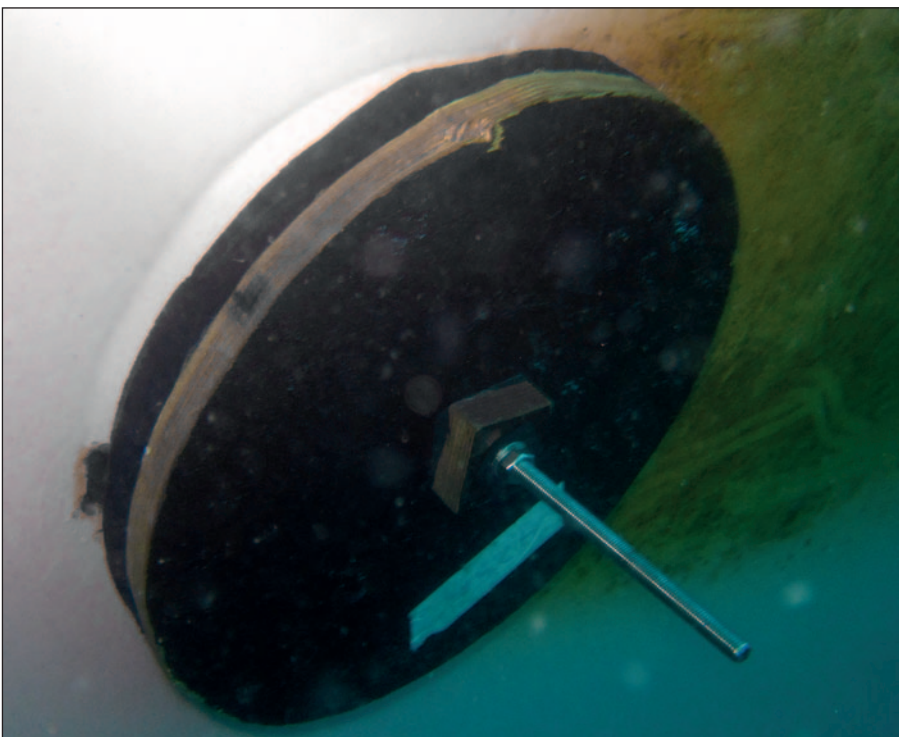


*Any type of transducer can be installed or replaced afloat.*



*New speedlog after installation by our divers.*

Our diving team started the operation with an inspection to determine the best place to install the speed log. They then marked the exact position where the speed log was to be positioned.



*Blankings can be used to close off any underwater aperture.*

The next step was to install a cofferdam over this area creating a dry space within it. Members of the team onboard the ship then cut a hole on the inside of the hull to the exact dimensions of the speed log and fitted and installed the housing. An oil ring seal was used to close off the housing to prevent water ingress.

At the same time, the other members of the team prepared the wiring for the speed log which was connected to the housing. At this point the cofferdam was removed. The wiring was then installed inside the vessel and the speed log was connected to the ship's electrical system.

The installation was carried out rapidly and flawlessly on both vessels which were then able to benefit from a fully operational speed log system on board, all without having to go to drydock.

### Propeller cleaning

We have developed a unique method of propeller cleaning. The traditional approach in the industry is to let the propeller foul and build up a calcareous growth and then polish once or twice a year underwater or in drydock. This polishing is done with a grinding disk which can be quite damaging to the propeller because a substantial amount of metal is removed, often altering the shape and efficiency of the blades, causing roughness and increasing rather than reducing friction. It is also a major source of marine pollution which is a problem in many ports.

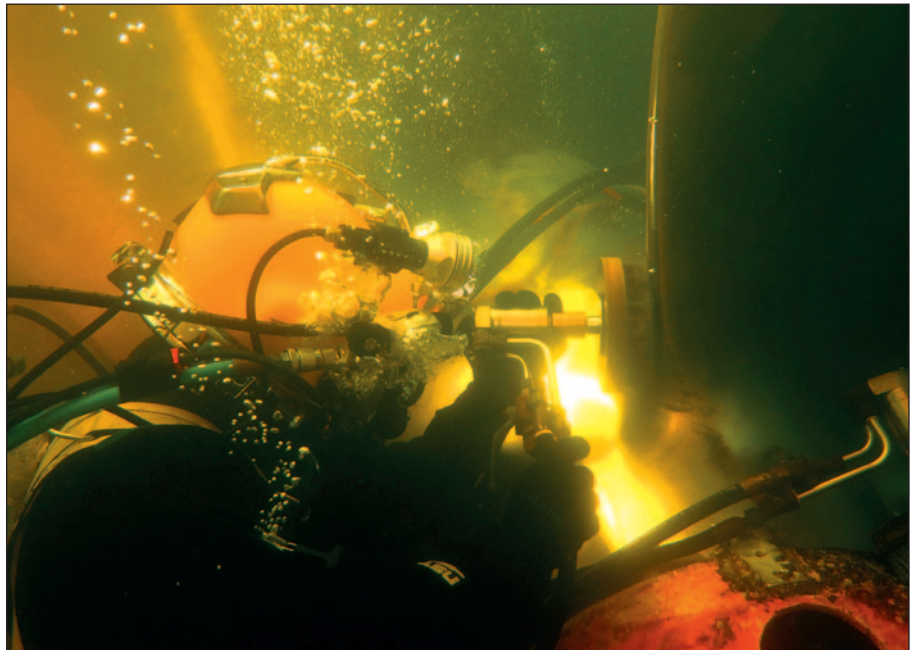
We discovered that more frequent, lighter cleaning of the propeller is the optimum. This is done using a much milder tool than a grinding disk, capable of removing the fouling before a calcareous layer builds up. Regularly and correctly done, this can result in 5% or even more

fuel savings. These savings far outweigh the cost of the propeller cleaning itself. Because the propeller is treated regularly, the cleaning is light and quick. No material is ground away which is good for the propeller and the environment. The blades are kept in an ultra-smooth condition which is how the fuel savings are achieved.

Many of our customers who have used this service have noticed a remarkable difference in their fuel efficiency after each cleaning. To quote one chief engineer, “You can clearly tell the difference in a ship’s performance after Hydrex has done its thing [propeller cleaning].”

### **Easy to combine with other operations**

Our teams consist of highly trained and experienced divers who can spot problems that are not directly related to the operation at hand. In this case, we will immediately communicate this to you so that we can follow up without delay if needed.



*Hydrex diver using our propeller cleaning technology.*

Minor operations like the ones described in this article can be combined with one or more other operations very easily. This can be any other maintenance or repair job.

By doing this, the shipowner is saved the hassle and cost of multiple mobilizations and possible delays to his vessel’s sailing schedule.

If a problem arises, no matter how big or small, it is important for you that it is solved as quickly and as efficiently as possible. Solving problems is exactly what we do, so do not hesitate to contact us for advice on dealing with both unusual and typical situations. Thanks to our network of offices and local support bases we can mobilize quickly to locations around the world. ■



*We have dedicated workboats ready for immediate mobilization.*



# Underwater propeller repairs



**W**hen damage to propellers occurs due to impact with ice and other debris we can help you, even if the damage is quite extensive. Our teams can restore the propeller's balance and efficiency.

By taking advantage of the in-house developed cold straightening technique, damaged blades can be straight-

ened underwater, allowing the ship to return to commercial operations without the need to drydock.

If straightening is not an option, the affected area of the blade will be cropped. This is done to achieve the greatest possible efficiency. Cropping is carried out using our propeller blade cutting equipment.

Our teams can also carry out any other repair work on the propeller. Examples of this are the removal and reinstallation of entire propeller blades or replacement of the propeller seal ring.

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



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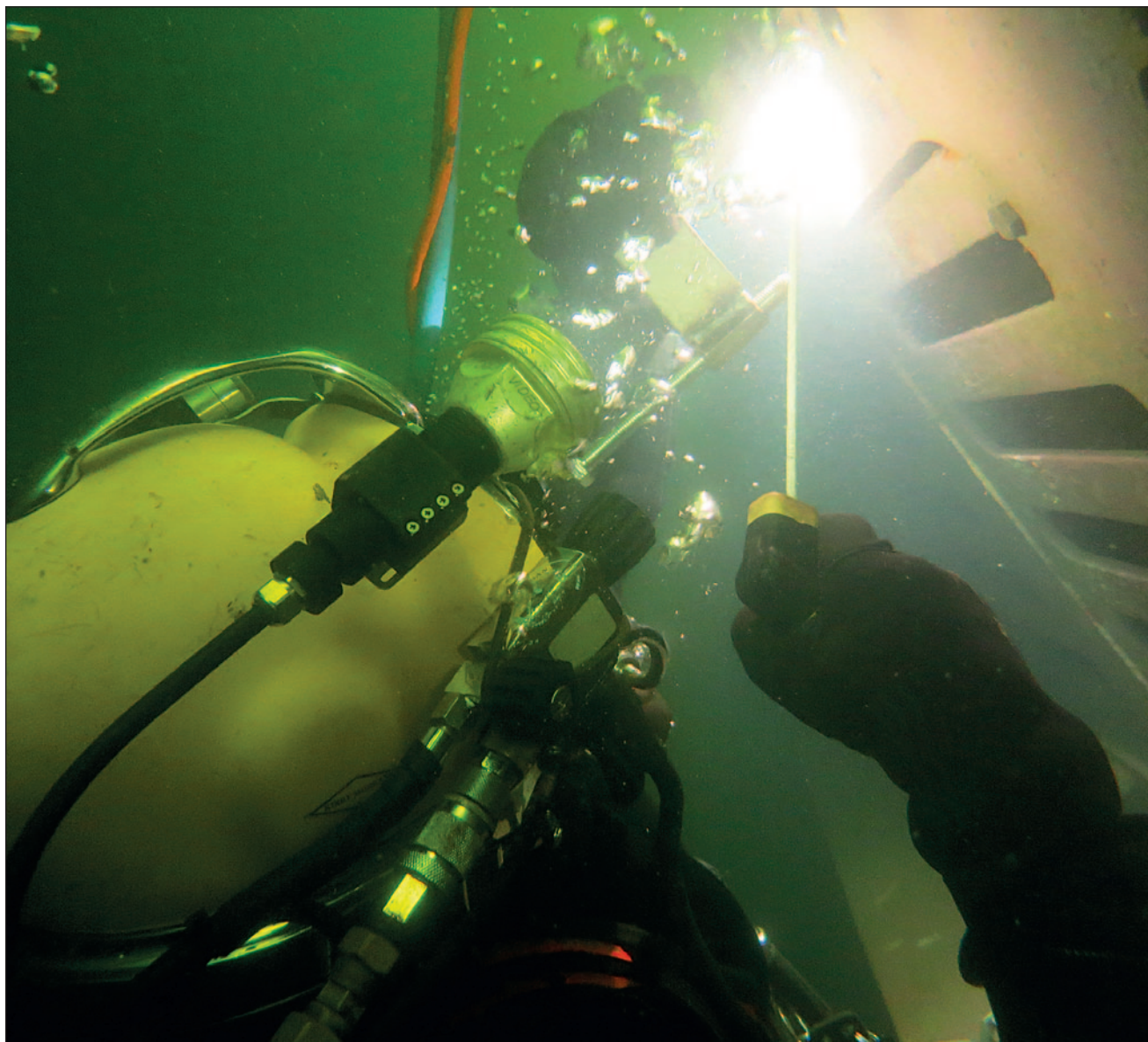
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# Sail safe with Hydrex



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