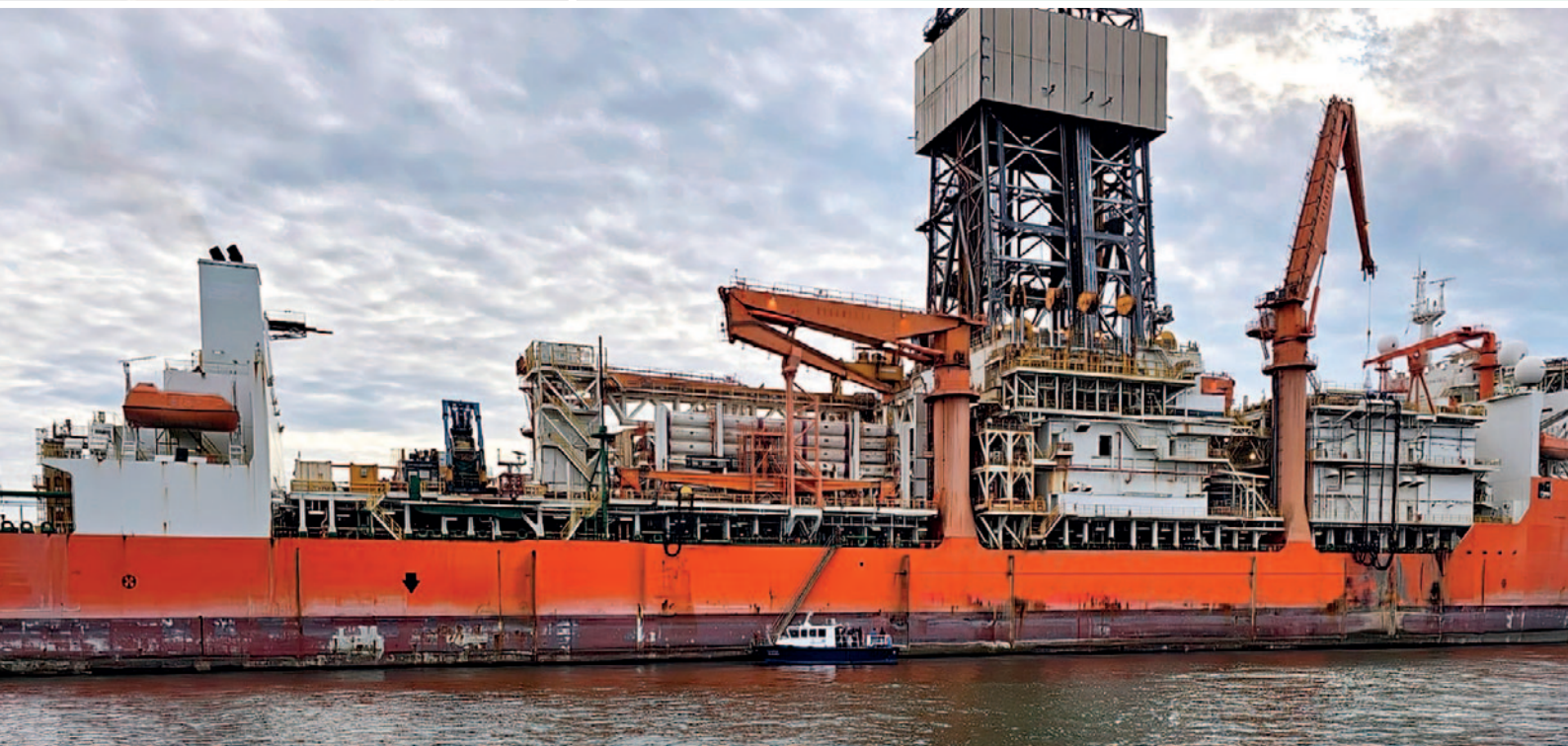


HYDREX[®]

UNDERWATER TECHNOLOGY

Magazine

Number 321



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Scrubber pipe repairs and lasting protection



Exhaust scrubbers filter out all harmful toxins from exhaust gases 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. This is done by coating the pipes with a highly corrosion resistant coating called Ecospeed.

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



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www.hydrex.be

Hydrex and Subsea Industries will be present at Europort in Rotterdam from November 7 until November 10. We would like to welcome you at our booth 1225 in Hall 1, Holland pavilion.

If you would like to learn more about how we can assist you, please visit our booth at Europort. Our team will be happy to give you the



information you need. You can also contact one of our offices if you would like to make an appointment for the exhibition or if you need assistance.

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Editorial



Keeping a ship in business is a very complex task that does not end at the close of an office day. For this reason, all Hydrex offices are available 24/7 to assist you with all things concerning your vessel's underwater hull, whether great or small, whether emergencies or long-term projects.

Hydrex has 50 years of experience with both maintenance and repair work. Maintenance work can be done as a one-time underwater survey, cleaning or propeller polishing, but can also be part of a maintenance contract. These contracts take the organizational hassle out of your hands and give it to our technical department.

While a lot of harm can be avoided by timely maintenance, damage can

still occur due to, for instance, collisions, grounding impact or ropes that get tangled in stern tube seal assemblies. In these cases, Hydrex can also assist you. We have diver/technician teams on standby at all times, ready to carry out small standard repairs as well as complex and rare operations.

If you are not sure if your ship's problem can be solved out of dry-dock, get in touch with us and we'll provide a professional opinion, free of charge.

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

Hydrex founder
Boud Van Rompay
bvr@hydrex.be
www.hydrex.be

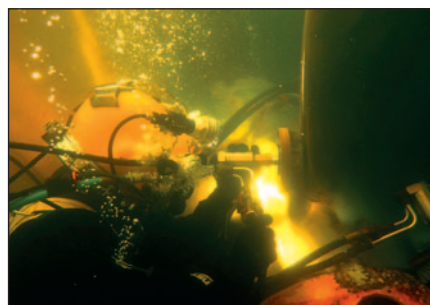
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HYDREX
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Underwater work in Singapore

Hydrex has been performing underwater maintenance and repair operations in Singapore for 40 years. Thanks to our well-stocked local support base we can mobilize to the location very quickly to assist ship owners with any problem they might encounter with the underwater part of their ships.

Singapore has always been a very important port strategically. It is the world's second biggest port, both in size and total shipping tonnage. Most ships passing between the Indian Ocean and the Pacific Ocean go through the Singapore Strait. This makes it the ideal location for vessels to have underwater repair or maintenance work carried out.

Since Hydrex was founded 50 years ago, we have always strived to find ways of performing our operations while cargo operations continue. This allows ships to keep their busy schedule with no or only very minimal delay.

To offer this same service around the world, we have built strong relationships with high quality local support bases that have the material we need ready for immediate use. Singapore is no exception to this.

For 40 years we have been delivering the well-known Hydrex high quality to ships making a port call in Singapore. To illustrate this we have gathered a few of the many case studies, some very recent, some from years ago, but all with the same result: a satisfied customer.



Flexible mobdock used to close off bow thruster tunnel of drilling vessel.

Emergency operation on drilling vessel

In 2010 Hydrex sent a team to Singapore to perform an emergency operation on a 154-meter drilling vessel that had just been to drydock for repairs but soon after leaving was still experiencing problems with one of its three bow thrusters.

The owner needed to know the exact reason for the problem as soon as possible so that he could decide whether to redock the vessel before it left for its working location with a view to minimizing off-hire time.

Thanks to our fast response center, within 24 hours after we were contacted, a team of 6 diver/technicians was on its way to Singapore. Simul-



Cofferdam installed over crack on 360-meter bulkhead.

taneously preparations were made by the local support base so that the team could start the operation immediately after it arrived at the vessel's location. This was only days after the call came in.

The first step was the installation of the unique Hydrex flexible mob-docks. These close off the thruster tunnel and allow for the creation of a dry working environment around the affected bow thruster unit. The cover

of the gearbox was then removed and a detailed inspection of the entire unit was carried out. This revealed that both the oil distribution box and the shaft were damaged and that the shaft needed to be replaced in its entirety. The delivery period for a new shaft ruled out a fast *in-situ* repair and therefore, in consultation with all parties involved, it was decided that a repair in drydock was the best option.

The operation was supervised from inside the monitoring station, located on a work pontoon next to the vessel, by the Hydrex team leader together with a representative of the manufacturer. The owner was able to make an informed decision about whether to drydock his vessel again or not and to make sure that it was in good working order before it left for its working location.

Underwater bilge keel repair

Last June a team of our diver/welders was mobilized to Singapore for a crack repair on a 360-meter bulkhead.

After arriving on site, the team first performed an on-board and underwater inspection of the damaged area. This revealed a crack measuring 232 mm just behind the start of the landing plate of the bilge keel section.

There was a high current where the vessel was anchored. As a result there was little diving time available to work in. The divers could only work during slack tide before the



The crack was first ground out.



The crack after being filled up with a full penetration weld.



Workboat next to drill ship in Singapore.



Preparing the edge of the opening prior to fitting the new pipe.

current became too much to allow diving operations.

In close communication with the customer, it was decided to save time by grinding out the crack and rewelding it instead of installing a new insert.

The bilge keel and landing plate were then partially cropped to allow for the installation of a cofferdam on the outside of the hull over the damage. The team could then work on the crack inside the ballast tank without water ingress. The crack was ground out over its entire length and filled with our class approved full penetration welding.

Next the cofferdam was removed and the bilge keel was further adapted to the correct shape. The cropped landing plate was fully welded and closed again.

Installation of new pipe

Last month we attended a 228-meter drill ship at anchorage in Singapore for the installation of the stub piece for a new overboard pipeline.

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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New pipe secured and ready for welding.



The pipe after full penetration welding.

After a safety meeting on board the ship and a toolbox meeting with all parties involved, our divers/technicians marked the position of the new insert on the hull. They then drilled a hole in the shell plating to show the location from the inside. A temporary plug was then inserted, and a cofferdam was installed over the area.

The next step was to remove the shell plating where the pipe was going to be installed. Once this was done the pipe could be fitted in the opening. Our certified welders then secured it with full penetration welding which was approved by an independent inspector. The operation ended with the removal of the cofferdam.

New generation propeller repair equipment used for cropping

For another example of an earlier operation we go back to 2015 when

our divers performed a propeller blade repair on a 300-meter container vessel in Singapore. All six blades of the vessel's propeller were severely damaged and cropping was the only option.

This kind of repair is carried out with 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.

Because the ship could be trimmed enough to bring the blades above water, scaffolding was installed around the propeller. This allowed the team to perform the operation in the dry.

When the cropping was complete, the blades were polished to minimize any remaining loss of efficien-

cy. The success of the operation was confirmed by the customer. After the operation the vessel completed sea trials and "managed to increase RPM up to 93 and developed 21 knots," said Maxim Bolduev, Deputy Fleet Manager Southern Shipmanagement. "Before propeller trimming we got 53 RPM and only 14 knots."

Conclusion

Whenever a shipowner asks us for assistance in Singapore, we only have to fly in our divers. All logistics for the repair are arranged by our technical department in close cooperation with our local support base. As a result, when our team arrives on site they can immediately start the operation. Because we are in constant communication with all parties involved, this is usually right after the ship reaches its lay-by berth or anchoring location. ■



The propeller blades of a 300-meter container vessel were severely bent.

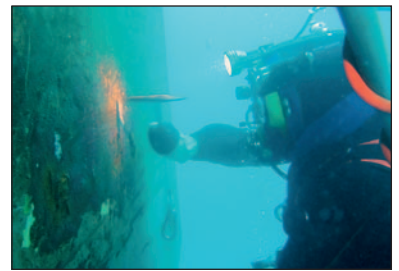


One of the cropped propeller blades, prior to having its edges grinded.



Team leader inside monitoring station.

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.



High quality in-water ship re

Permanent insert repairs

Specialist class approved insert repair work carried out on a permanent basis. Providing a real alternative to drydock.

Emergency repairs

Fast response emergency repairs worldwide.

Inwater video inspections

Professional video surveys provide a reality of the problem and enable owners and classification surveyors to directly diagnose any problems.



Echo sounder inspection and replacement

Speed log
Checks for damage, marine fouling and replacement.

Bow thruster and propellers
Permanent on-site repair, maintenance and replacement with the award winning flexible mobdock technique.

Hull cleaning on suitable coatings

Bilge keel
Check and repair broken welds, renewal of sacrificial anodes.

pair and fuel saving services

KEEPING SHIPS IN BUSINESS



Essential maintenance operations

In 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 50 year of experience in both maintenance and repair services, we can carry out any required follow-up repair without any

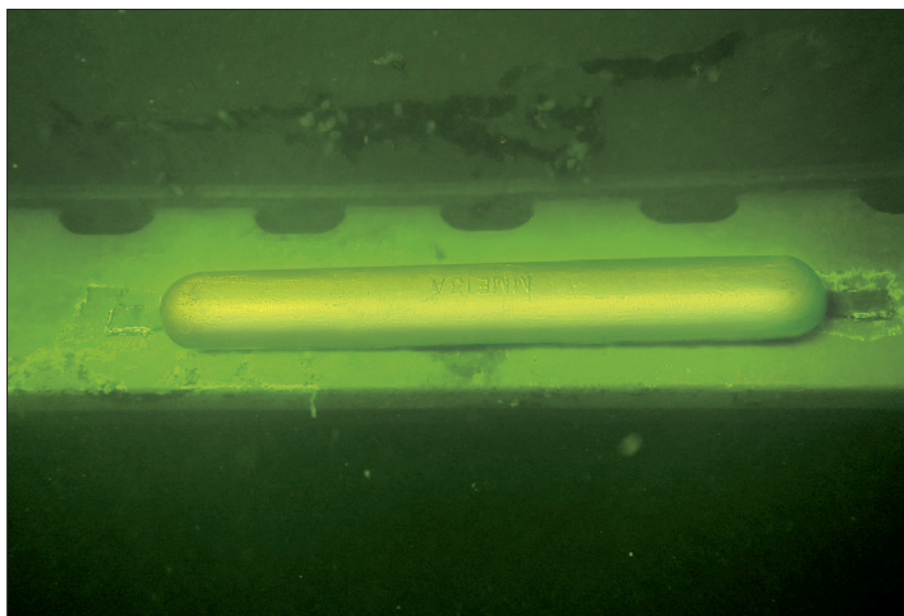
unnecessary loss of time. Scheduling in a new date is not needed as all our diver/technicians are skilled to perform the repair work as well.

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.

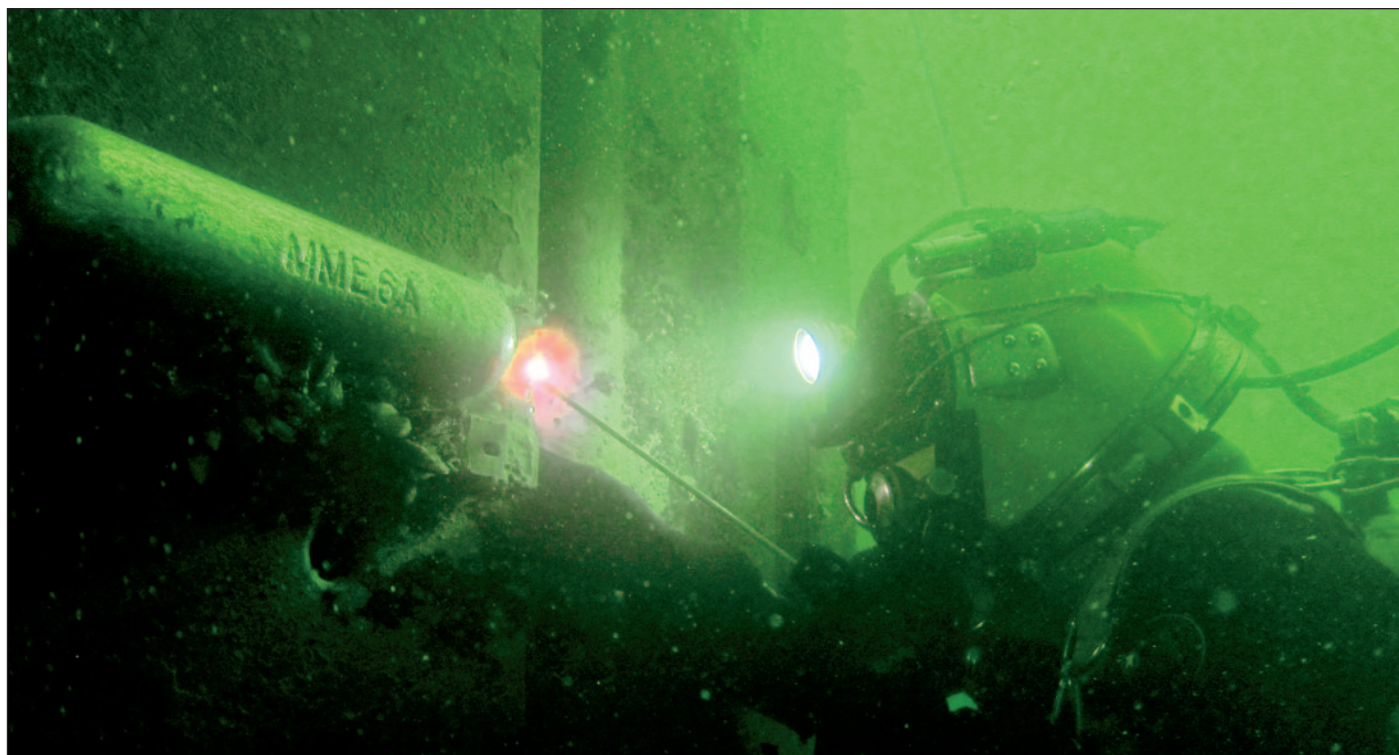
In this case the anodes were supplied by us, saving the owner the trouble of having to arrange the delivery himself.

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,



Hydrex diver welding an anode.

an oceanographic vessel and an off-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.

Our diving team started the operation with an inspection to determine

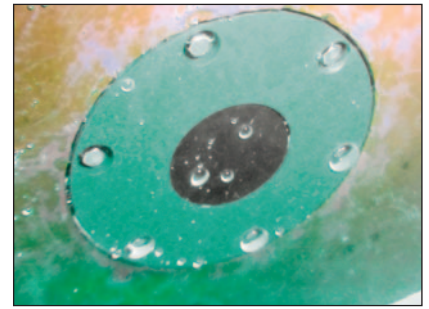


Any type of transducer can be installed or replaced afloat.

the best place to install the speed log. They then marked the exact position where the speed log was to be positioned.

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.



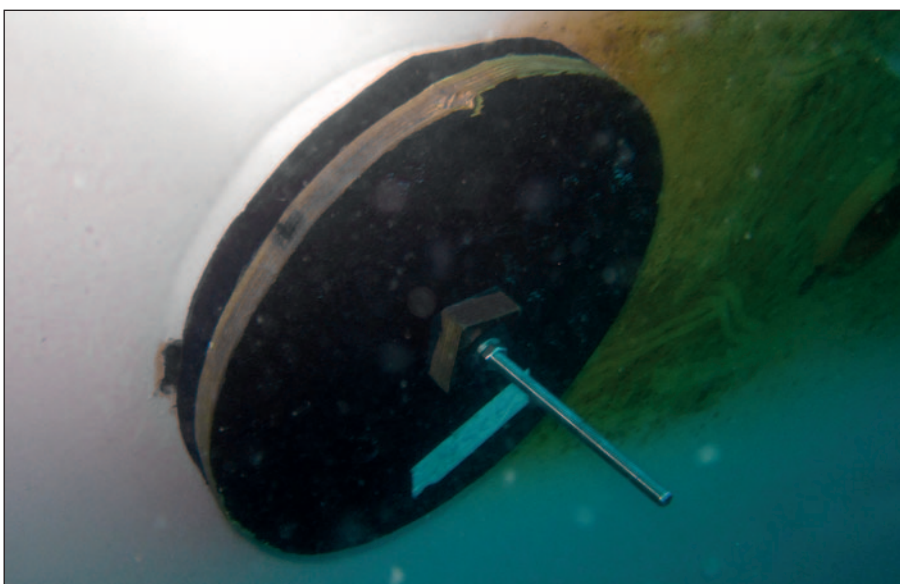
New speedlog after installation by our divers.

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



Blankings can be used to close off any underwater aperture.

blades are kept in an ultra-smooth condition which is how the fuel savings are achieved.

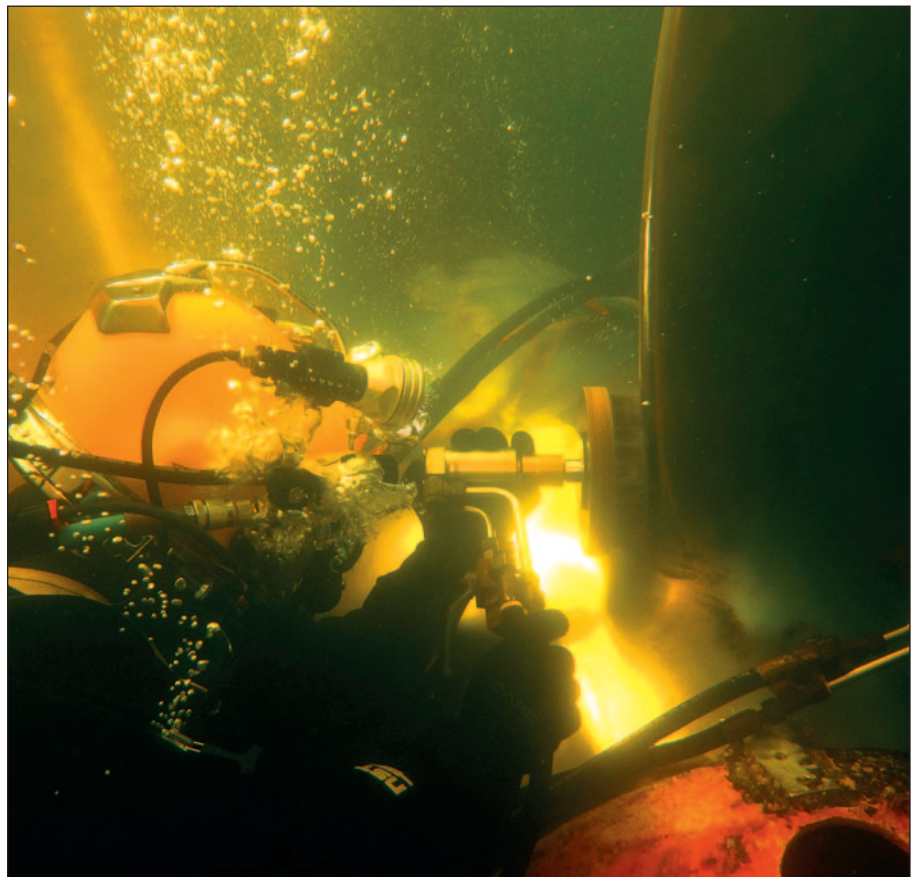
Many of our customers who have used this service have noticed a remarkable difference in their fuel efficiency after each cleaning. To quote one chief engineer, “You can clearly tell the difference in a ship’s performance after Hydrex has done its thing [propeller cleaning].”

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.

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



Hydrex diver using our propeller cleaning technology.

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.

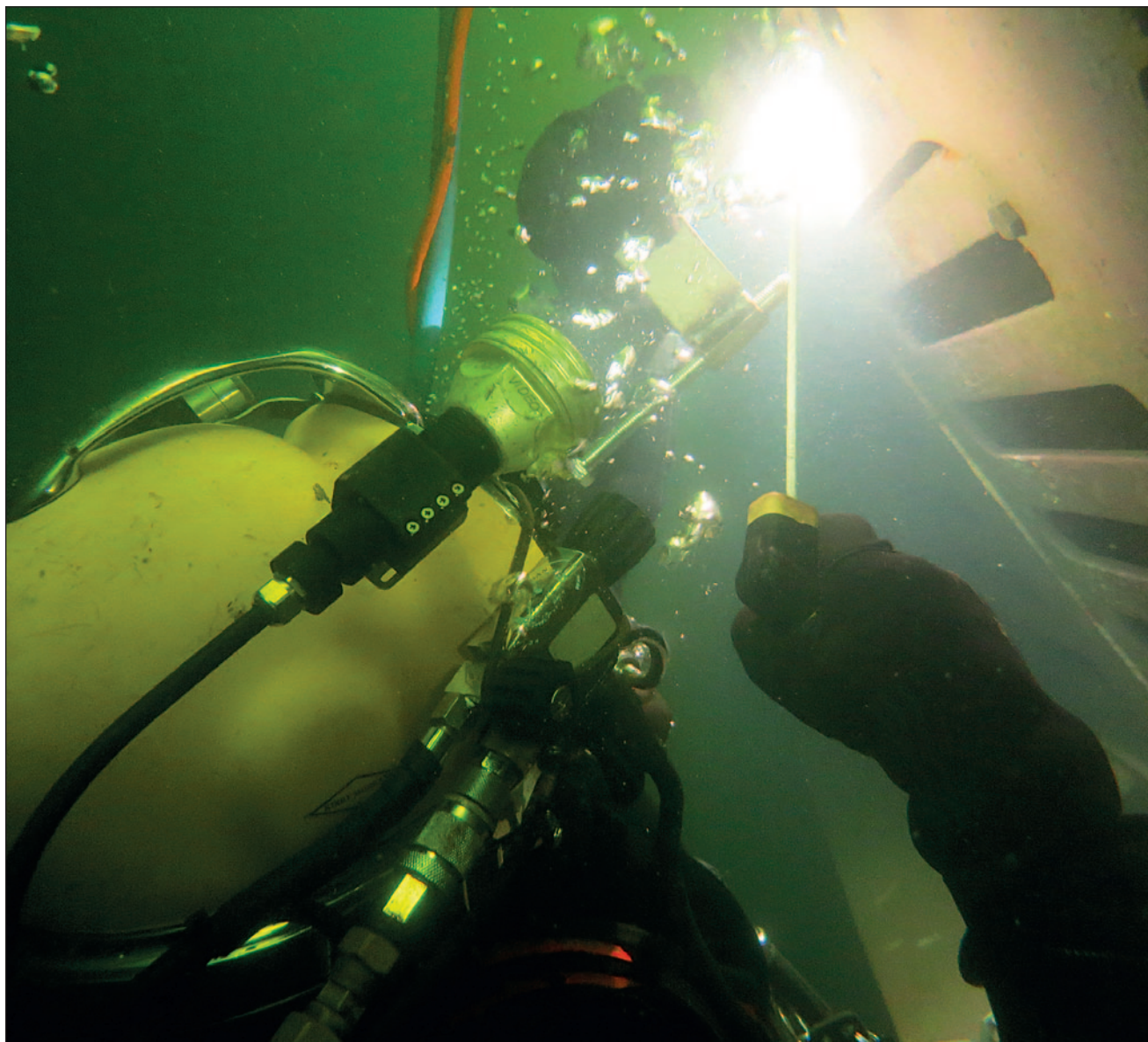
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