

HYDREX[®]

UNDERWATER TECHNOLOGY

Magazine

Number 291



Scrubber overboard pipe repairs in the Netherlands, France and Spain	4
Underwater repair solutions.....	8
Propeller repairs in winter conditions in Europe.....	10
Underwater propeller cone fin installation offers immediate fuel saving.....	14

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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Editorial

Table of contents



In the first article in this magazine we talk about several scrubber overboard pipe repairs our teams carried out in Europe in the last months. Corroded scrubber pipes can lead to water ingress if no solution is found.

We offer such a solution. First we replace the damaged pipe with a new one and then we apply a special coating system that will prevent the new pipe from corroding. All this is done while the vessel stays afloat and on schedule.

Further on in the magazine you can read about four propeller blade repairs our men performed in a single week. Two propeller blade

straightenings and two blade cropings were done in ports across Europe. In all cases in-house developed equipment was used.

Another article describes the advantages of underwater propeller cone fin installations. Instead of having to wait until the next drydocking, shipowners can immediately benefit from the offered fuel savings.

A handwritten signature in black ink, which appears to be 'BVR' followed by a stylized line.

Hydrex founder
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Scrubber overboard pipe repairs in the Netherlands, France and Spain 4-7



Underwater repair solutions 8-9



Underwater propeller repairs in winter conditions in Europe 10-13



Underwater propeller cone fin installation offers immediate fuel saving 14-15

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Scrubber overboard pipe repairs in the Netherlands, France and Spain

Recently our diver/technicians carried out scrubber overboard pipe repairs in ports in France, the Netherlands and Spain. On a 400-meter container ship six pipes were replaced while one pipe was replaced on another container vessel and on a crude oil tanker. In all cases the pipes were protected with a highly chemically resistant coating produced by Subsea Industries.

Exhaust scrubbers are systems that filter out all harmful toxins from exhaust gasses of marine diesel engines. These can severely corrode the pipes of the scrubber which can result in water ingress if the damage is not handled quickly enough.



Corroded scrubber pipe of oil tanker in Le Havre.



Positioning the new scrubber pipe on tanker.

In the examples below all pipes needed to be replaced completely. They were constructed at our warehouse in Antwerp. Our divers are certified wet and dry welders as well as technicians which allowed us to offer full repairs from start to finish to each of the customers.

The inside of the pipes were coated with Ecospeed to protect them against corrosion. This product is produced by Subsea Industries (www.subind.net) and is highly chemically resistant. Taking into account the nature of the process taking place inside a scrubber, this is essential for a lasting protection of the pipe. The coating can also be used to protect a newly installed scrubber system from day one.



The new pipe was secured with a full penetration weld.

Fast mobilization

A team traveled to the crude oil tanker's location in Le Havre. After arriving at the ship they first performed an inspection of the damaged areas on both the waterside and the onboard side of the hull.

Our diver/welders then sealed off the outlet of the overboard pipe. This was done with a custom cofferdam designed and constructed at our workshop based on the drawings sent by the customer.

The stub piece of the scrubber pipe

was then removed and replaced with a new one. It was positioned and secured with a full penetration weld. When the welding was complete the surface was cleaned and an MPI was carried out by an independent inspector.

Adapting to the customer's schedule

The operation on the first container ship was almost identical to the repair described above. The vessel was on a very tight schedule and it was essential that the ship could keep to this schedule during the repair. For this reason we split up the operation in several stages. These were carried out in different ports to fit the customer's need: Fos-Sur-Mer, Algeciras, Valencia and Barcelona.



Cutting away the damaged pipe on container vessel.



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.



Preparing the new scrubber pipe for installation.



Final preparations on pipe prior to installation.



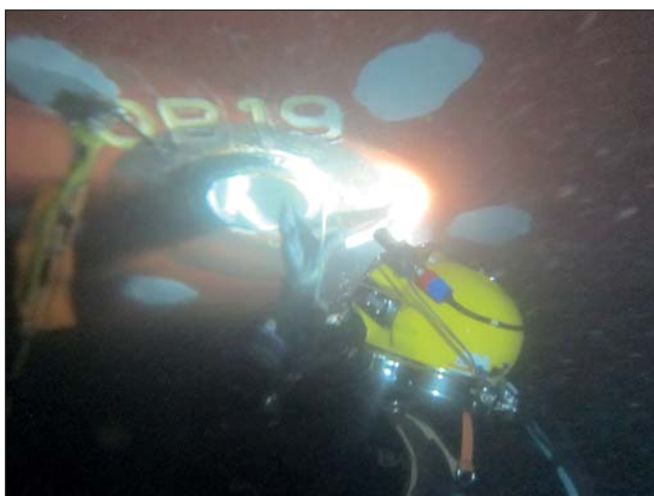
Our welders during installation of the new pipe on container vessel.



Scrubber pipe after welding and installation of the brackets.



Outlet of one of six new scrubber pipes on second container vessel.



Hydrex diver/technician working on one of the new scrubber outlets.



New overboard scrubber pipe with Ecospeed protection on the inside.

The operation on the second container vessel was more complex because a total of six pipes were damaged and needed to be replaced. This was also done without disturbing the ship's schedule and without causing any hindrance for the customer. The repair was performed in Dunkirk Rotterdam, Algeciras and Le Havre.

Preventive maintenance

We offer a full package to owners that are experiencing similar damages. We replace the corroded exhaust pipe while your vessel stays on schedule and we make sure that you will not have to call us again for the same problem.

Most ships sail on a tight schedule. We know how important it is to prevent any loss of time. Our technical department has many years of experience in drawing up a repair plan that fits in perfectly with a vessel's schedule. Working in shifts or splitting up an operation in stages are just a few of the many ways we can make sure that the impact of the repair is limited to the absolute minimum or avoided entirely. ■

Contact us to find out how we can assist you. We are available 24/7.

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**KEEPING SHIPS
IN BUSINESS**



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, even if the damage is extensive, 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 afloat.



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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Underwater propeller repairs in winter conditions in Europe

In just over a week our diver/technicians traveled to Finland, Germany, the Netherlands and France to assist ship-owners with damaged propeller blades. On two bulkers the blades were cropped while on a third bulker and a general cargo vessel the bent blades could be straightened.

In all cases the best solution was offered to the customer to restore the propeller's efficiency as close to the original condition as possible.

Smoothing the creases

One of the propeller blades of a 180-meter bulker was severely bent. A fast, on-site solution to restore the propeller's balance and efficiency was needed. We therefore sent a team to the ship's location in Rotterdam with one of our workboats.



Hydrex vans and equipment next to general cargo vessel in Finland.

After the equipment arrived the team started the operation with a detailed survey of the ship's propeller. This revealed that one of the other three propeller blades was also bent slightly. It was decided to straighten this blade as well.

With the survey completed and in close communication with the team leader in the monitoring station on-shore, the divers returned the bent blade to its original state. When the straightening was complete, our technicians polished the blade to



Bent propeller blade on bulker in Rotterdam.



Propeller blade after straightening.



Hydrex diver taking the plunge.

make sure that any remaining loss of efficiency would be minimal. The same procedure was then repeated on the other damaged blade.

Ice and cold no match for Hydrex

The conditions for a similar repair in Tornio, Finland were a lot less

warm. All 4 blades of a 144-meter general cargo ship were bent. We mobilized a team to straighten the blades using the same procedure as on the vessel in Rotterdam. They traveled through the snowy landscapes with two vans and the needed equipment to the ship's location.

During the operation our divers had to work in water filled with chunks of ice, but these conditions offered no problem for them. They are used to adapt to different circumstances and carried out the repair without any loss of quality.



Our team on their way to Finland in winter conditions.

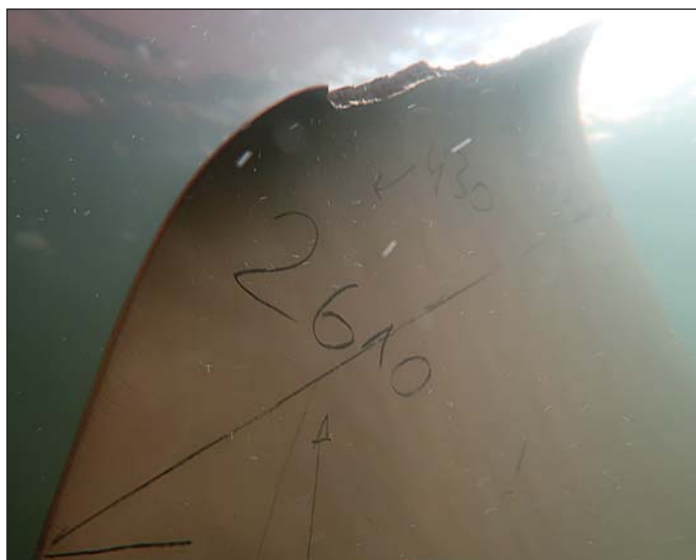
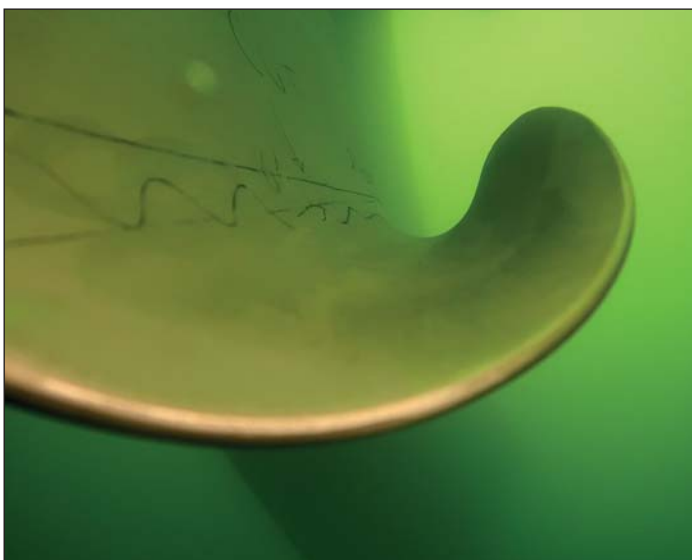




Icy winter conditions do not affect the quality of our work.



Propeller blade of bulker in Germany after cropping and smoothing.



Two of the four severely damaged blades of bulker in Germany.

If straightening is not an option, the affected area on the blade will be cropped. By doing this the greatest possible efficiency is achieved for the vessel. This was the case for the operations described below.

The cream of the crop

With all four blades of a 235-meter bulker's propeller severely damaged after impact with ice, the engine was overloading. We were asked to perform an on-site repair during the ship's stop in Rostock, Germany.

After the equipment arrived at the vessel's location our men started the underwater operation with a detailed survey of the affected propeller blades. They then used the information acquired during the inspection to calculate and determine the correct measurements needed to crop the blades.

Next the divers cropped the blade tips. When the cropping was complete, the blades were smoothed.

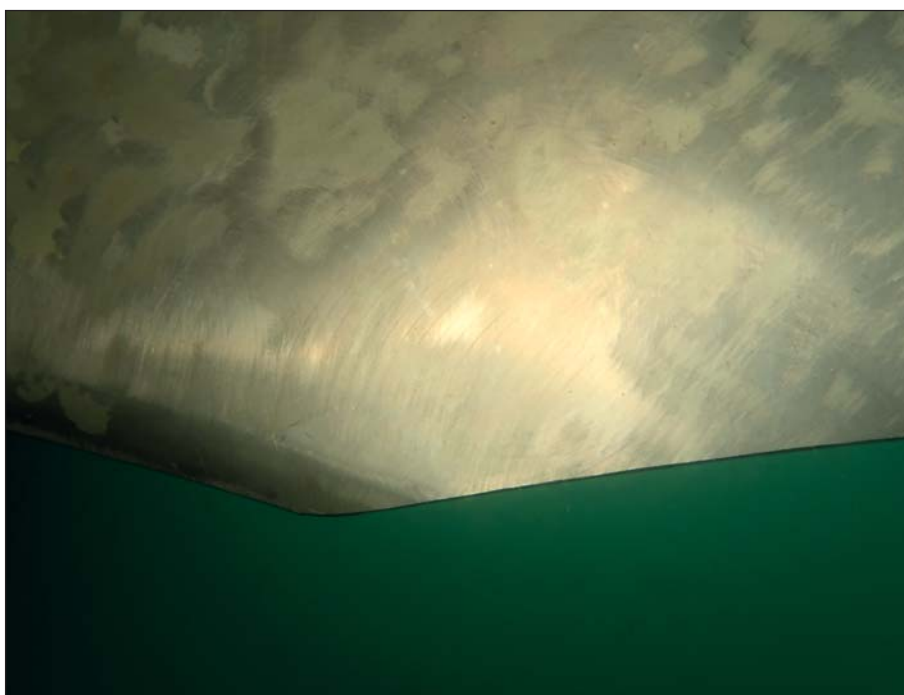
The 5-blade propeller of a 229-meter bulker had unfortunately suffered a similar fate. An identical repair was carried out by our diver/technicians in Dunkirk, France. The result of the



Cropping one of the blades of bulker in France.



Cropped tips of the five propeller blades in France.



Propeller blade after cropping and polishing in France.

operation was also the same: The propeller's balance was restored and the efficiency was brought back to optimum condition.

We often encounter blades like this that have been severely damaged, chipped or almost completely broken off during ice navigation. In most instances they can still be repaired on-site by grinding and cropping the blades.

Conclusion

Over 45 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 afloat and underwater operations can be carried out fast, fluently and efficiently.

When damage to propellers occurs due to impact with ice and other debris, Hydrex can offer you the best possible solution, even if the damage is quite extensive. Repairs can be carried out rapidly and efficiently afloat and underwater.

After your call we will immediately mobilize a team to the vessel to inspect the damage and perform the required repairs. During the winter months these operations often have to be carried out in extreme circumstances. Ice conditions like this will not prevent our divers from providing the service you need. They are professionally trained to perform a wide variety of operations, both above and below water, anywhere in the world.

By taking advantage of the in-house developed cold straightening technique, damaged blades can be straightened underwater. This allows a ship with a damaged propeller to return to commercial operations without the need to drydock. Optimum efficiency of the propellers can be restored by bringing the blades back to their original form.

Please contact us if you need more information on propeller or other underwater operations. We are ready to assist you 24/7. ■

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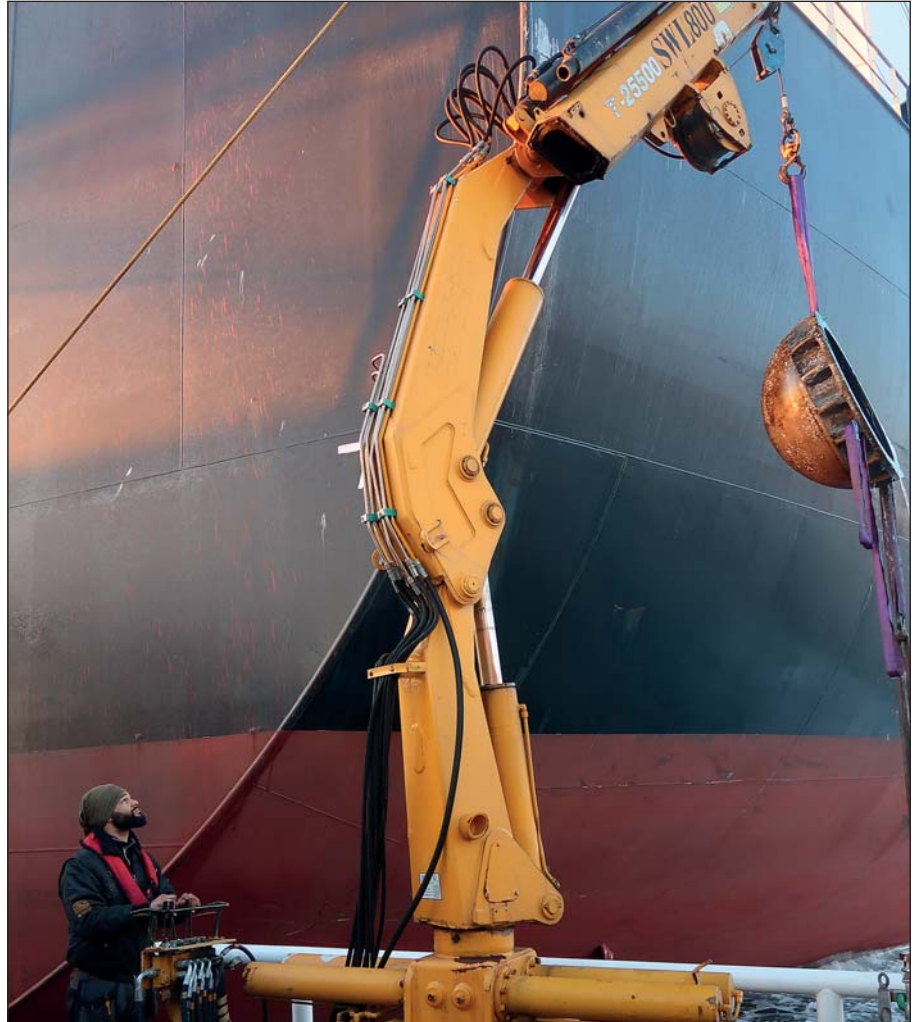


Underwater propeller cone fin installation offers immediate fuel saving

Recently Hydrex installed propeller cone fins on two chemical tankers: one in Antwerp and one in Rotterdam. Both operations were carried out with our dive support workboats. Stationed in these ports, they allow for immediate mobilization.

A direct result of these underwater operations is that an owner can instantly start benefitting from the fuel savings a propeller cone fin brings. He does not have to wait until the next scheduled drydocking for the installation.

Propeller caps like these 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. Hydrex can install propeller cone fins underwater on any size and make of propeller, on both new build or in-service vessels.



Removing the old propeller cap.



Preparing the propeller cone fin for installation.

Installation afloat prevents a long wait for fuel savings

We carry out these operations following the specific procedures required by the involved OEM, adapted for an underwater installation.

After a preliminary inspection the divers remove the propeller cap and clean the flange where the device is to be installed. They then lower the propeller cone into the water and position it on the propeller. The bolts are put on the correct torque and

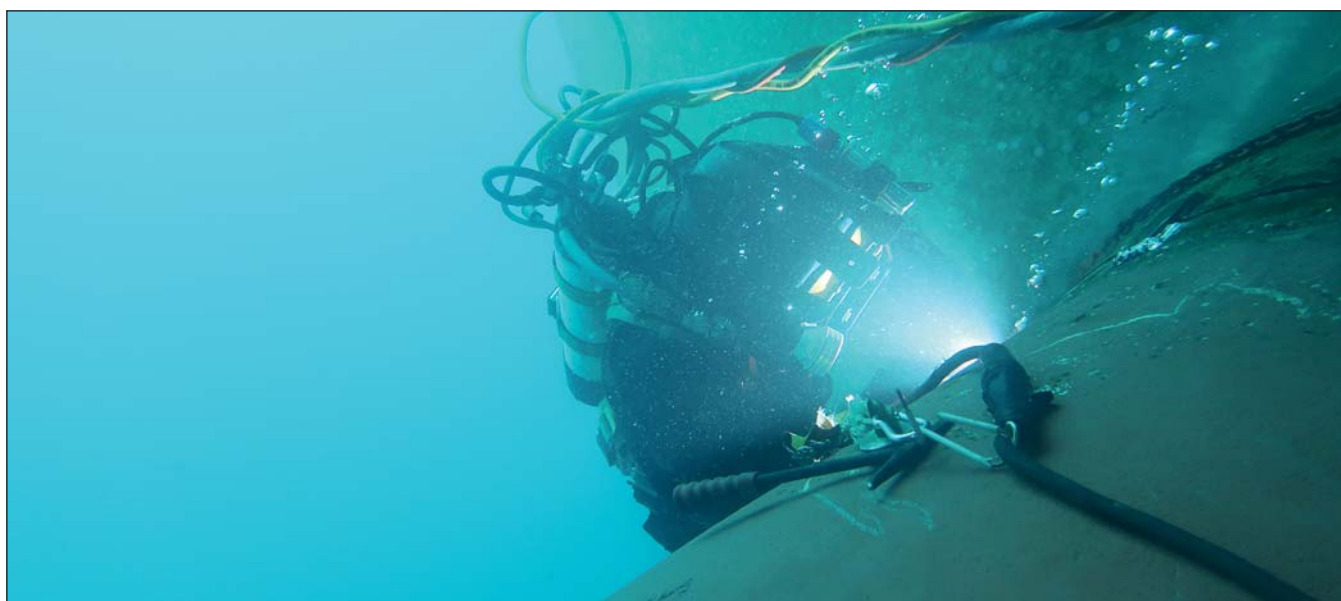


Propeller cone fin ready to be lowered into the water.

secured. Hydrex teams can work in shifts around the clock to finish the operation as quickly as possible.

The owner of the vessel can start enjoying the fuel savings the propulsion improving device creates right away. Not having to wait for the next scheduled drydocking to have the propeller cone fin installed can win him up to four years of fuel savings. In contrast, he will have earned back the cost of the underwater installation in only a few months. The savings are considerable. ■

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.

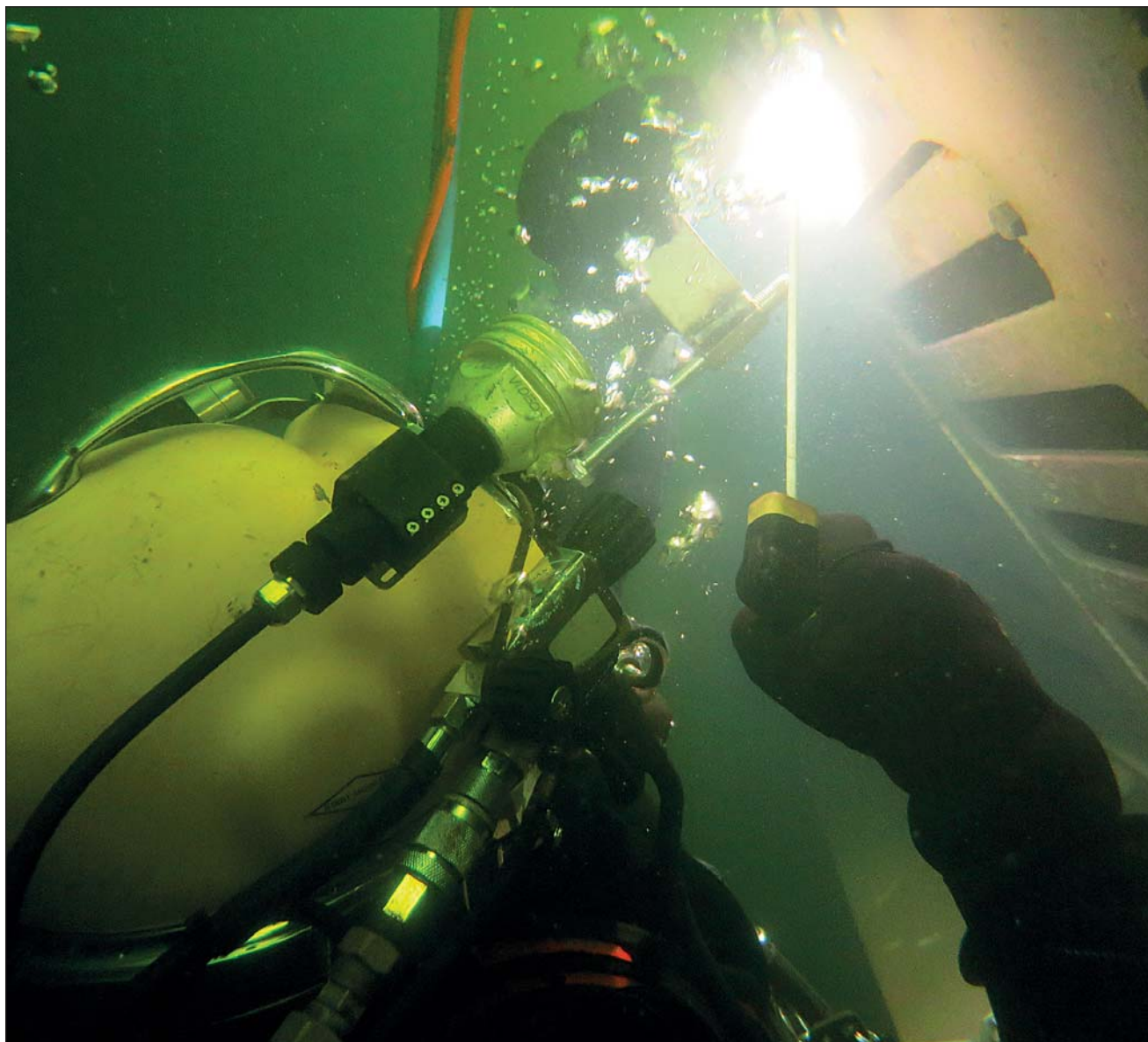
Visit the special stern tube seal repair section on our website for more information and examples of the many seal repairs we have performed in recent years.

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