HYDREX®

UNDERWATER TECHNOLOGY

NEWS

LETTER | 302

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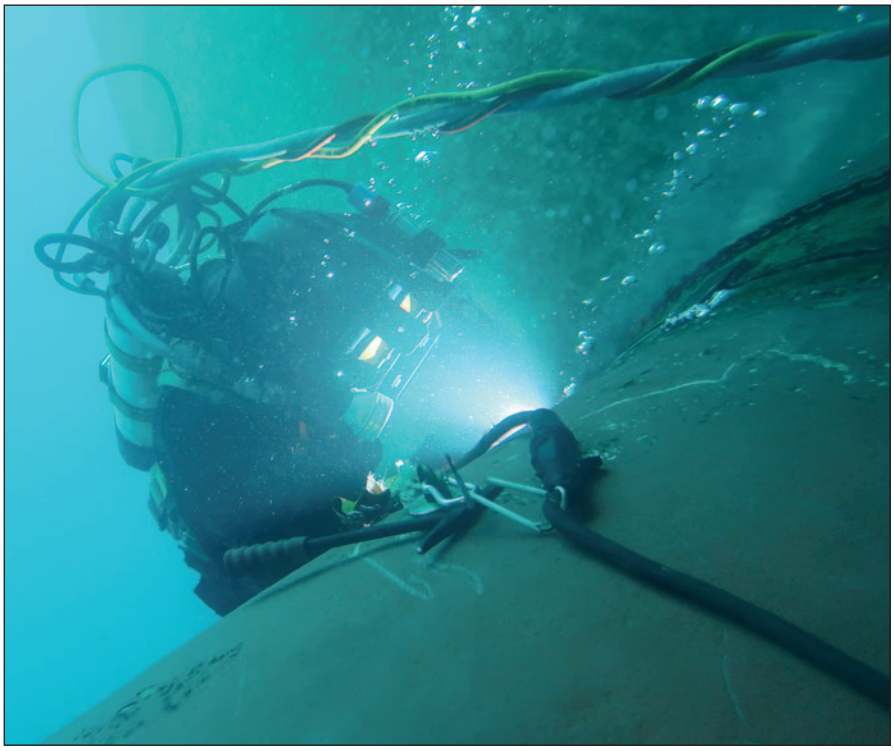
KEEPING SHIPS IN BUSINESS

ISO 9001 certified

Underwater services and technology approved by:

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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Scrubber pipes repaired and given lasting protection

In the last two months our diver/technicians carried out scrubber overboard pipe repairs in Belgium, France, the Netherlands, the United Kingdom and Spain. In total, six corroded pipes were replaced on four ships: three container vessels and a tanker.

Corroded scrubber pipe on container ship.

In all cases the pipes were protected with Ecospeed. This product is produced by Hydrex's sister company Subsea Industries (www.subind.net). Ecospeed is highly chemically resistant. Considering the nature of the process taking place inside a scrubber, this is essential for a lasting protection of the pipe. Ecospeed can also be used to protect a newly installed scrubber system from day one.

Hydrex technician cutting away the old pipe.

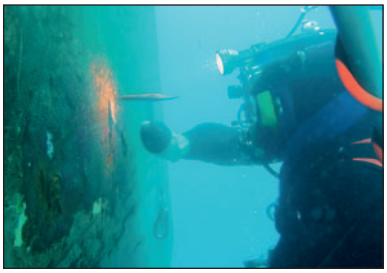
Exhaust scrubbers are systems that filter out all harmful toxins from exhaust gases of marine diesel engines. These can severely corrode the pipes of the scrubber which can result in water ingress if not handled quickly enough.

To prevent this, the owners of the four vessels decided to replace the damaged pipes before leaks could occur.

Experience and flexibility

We know how important it is for ships to keep their schedule. For this reason, we split up operations like

Hydrex underwater 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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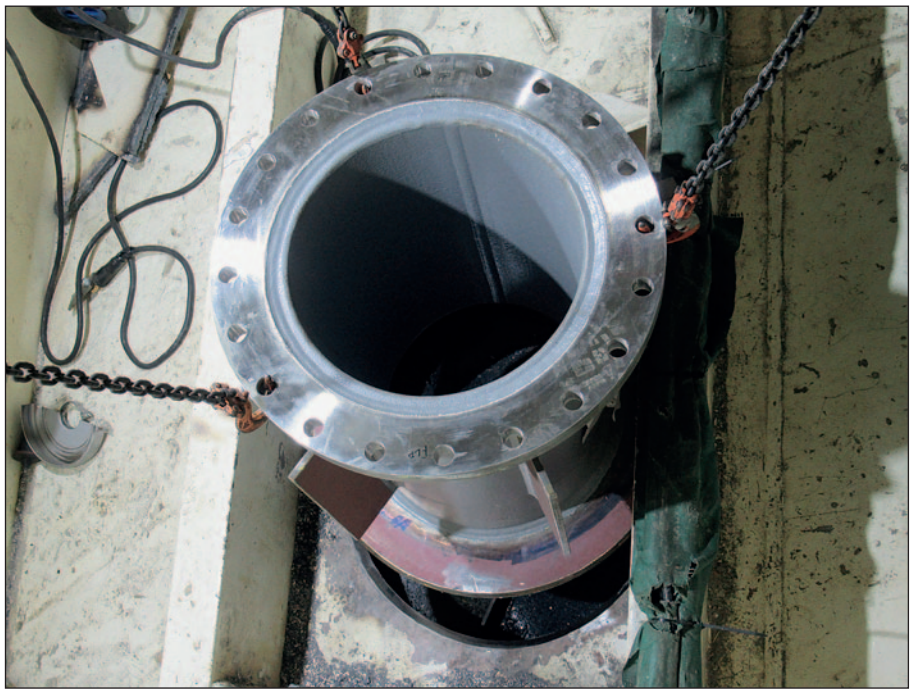


Positioning a new scrubber pipe.

Welding the new pipe.

New scrubber pipe after welding.

this in several stages if needed. These can be carried out in different ports to fit the customer's need. Over 45 years of experience allows us to arrange this without causing any hindrance for the customer.

In these examples, 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.

Because of the location of the damaged parts of the pipes, welding work on the inside shell plating of the hull was needed. As a result, the outside of the overboards could not be sealed off with a simple patch. Custom cofferdams were also designed and constructed at our workshop based on the drawings sent by the customers.

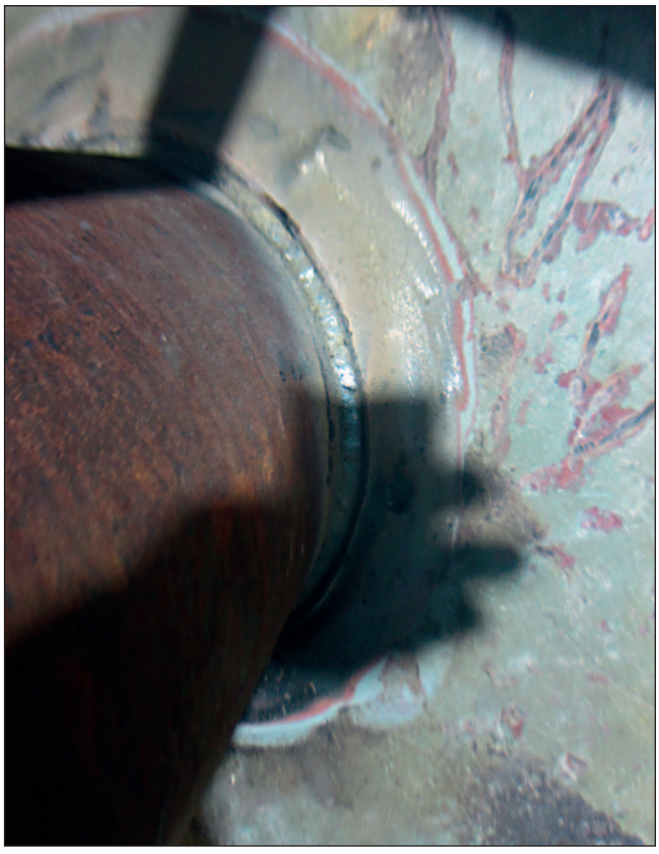
Container ships in Antwerp, Rotterdam and Southampton

Both scrubber pipes were replaced on two 400-meter container sister ships. The same procedure was followed on each occasion.

After arriving at the ship, our team first performed an inspection of the damaged areas on both the waterside and the onboard side of the hull. They then installed the cofferdams over the outlets of the pipes. This allowed our welders to safely work on the shell plating of the vessel.

Both pipes were then removed and

One of our men preparing the edge for installation of new pipe.



Fully installed pipe on tanker in Algeciras.

Permanent in-water rudder repairs now possible without drydocking

Hydrex has developed an entirely new method enabling permanent repairs of rudders without drydocking the ship. Permanent repairs were hitherto not possible and ships had to drydock in case a major defect was found. The newly designed equipment is light-weight and can be mobilized very rapidly in our special flight containers. Therefore this new service is now available world-wide.

Major defects on rudders very often cause unscheduled drydocking of ships. The new method designed by our technical department allows engineers, welders and inspectors to perform their tasks in dry conditions. Class approved permanent repairs on-site, without moving the ship, are now possible and commercial operations can continue. Steel repairs and replacements can be performed and pintle and bushing defects can be solved without the loss of time and money associated with drydocking.

The equipment can be mobilized within hours to any port in the world and is available for rapid mobilization from the Hydrex headquarters in Antwerp.

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Hydrex technician during removal of old scrubber pipe.

replaced with new ones. They were positioned and secured with a full penetration weld. Next an independent inspector carried out NDT testing of the weld seams.

In these two examples the new pipes were coated with Ecospeed in advance because no welding work needed to be carried out in close proximity to the coated area. If this is not an option, the coating can also be applied after the new pipe is installed. This was the case during the operation on a 225-meter tanker berthed in Algeciras.

Hydrex certified welder at work on tanker in Antwerp.

All welding work is done following our class approved procedures.

Independent inspector testing the weld seams.

Adapting to the customer's schedule

The last container ship was on a very tight schedule, and it was essential that the ship be able to keep to this schedule during the repair of its corroded scrubber pipe. For this reason, the operation was carried out in four different ports to fit the customer's need: Dunkirk, Le Havre, Antwerp and Rotterdam.

Our team first traveled to Dunkirk. There they performed an inspection of the pipe and installed the cofferdam. The ship then sailed on to Le Havre where our diver/technicians loaded the new pipes and all the needed equipment onboard.

During the ship's next stop in Antwerp the damaged scrubber pipe was replaced and the new one was coated with Ecospeed. The final part of the operation took place in Rotterdam. During this stop the cofferdam was removed and a final inspection was performed.

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. ■

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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Underwater bow thruster installation in stages allows vessel to stay on schedule

Two and a half months after our diver/technicians removed the bow thruster of a 363-meter container vessel in Rotterdam, a team once again mobilized to reinstall the overhauled unit underwater with the use of our flexible mobdock technique. Like the removal, the operation was performed in stages at several locations to allow the vessel to keep to its sailing schedule.

Hydrex diver/welder working on reconnecting the thruster to the engine room.

The superintendent of the ship was very happy with the first part of the operation. For this reason, the customer asked us to take care of the reinstallation as well. The job was completed well within the available time frame thanks to good teamwork of the ship staff and our divers.

The available time window was very short for the ship. The time required to reinstall the thruster unit therefore needed to be brought back to the absolute minimum, so the operation was split in parts. The first part of the procedure was carried out during the vessel's stop in Le Havre.

Overhauled thruster unit on workboat next to container vessel.

Installing the bow thruster unit in Le Havre

We have a special R&D department that is continuously looking for new ways to streamline the repair procedures used by our teams. One of the results of their research is a cradle designed especially for thruster operations. This device allowed the divers to lower the bow thruster unit into the water in Le Havre and maneuver it inside the thruster tunnel in one take.

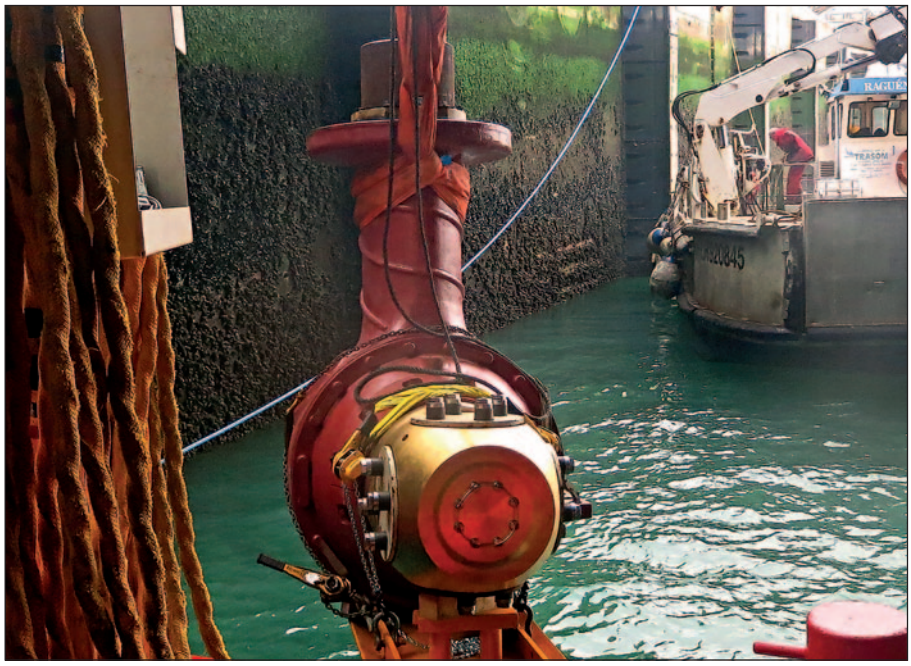
Another technology developed in-house are our mobdocks used to close off a thruster tunnel. Mobdock is short for 'Mobile mini drydock,' so called because they enable our diver/technicians to create a dry environment to work in, while the vessel stays afloat. These mobdocks have been used during thruster operations for 20 years now. In the early days, rigid mobdocks were used, but later a lightweight flexible variant was designed and put in use. These

Preparation of the thruster for reinstallation in Le Havre.

can be shipped anywhere in the world by plane very quickly.

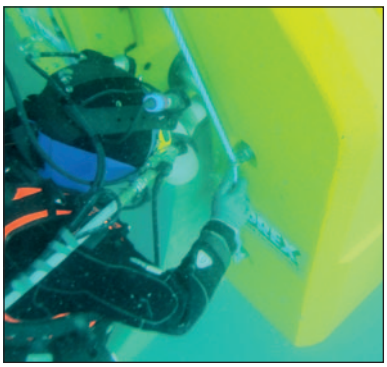
After all water was removed from the tunnel, the team secured the unit and connected it to the engine room.

This finished the first part of the operation. The divers returned to the Antwerp headquarters, ready to mobilize again when the vessel was arriving at the Port of Rotterdam.



Thruster unit being lowered into the water.

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.

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Our workboats can be used for a wide range of operations.

Phase two of the operation carried out in Rotterdam

Deployment to Rotterdam was done using one of the Hydrex workboats loaded with all the needed equipment. These catamarans are fully equipped as dive support stations that can be used for a wide range of operations. They increase flexibility, which is essential during operations like these where speed is of the utmost importance.

In Rotterdam the team once again used the lightweight mobdocks to close off the thruster tunnel on both sides. Once this was done they installed the thruster propeller blades one by one. With the thruster blades in position, the ship left Rotterdam on schedule.

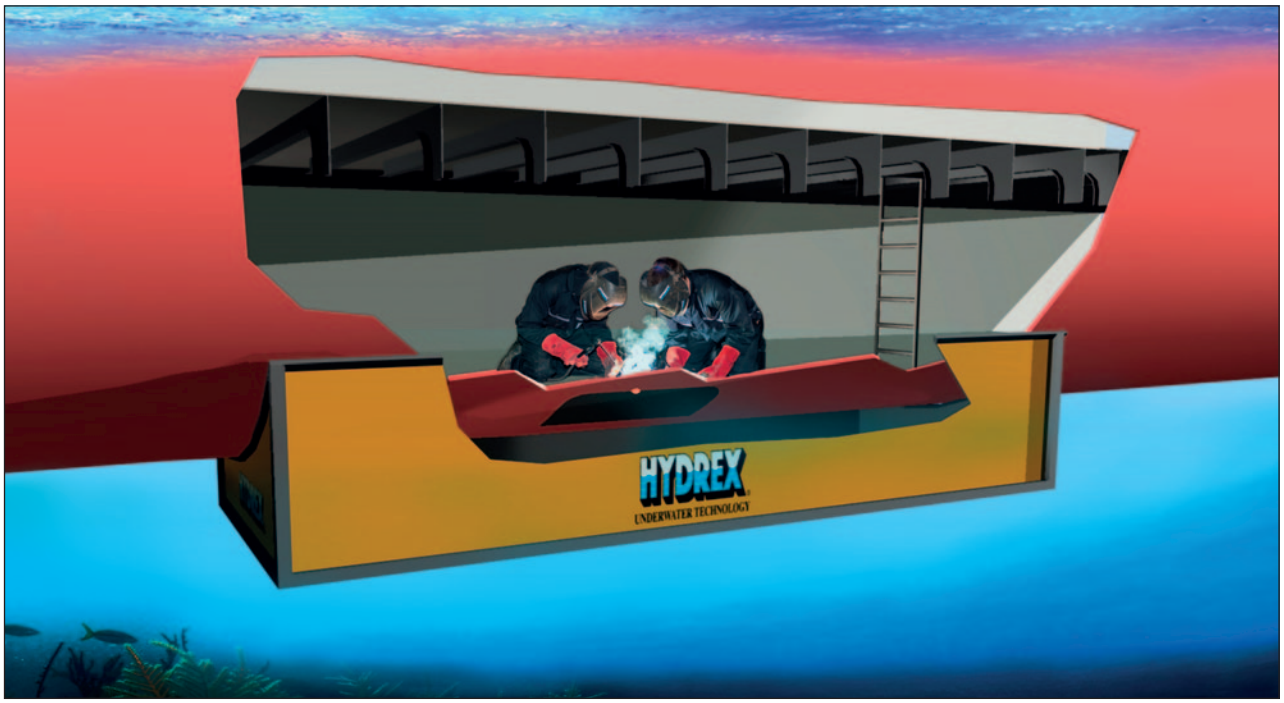
The thruster was removed by our team 2 1/2 months earlier in Rotterdam.

Conclusion

We can assist shipowners with almost any problem they encounter with their vessel's thruster. A wide range of underwater repair or maintenance work can be carried out to all types of thrusters. An entire unit can be overhauled, propeller blades or seals can be replaced or repair work on a specific part of a thruster can be performed by our diver/technicians on site.

Team members are trained to be flexible and adapt to rapidly changing circumstances. They worked in shifts around the clock and finished the job well within the available time frame. By performing the operation in steps on-site and underwater, Hydrex made it possible for the owner to stick to his schedule. ■

Hydrex hull repairs save time and money



Hydrex on-site hull repair services include the renewal of both small and large areas of damaged hull plating. These repairs can be carried out above or below water, according to the circumstances, with tailor-made cofferdams. Normal commercial activities can therefore continue without disruption. These operations follow the Hydrex procedure for welding cracks in the vessel's shell plating and they are approved by all major classification societies.

Hydrex diver/technician teams carry out these on-site hull repairs all over the world. In most cases the damaged area can be replaced with a permanent insert and no condition of class is imposed. On the rare occasions where the damage does not allow such a repair, a temporary doubler plate is installed over the affected area. This allows the owners to keep to their schedule and have a permanent repair carried out during the next scheduled drydock visit.

To offer the fastest possible service to customers, Hydrex offices have fast response centers where an extensive range of state-of-the-art tools and diving support equipment is available at all times for the repair teams to mobilize to your location.

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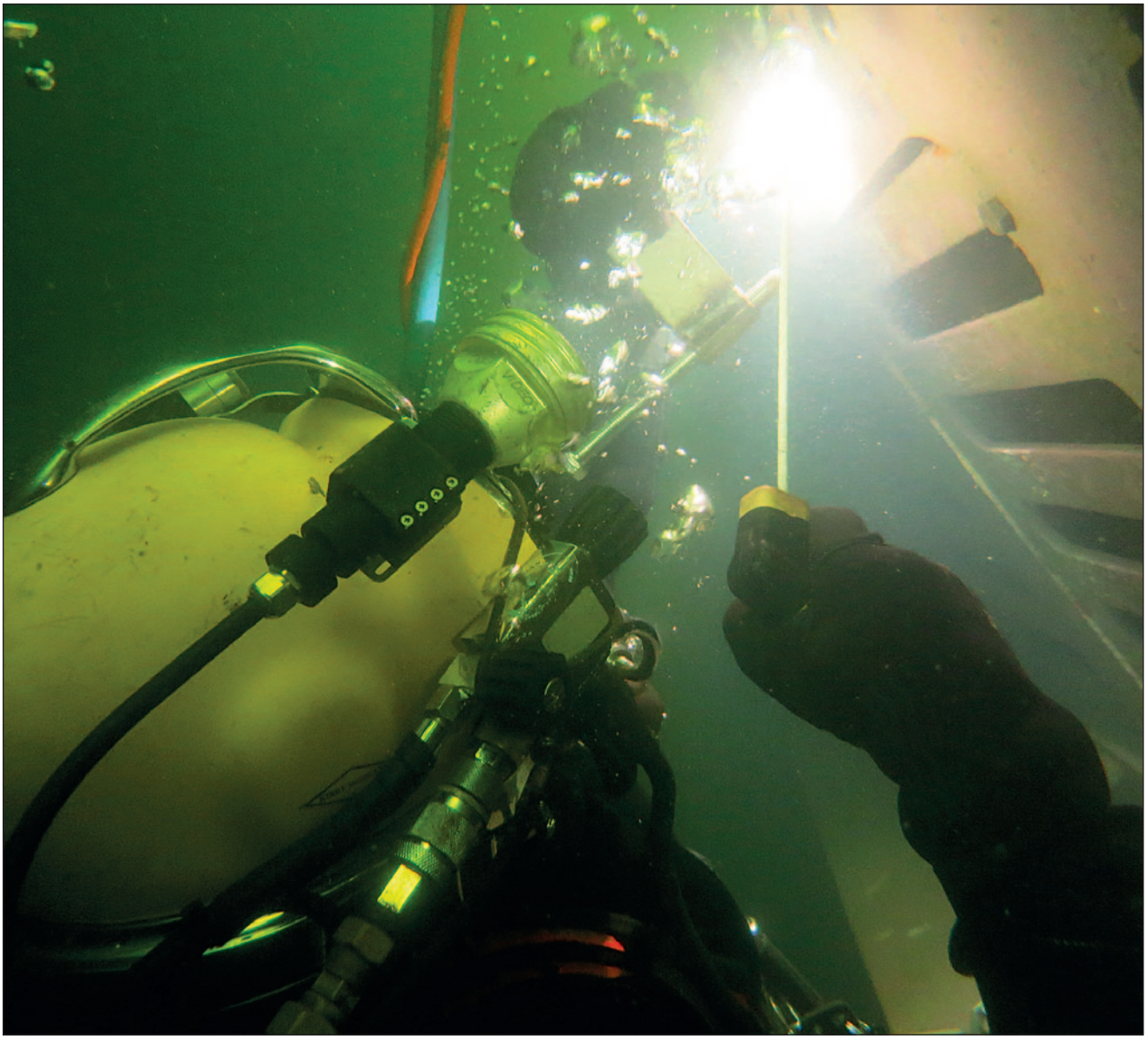

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