HYDREX®

UNDERWATER TECHNOLOGY

Magazine

Number *315*

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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UNDERWATER TECHNOLOGY

+ 32 3 213 5300 (24/7)
hydrex@hydrex.be
www.hydrex.be

Editorial

Although Hydrex performs routine underwater maintenance and repair jobs every day, from time to time an unusual situation arises which requires major hull repair.

It takes great skill, coordination and superior teamwork to be able to respond to a major emergency quickly and get the job successfully carried through to completion so that the ship can again sail, often to drydock for permanent hull repair.

In this magazine you will read about one such recent operation when Hydrex was called in to rescue a ship that had run aground. A 45-ton cofferdam, carefully designed and fabricated and then fitted in place, was used to temporarily handle the major damage that had been inflicted. When surprises came up during the job, as they often do, the technicians and the team at headquarters were able to solve them too, so that the ship could sail.

As always, don't hesitate to contact us if you need our assistance with any problem you might encounter with your vessel.

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

ISO 9001 certified

Underwater services and technology approved by:

BUREAU VERITAS · ABS SERVICE SUPPLIER · LRQA CERTIFIED ISO 9001 · LRQA CERTIFIED · APPROVED SERVICE SUPPLIER DNV DNV.COM/AF · ADC International · ClassNK · RINA · LR

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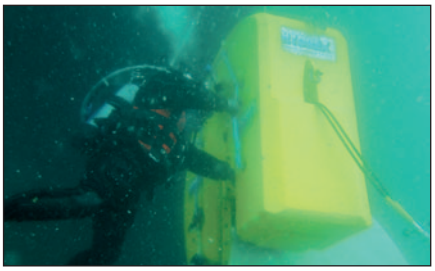

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45-ton cofferdam to repair a large bulk carrier after a severe grounding

When a fully laden, 300 x 50m, 207,000 ton DWT bulk carrier suffered heavy damages from a grounding in Suez, the owners and management's first thought was to call Hydrex. Over the years, Hydrex has earned a reputation for being able to tackle the most challenging underwater and afloat rescue and repair operations. In this case the ship was carrying a valuable cargo and every day she was out of action represented a huge loss to the owners.

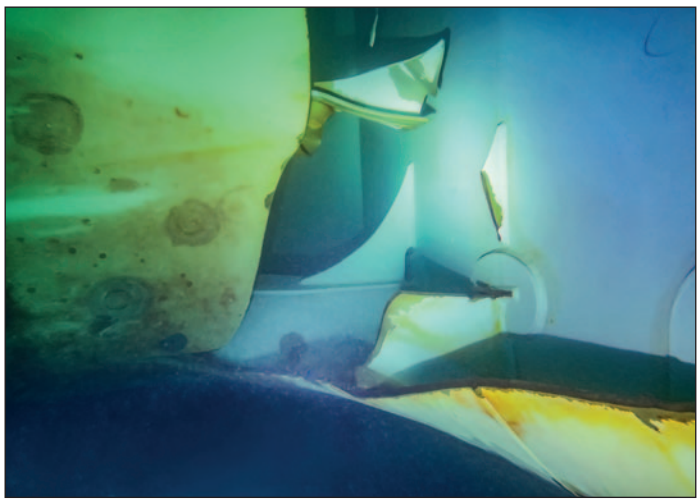
Welding the cofferdam in place.

Hydrex was contacted by the vessel's management requesting urgent assistance with repairing the damage so that the ship could sail again. The ship had suffered a breach of the hull and port side water ballast tanks (WBT) 1, 2 and 3 were letting in water. The ship was moved under state and class supervision and with a tug escort to Great Bitter Lake for an underwater survey. When the call for help arrived at Hydrex headquarters in Antwerp, the Hydrex team responded immediately. Calls of this nature are answered 24/7. There is always someone on duty to take the call and start the necessary actions to begin the job.

Inspection and planning

Hydrex proposed sending a team of divers to the ship in Suez to assess the damage and gather the information needed to come up with a detailed plan for repairs to enable the ship to sail to drydock. This proposal was accepted and the team rapidly mobilized.

The underwater inspection revealed and documented the full extent of the damage, which was quite severe. It included one hull penetration at



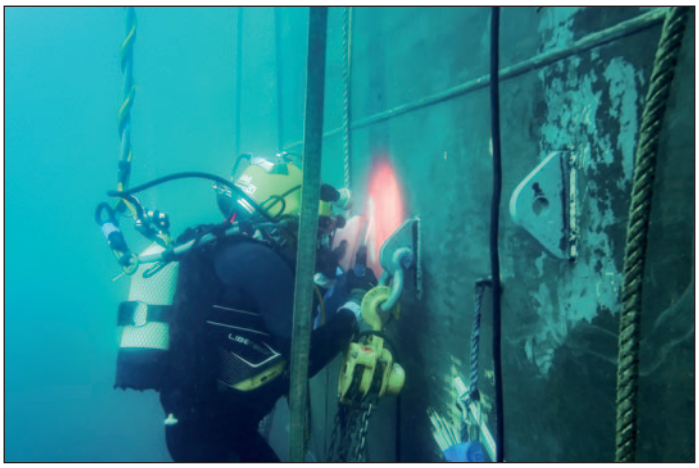
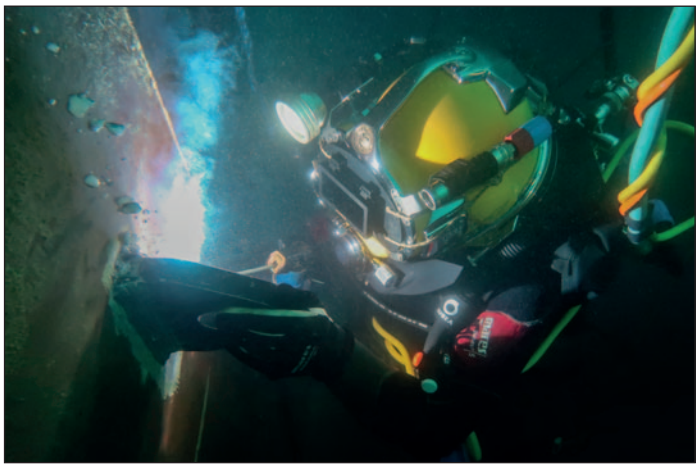
Severe damage to the hull from the grounding.

Fabrication of the 45 ton cofferdam.

the turn of bilge 7m long with a maximum width of 5m and another smaller penetration of 10x5 cm.

Based on the initial inspection and rough measurements, a plan was proposed to carry out precise measurements of the hull where the large damage occurred so that a cofferdam could be designed which would then be installed to make the hull watertight so that the water ballast tanks could be pumped out.

The proposal for handling the additional damage was to arrest the crack by drilling holes and then weld a doubler plate over the large crack in the hull. The plan was approved by class (LR), and ship management gave the go ahead to implement it. The Hydrex team took

Welding padeyes on the hull.

full measurements of the hull in the damaged area using a fabricated frame. The measurements were relayed to the engineers in Antwerp who produced drawings for the yard in Egypt where the cofferdam was fabricated. The final cofferdam consisted of a frame or shell with a flange built to the shape of the hull and insulation material to make it watertight.

45-ton cofferdam

As soon as the fabrication was completed, a Hydrex team of eight diver/welder/technicians flew back to Suez to install the cofferdam. After some needed modification, the massive, 45-ton cofferdam was lowered into position by crane and secured against the hull with welded screw dogs, stoppers and thick seals.

However, with the cofferdam secured in place, when an attempt was made to empty out WBT 2, the pressure of the water was too much for the structurally weak hull which started to cave in under the force. Evacuation of the ballast tank was halted. It became clear that the ship had suffered too much internal damage to permit the water ballast tanks to be fully pumped out. This was not something that could have been predicted or remedied with the ship afloat.

Cement boxes

In order to reinforce the bulkhead between the water ballast tanks, a new plan was proposed to build cement boxes and pour concrete to provide enough strength for the bulkheads in between the ballast tanks. But WBT 2 port could not be emptied. Part of the plan, therefore, was to lighter the ship as necessary until the class-required draft could be achieved.

Seaworthy

With the cement boxes in place, the cofferdam was fully secured and sea trials were conducted. The officers and crew of the ship were very happy with the results and a final inspection of the cofferdam was conducted and showed that all was secure and ready for sailing. The Hydrex team's job was done and they headed home to Antwerp. Many of them had spent their Christmas working on the distressed vessel. It was a long haul with many ups and downs and unexpected twists and turns, but in the end, persistence won the day.

Internal damage in the water ballast tanks was very severe.

Concrete used to strengthen the bulkhead between water ballast tanks 2 and 3.

Crane barge moving the cofferdam into position.

When the ship arrived in drydock, the sheer size of the cofferdam could be appreciated.

Safely in drydock

Because WBT 2 could not be pumped out, the ship had to be partially lightered so that the class-required draft could be achieved and she could sail on to drydock. Once the ship was dry, it was possible to see the sheer magnitude of the repair job. It was the largest cofferdam ever installed in a hull repair by Hydrex. It remained firmly in place until it could be removed when the ship was in drydock and permanent hull repair could be carried out.

Conclusion

When carrying out underwater repairs, especially on an emergency basis, unexpected situations inevitably arise. The test of the divers and technicians carrying out the repairs is whether they have the knowledge and experience to think on their feet and solve the problems that come up. Team work and support from the technical services group at headquarters play a vital part in the successful outcome.

Hydrex is known for persistence and for getting the job carried through to a successful outcome no matter that the situation and circumstances. This was another example of these qualities and characteristics in action. ■

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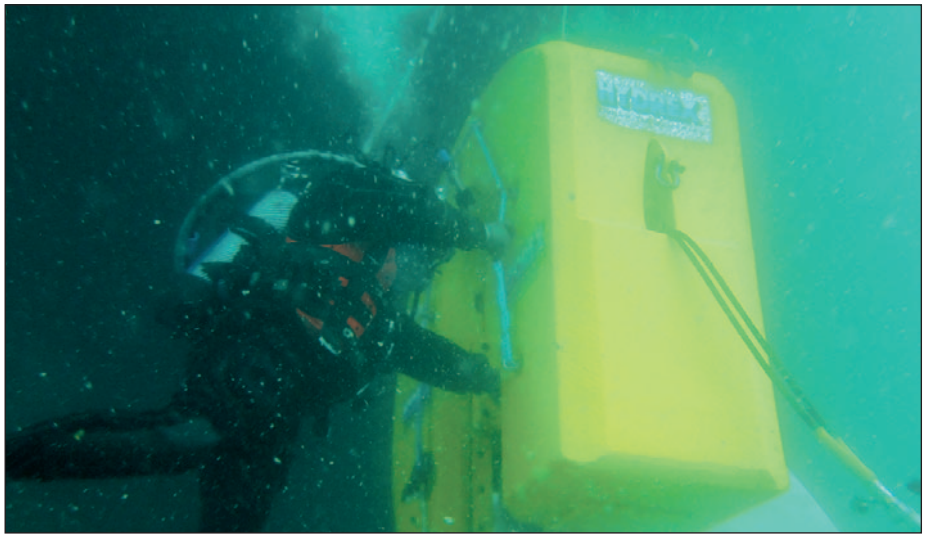
Underwater re

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 an

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 at anchorage and cargo operations contin

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.

epair solutions

ny problem encountered with thrusters.

y type of rudder while the vessel remains
nue.

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 bow thruster removal and reinstallation in Naples

To save time and money for the owner of a 200-meter roro ship, our divers removed the bow thruster of the ship and reinstalled the unit after it was overhauled while the vessel was at anchorage in Naples, Italy. By carrying out both parts of the operation underwater the ship could stay operational and did not have to go to drydock.

After the team set up a monitoring station next to the vessel, the divers started the operation with a detailed inspection of the bow thruster and tunnel. In the meantime, initial preparations were made in the bow thruster engine room for the removal of the unit so that there would be no ingress of water once it was taken out.

The divers first action was to take off the external thruster tunnel grids to provide access for removal of the unit. Next pad eyes were welded inside the tunnel to hoist the thruster unit up and down.

The next step was to secure the gearbox with hoisting equipment. The team then disconnected the unit from the engine room and removed it from the thruster tunnel. It was then brought to the surface where it was overhauled by the OEM's technician, with assistance of our diver/technicians.

Because the thruster was fully assembled and prepared, it could be installed in its entirety without the need to create a dry environment in the tunnel as is required when the blades are installed separately. Our diver/technicians lowered it into the water and brought it into the thruster tunnel. The team secured the unit and connected it to the engine room.

Bow thruster during initial inspection of the tunnel and grid.

The operation ended with the removal of the pad eyes and the reinstallation of the thruster tunnel grids.

Conclusion

We assist shipowners with almost any problem they encounter with their vessel's thrusters. A wide range of underwater repair or maintenance work can be carried out on all types of thrusters. An entire unit can be overhauled, propeller blades or seals can be replaced or repair work on a

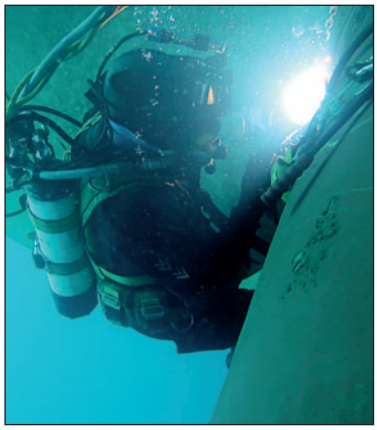
Thruster unit brought to the surface.

The bow thruster unit could be removed and reinstalled with the blades attached.

Hydrex diver working on the tunnel grids.

Bow thruster on Hydrex truck prior to overhaul.

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 many 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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Hydrex technician during overhaul of the thruster.

specific part of a thruster performed by our diver/technicians while the ship remains afloat.

By performing the operation in Naples on-site and underwater our divers made it possible for the owner to keep the vessel out of drydock. Our team worked in shifts around the clock to finish the operation as quickly as possible.

If you have any questions regarding bow thruster or other repairs, do not hesitate to contact us. We are at your disposal 24/7 and ready to mobilize almost immediately. ■

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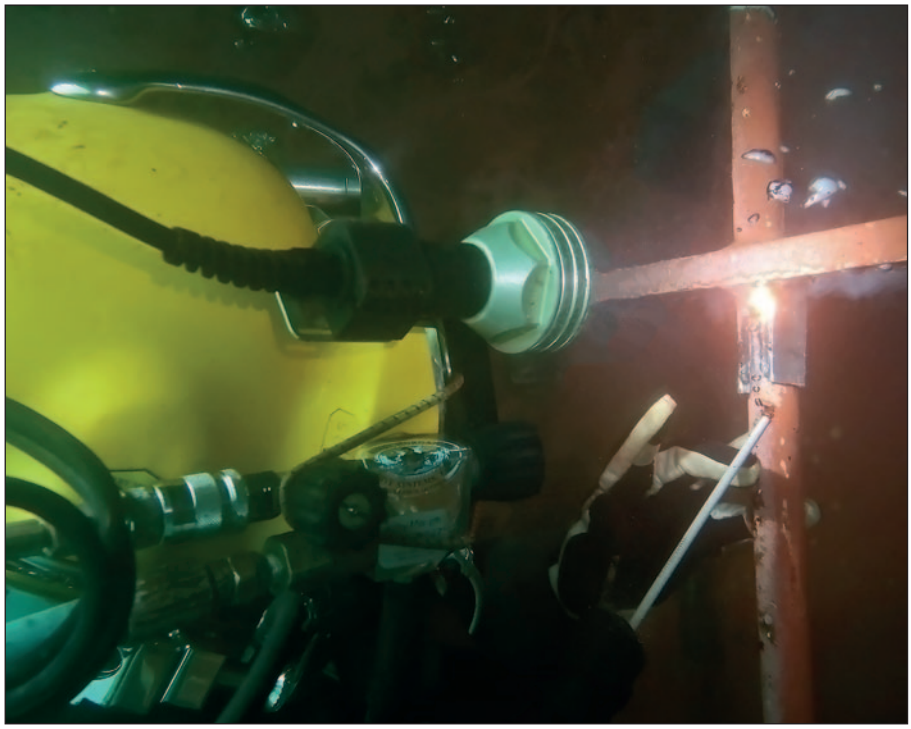

Reinstallation of the tunnel grid after the unit was back in place.

Dive and afloat repair workboats in Rotterdam and Antwerp

Our offices in Antwerp and Rotterdam have workboats available for immediate mobilization. These vessels can be used for a wide range of operations in Belgium, the Netherlands, the United Kingdom and France.

The catamarans are fully equipped as dive support stations for welding and general repair with hydraulic cranes, hydraulic winches, nautical and communication equipment and a dive control room.

The workboats are docked right outside the Antwerp office, where a wide range of state-of-the- art equipment and tools is available at all times and in the center of the Rotterdam port from where we can mobilize throughout the entire port within hours.

Hydrex has experienced diver/technicians ready to mobilize together with the workboats.

Both workboats are fully equipped as dive support stations.

Hydrex workboat during operation.

The workboats are stationed in Antwerp and Rotterdam where a wide range of extra equipment is available.

Hydrex has experienced and certified teams of diver/technicians ready to mobilize together with the workboats. They can carry out routine operations as well as highly technical repair work within a very short time frame and all to Hydrex's well-known high quality standards.

Contact us 24/7 for more information about these vessels or the underwater services Hydrex offers. ■

Workboat during operations in Rotterdam.

If you have received this magazine at the wrong address or if your company is going to move, please let us know.

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KEEPING SHIPS IN BUSINESS

Inwater propeller repairs

When 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 straightened 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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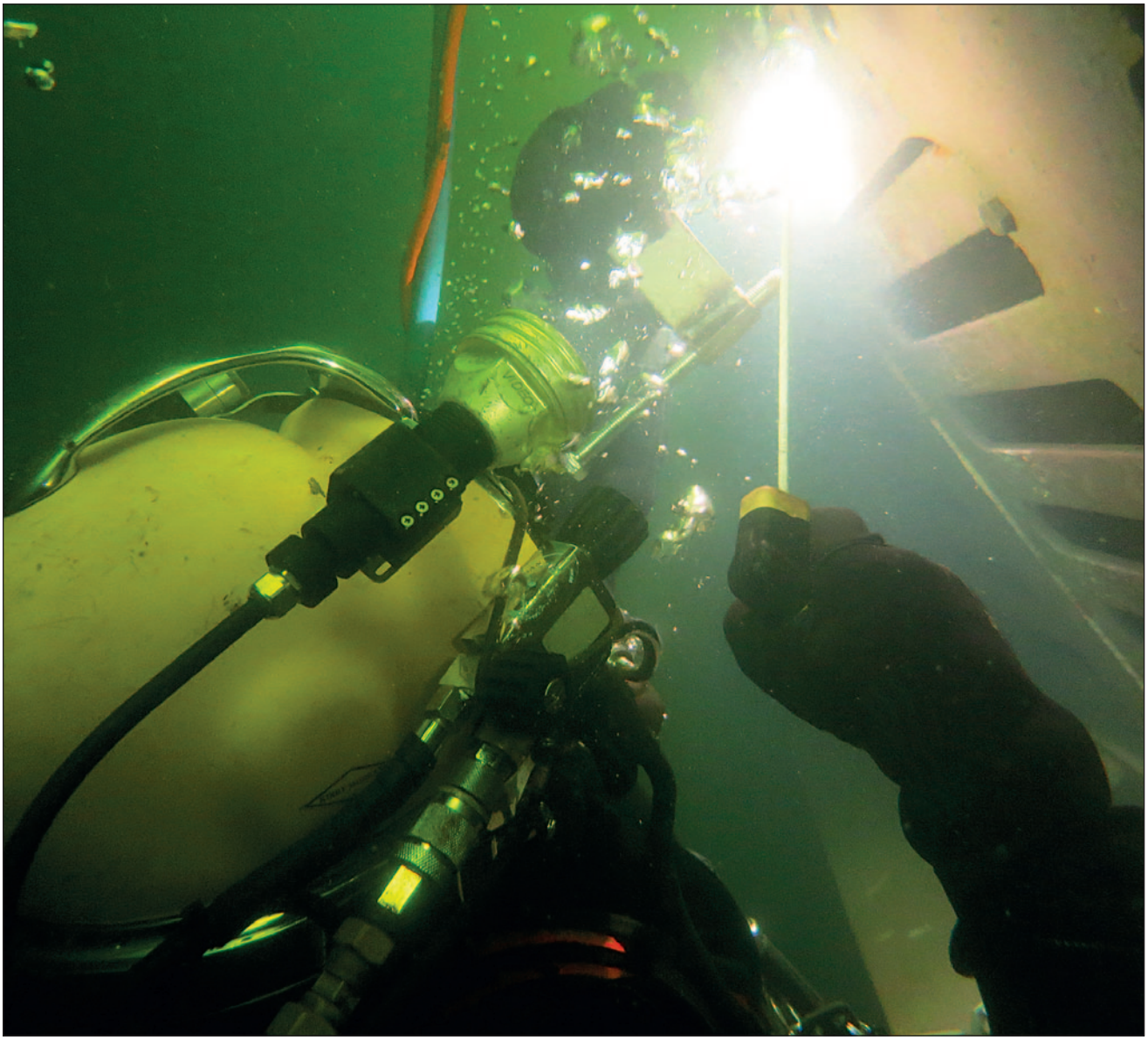

HYDREX®
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Headquarters Hydrex N.V. - Antwerp
Phone: +32 3 213 5300 (24/7)
E-mail: hydrex@hydrex.be

Hydrex Rotterdam
Phone: +31 10 313 25 19 (24/7)
E-mail: info@hydrex.nl

Hydrex Spain - Algeciras
Phone: +34 956 675 049 (24/7)
E-mail: info@hydrex.es

Hydrex LLC - Tampa, U.S.A.
Phone: +1 727 443 3900 (24/7)
E-mail: info@hydrex.us

www.hydrex.be