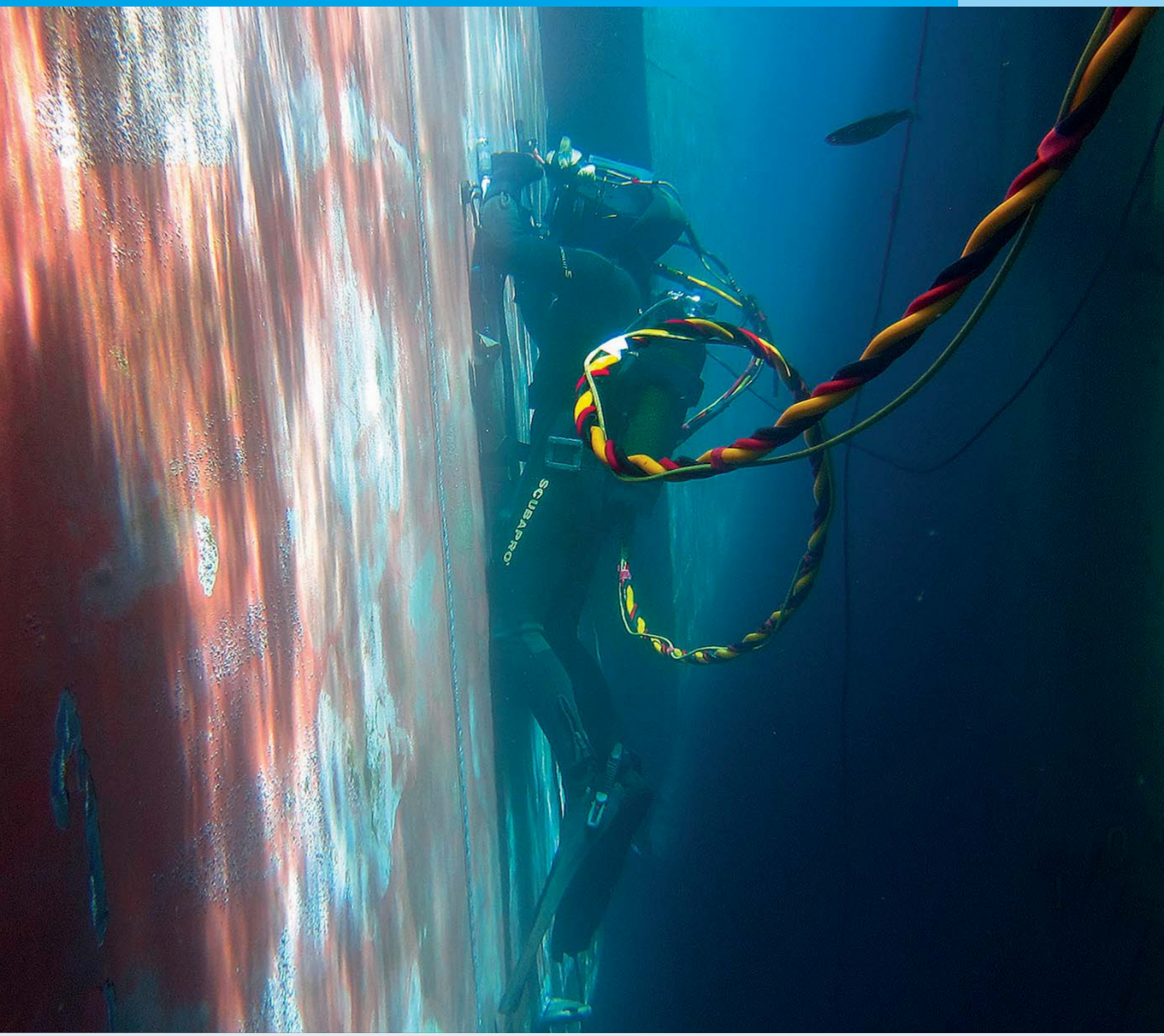
HYDREX®

UNDERWATER TECHNOLOGY

Magazine

Number *221*



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Swift on-site bow thruster operations

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 with-out 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.

HYDREX®
UNDERWATER TECHNOLOGY

Phone: + 32 3 213 5300 (24/7)
Fax: + 32 3 213 5321
hydrex@hydrex.be

www.hydrex.be

Editorial

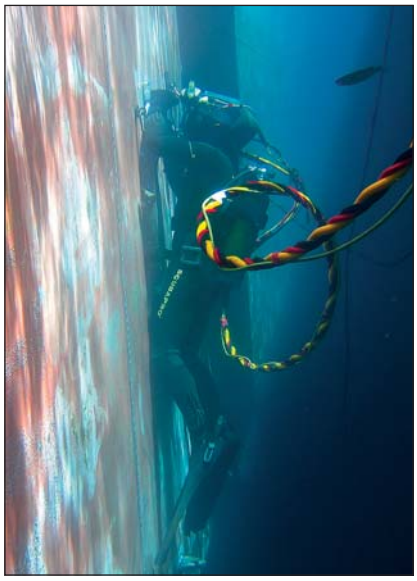
The first article in this month's magazine talks about a recent underwater rudder crack repair in Israel. The operation allowed the vessel to sail on safely until the next scheduled drydocking.

In the second article you can read about a successful propeller cropping that we carried out in South-Korea under challenging weather circumstances. With the five blades of a bulk carrier's propeller severely bent, a fast on-site solution was needed to restore the propeller's balance with a minimal loss of efficiency.

Further on in the magazine we give an overview of how Hydrex can carry out permanent hull repairs on vessels without disturbing commercial activities. These operations are fully approved by all the major classification societies. They can be carried out very swiftly and save you precious time and money.

Do not hesitate to call us when you need any repair or maintenance work performed. Hydrex has the means and knowledge to provide you with a fast, underwater solution. This will enable you to keep your vessel sailing safely, economically and on schedule.

Hydrex founder
Boud Van Rompay



Cover: Hydrex diver/technician during hull operation.

HYDREX N.V.
On Time Worldwide High Quality Underwater Services

ISO 9001 certified

Underwater services and technology approved by:

BUREAU VERITAS
ABS
ClassNK
ADC International
RINA
Lloyd's Register

To receive a free copy, fax to:
Hydrex N.V. +32 3 213 53 21
or e-mail to hydrex@hydrex.be

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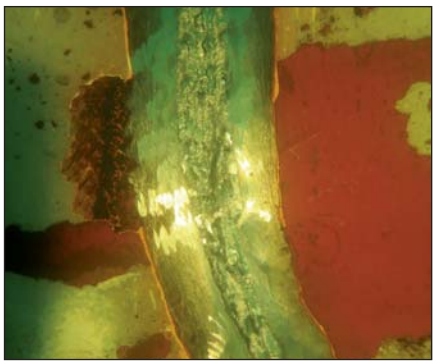

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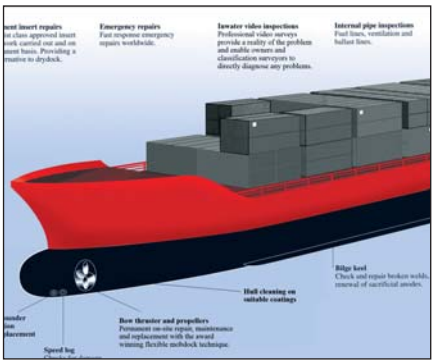

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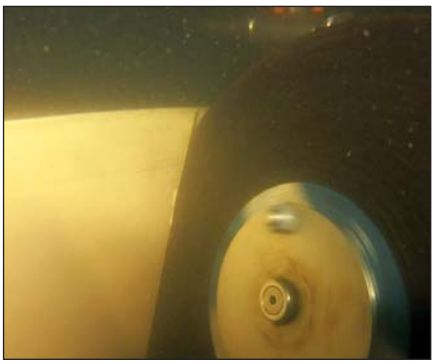

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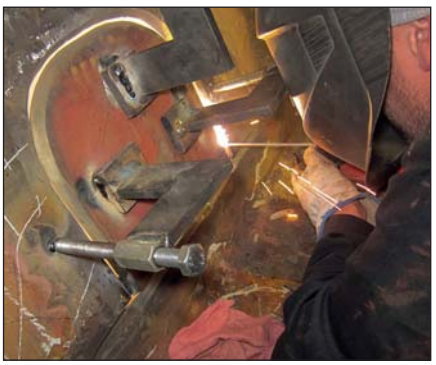


Hydrex *permanent* hull repairs out of drydock **13-14**

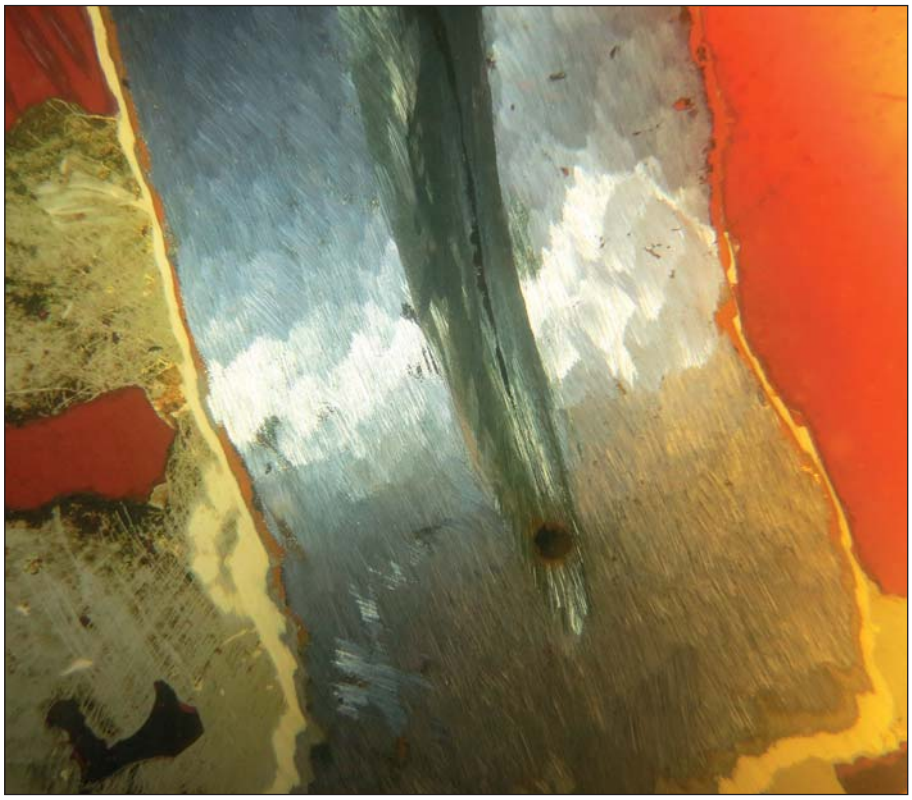
Underwater rudder crack repair in Haifa

At the end of March a Hydrex team traveled to Haifa, Israel to carry out a crack repair on the rudder of a 260-meter container vessel.

The divers started the operation with a detailed underwater inspection of the affected area. This was done under the supervision of a representative of the classification society. With the measurements taken during this inspection, a complete assessment of the damage could be made. This allowed us to create the best possible repair plan for the problem

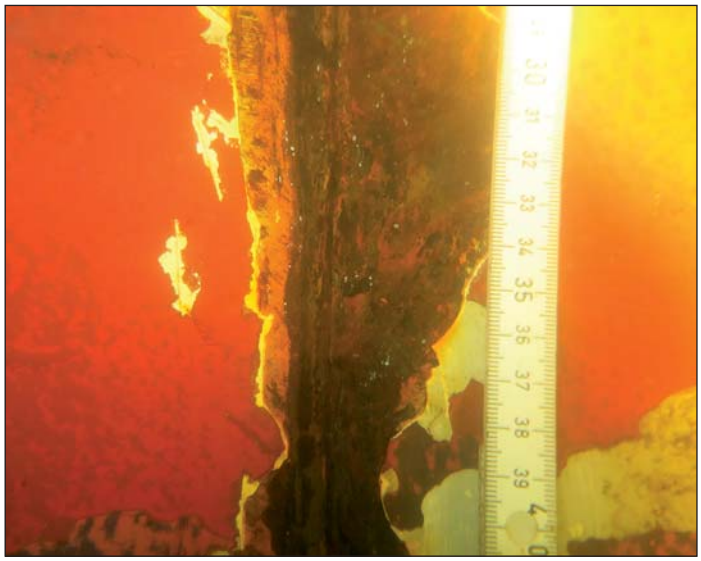
A 690 mm crack was found, partially covering the weld seam of the portside rudder cover plate. The crack was curved at the top and the bottom. Crack arrests had already been made at both ends to prevent it from spreading further. A more thorough solution was now needed to fix the problem.

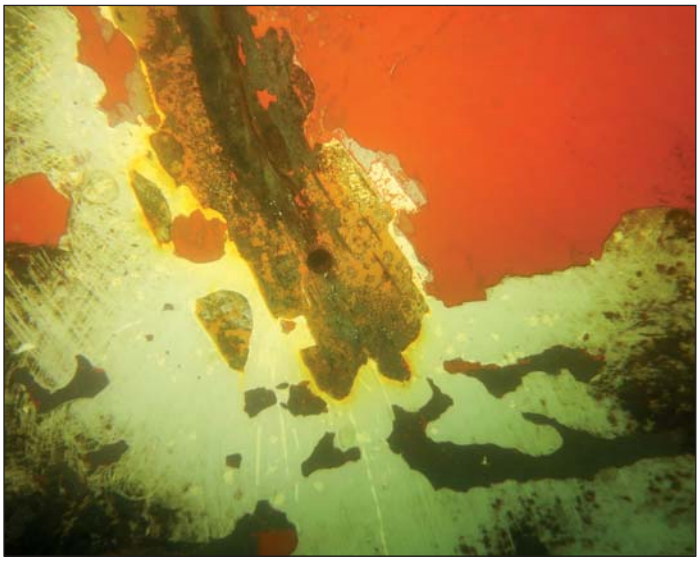
In consultation with the class surveyor a repair plain was devised. First the Hydrex diver/technicians ground out the crack in a v-shape. They also ground the surrounding area. Then a root weld was put in the crack.



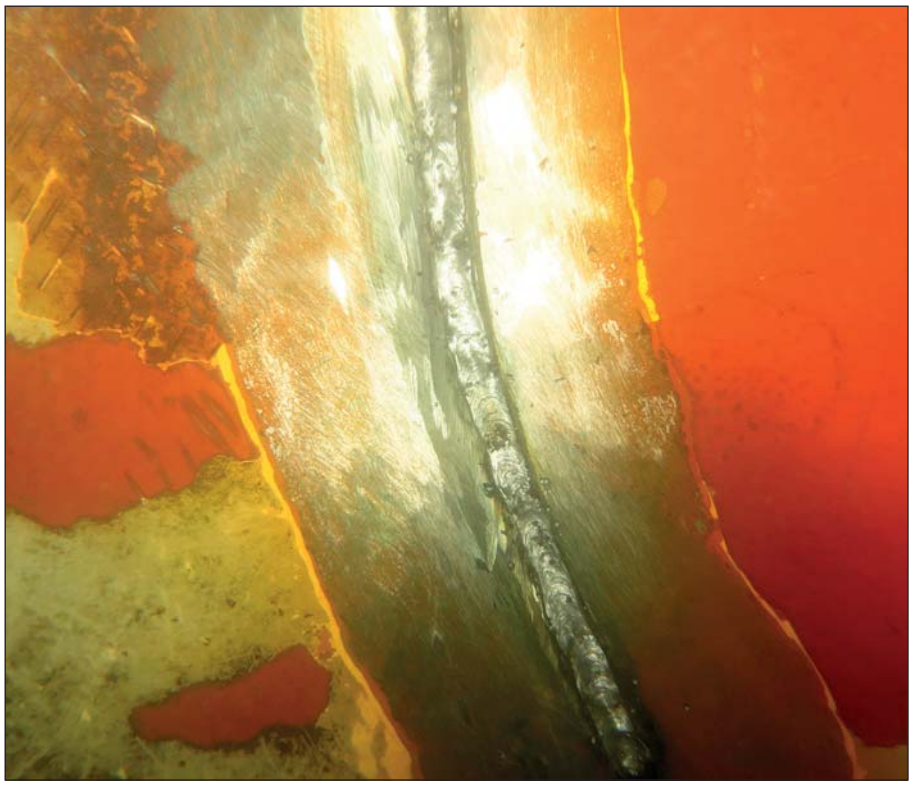
The crack and the surrounding area was cleaned and ground first.

Next the team filled the crack with welding beads. The repair was finalized with a steel reinforcement bracket that was installed over the middle of the affected area.





690 mm crack in the rudder of a container vessel.

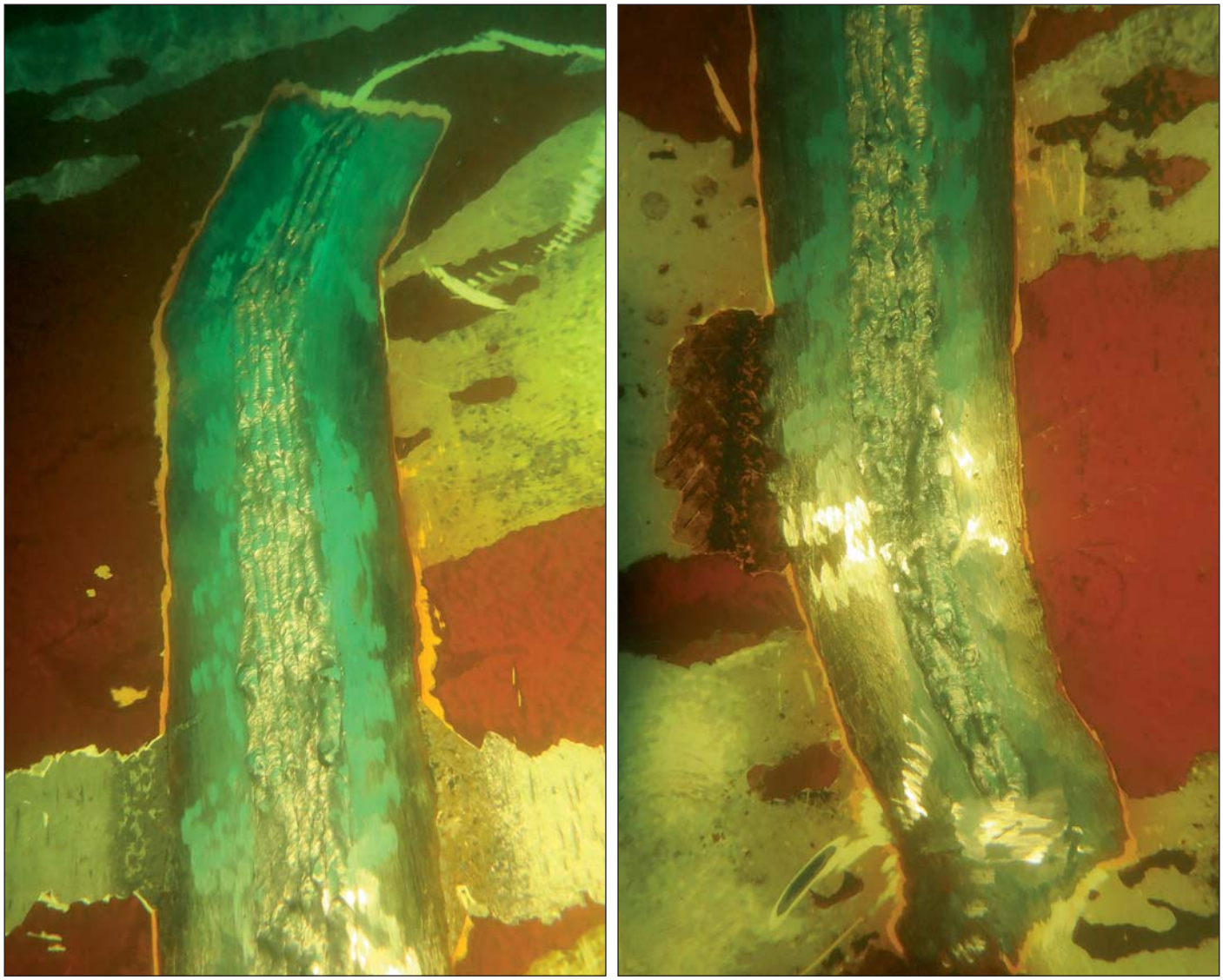


Root weld put in the crack.

A successful pressure test was performed to make sure that the dry rudder compartment behind the crack was not compromised. The surveyor then gave his approval for the repair.

The operation allowed the vessel to sail on safely until the next scheduled drydocking. ■

KEEPING SHIPS IN BUSINESS



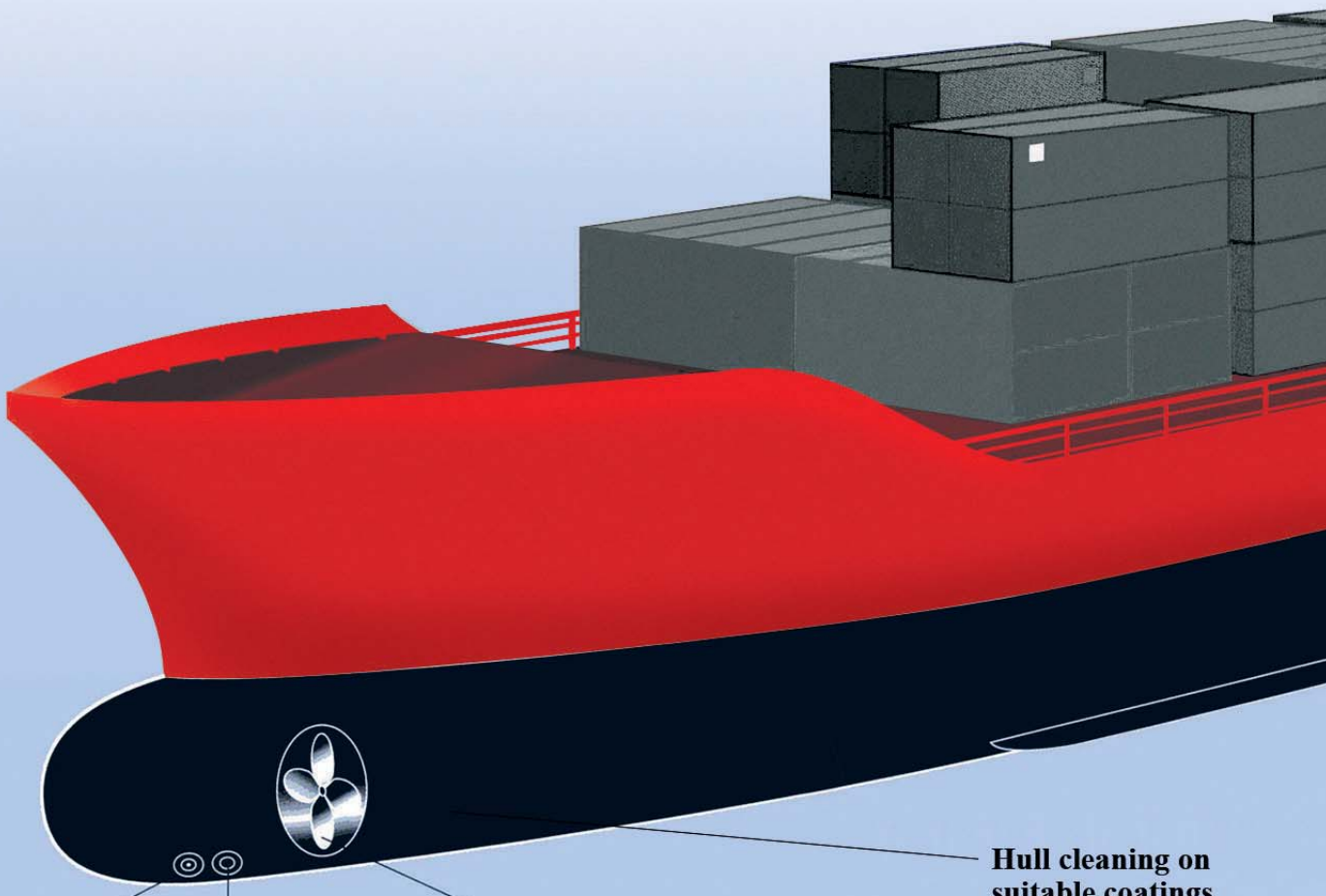
After the crack was filled, the vessel could sail until the next scheduled docking.

High quality in-water ship rep

Permanent insert repairs
Specialist class approved insert repair work carried out and 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.



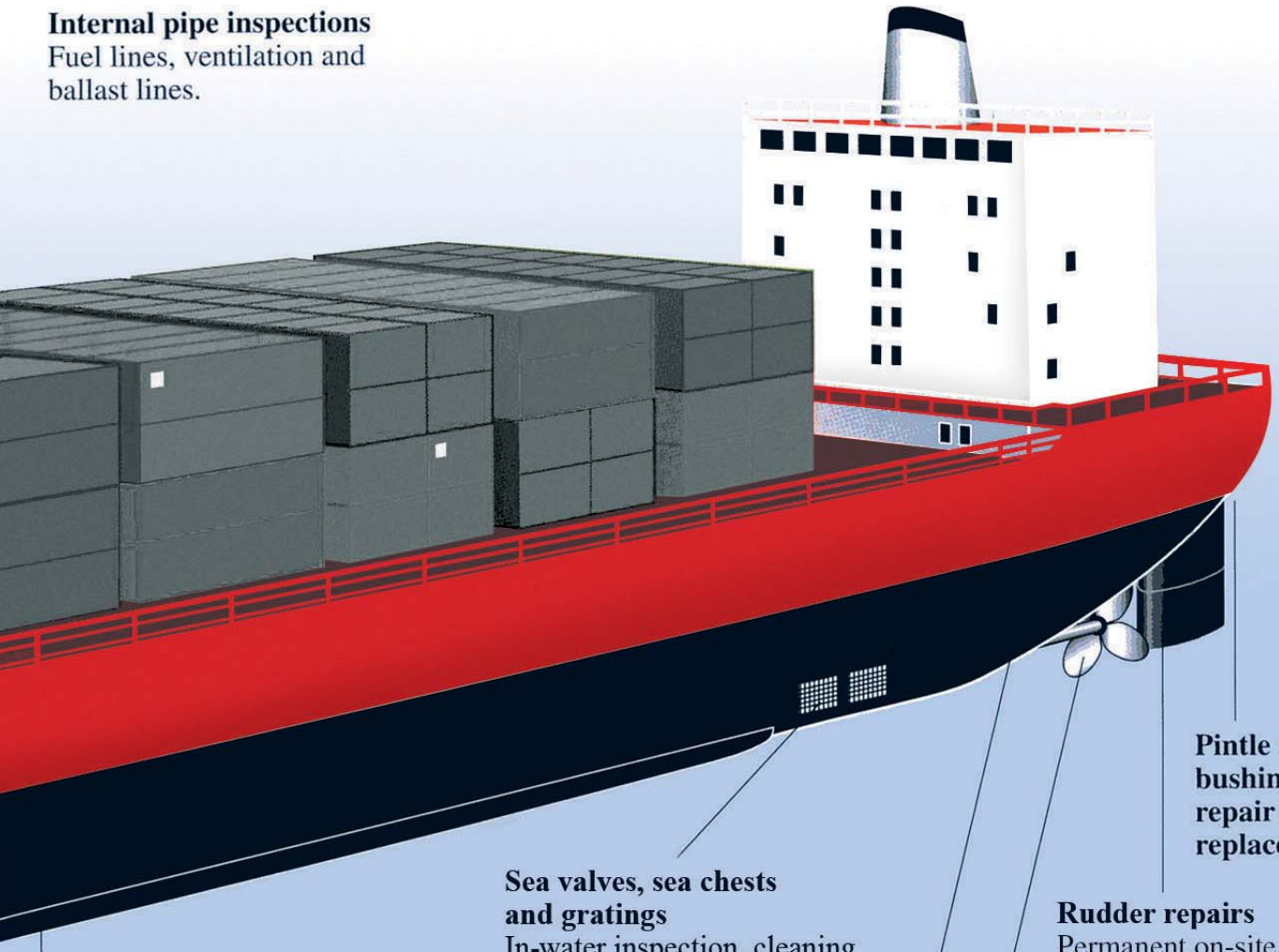
Hull cleaning on suitable coatings

Echo sounder inspection and replacement

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

Speed log
Checks for damage and marine fouling.

air and fuel saving services



Internal pipe inspections
Fuel lines, ventilation and ballast lines.

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

Sea valves, sea chests and gratings
In-water inspection, cleaning and repair of intakes and valves, installation of new sea chests, condensers and coolers afloat.

Stern tube seal replacements
Permanent inwater stern tube seal replacements and repairs with the unique Hydrex flexible mobdock technique.

Pintle and bushing repair and replacements

Rudder repairs
Permanent on-site repairs on all types of rudders with groundbreaking new technology.

Propeller operations
Propeller buffing with special tools, on-site blade straightening and cropping. Permanent repairs to all types of propellers or installation of propeller cone fins.

KEEPING SHIPS IN BUSINESS

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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Phone: + 32 3 213 5300 (24/7)
Fax: + 32 3 213 5321
hydrex@hydrex.be

www.hydrex.be

Underwater propeller blade cropping in Yeosu restores efficiency

Last month a diver/technician team performed a successful propeller blade cropping operation on a 190-meter bulker under difficult weather circumstances while the vessel was at anchorage in Yeosu, South-Korea. An underwater inspection was done by our local support base. This revealed that all five blades were bent severely, with two of the blades bent 90° or more. The blades had also suffered cracks and dents along the trailing edges. Cropping was the only option.

Monitoring equipment, ready for operation in South-Korea.

With the five blades of the bulk carrier's propeller severely bent, the motor was overloading. A fast on-site solution was needed to restore the propeller's balance with a minimal loss of efficiency. A Hydrex team was therefore rapidly mobilized to the ship's location in South-Korea on the same day the results of the underwater inspection came in. With these results our technical department devised a repair plan to restore the efficiency of the damaged blades as well as the propeller's balance. This kind of repair is carried out with the propeller blade cutting equipment developed by the Hydrex research department. The equipment is lightweight and could easily be mobilized together with the divers.

All five blades also suffered dents and cracks along the edges.

One of the five severely bent propeller blades.

In-house developed cutting equipment used to crop the blades.

One of the cropped parts being lifted out of the water.

At the time of the repair there was a very high current. This meant that there was only a very small window available each day for our divers to safely perform the operation. Hydrex diver/technicians are trained to adapt to difficult circumstances and still carry out underwater repairs in the shortest possible time frame. They do this while keeping to the highest safety and quality standards. Their expertise and experience allowed them to easily divide the operation in parts so that they could crop the blades spread out over a number of days.

After the team arrived at the vessel's location, they started the underwater operation with a detailed survey of the affected propeller blades. The information acquired during the inspection was then used to calculate and determine the correct measurements needed to crop the propeller blades.

Next the divers cropped the blades and ground out the cracks in the blade edges. When the cropping was complete, the blades were polished to make sure that any remaining loss of efficiency would be minimal.

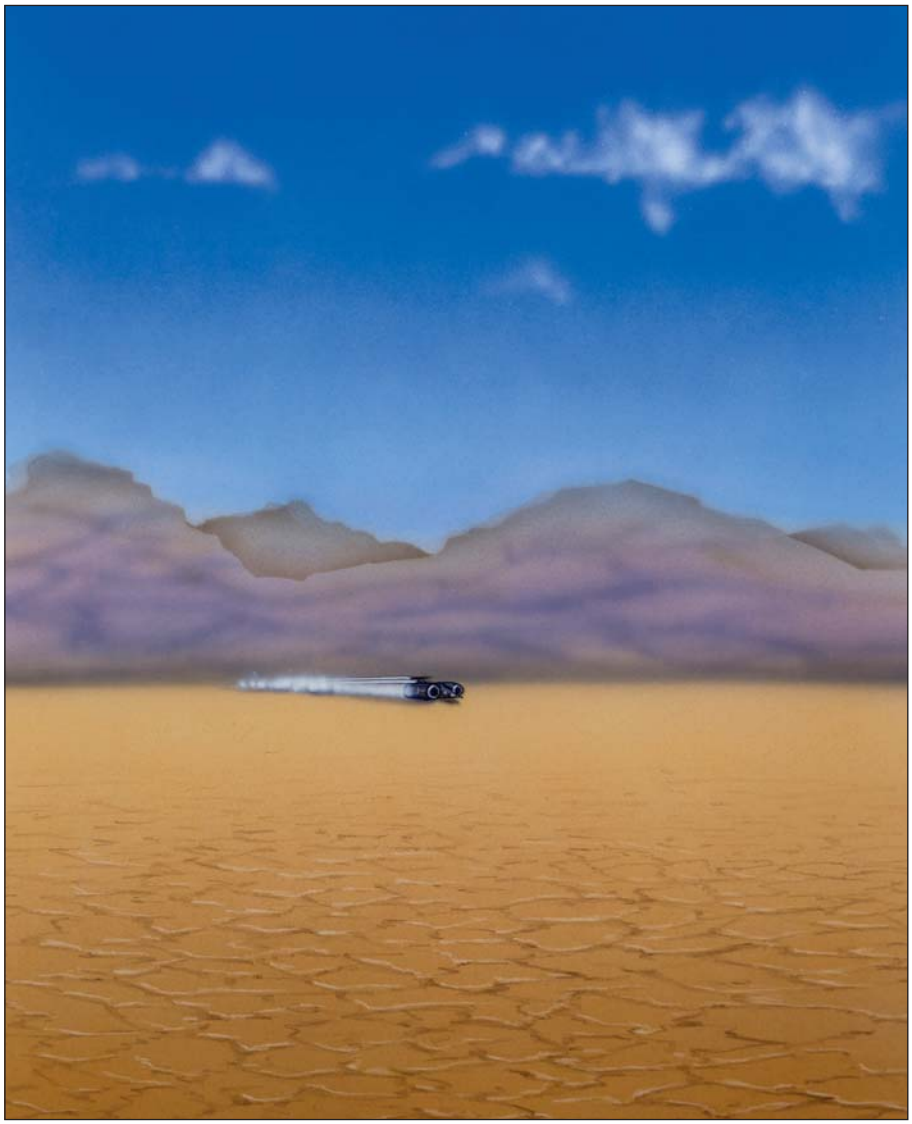
Two of the five bent blade tips that were cropped.

During the cropping a class surveyor was present. After a final inspection was performed, he gave his approval for the operation.

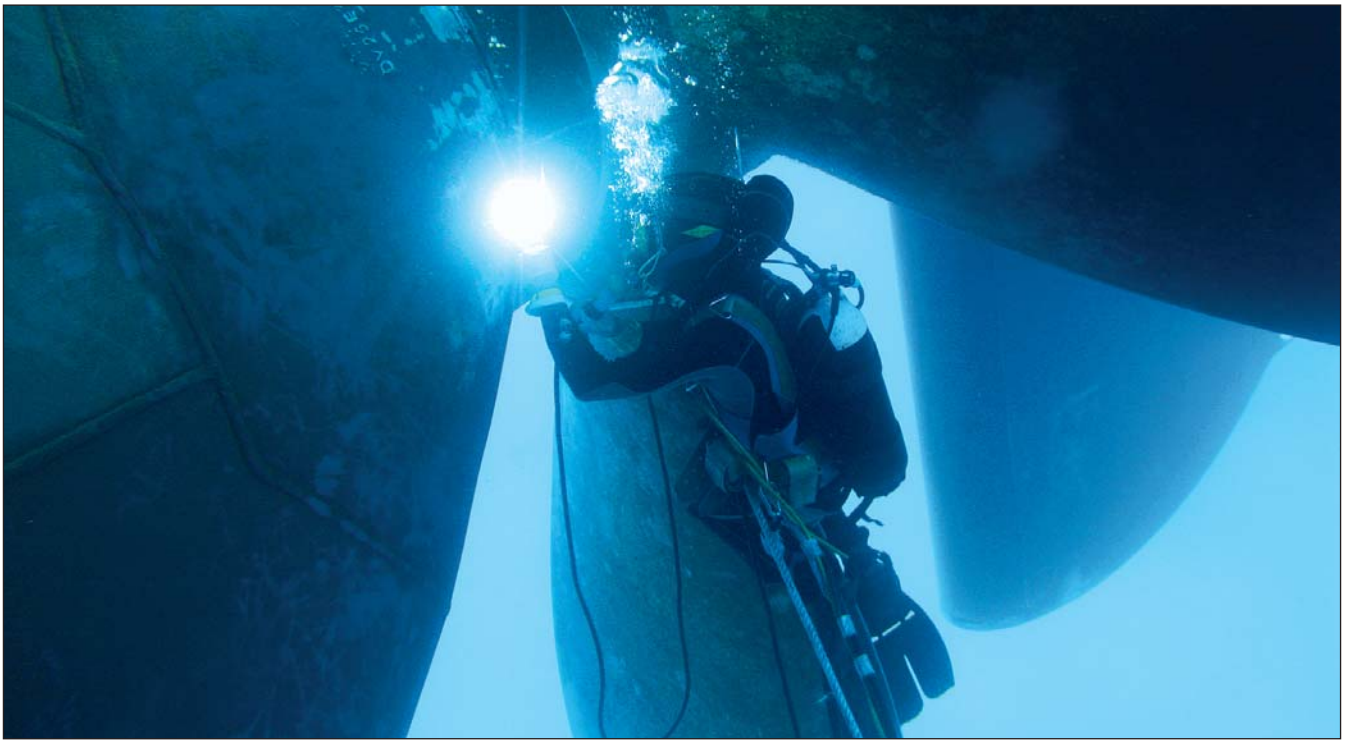
Conclusion

Damaged propeller blades will have a performance below average. The engine will have a higher work load. This results in increased fuel consumption and added stress. 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 type of repairs can be performed on-site and underwater, allowing a ship to return to commercial operations without the need to drydock. ■

The edges of the cropped blades were polished for maximum efficiency.



Hydrex US ready to mobilize immediately



Hydrex has an office located in Clearwater in the Tampa Bay area that is ready to mobilize immediately. The office has a fast response center that is equipped with an extensive range of state of the art logistics, trucks, tools and diving support equipment. This enables Hydrex US to efficiently service vessels and offshore units calling on ports in Canada, North, Central and South America as well as the Caribbean.

All staff members of the Hydrex office in Clearwater undergo stringent training at the Hydrex headquarters in Antwerp. They can carry out both simple and complex high quality jobs even in the harshest of circumstances.

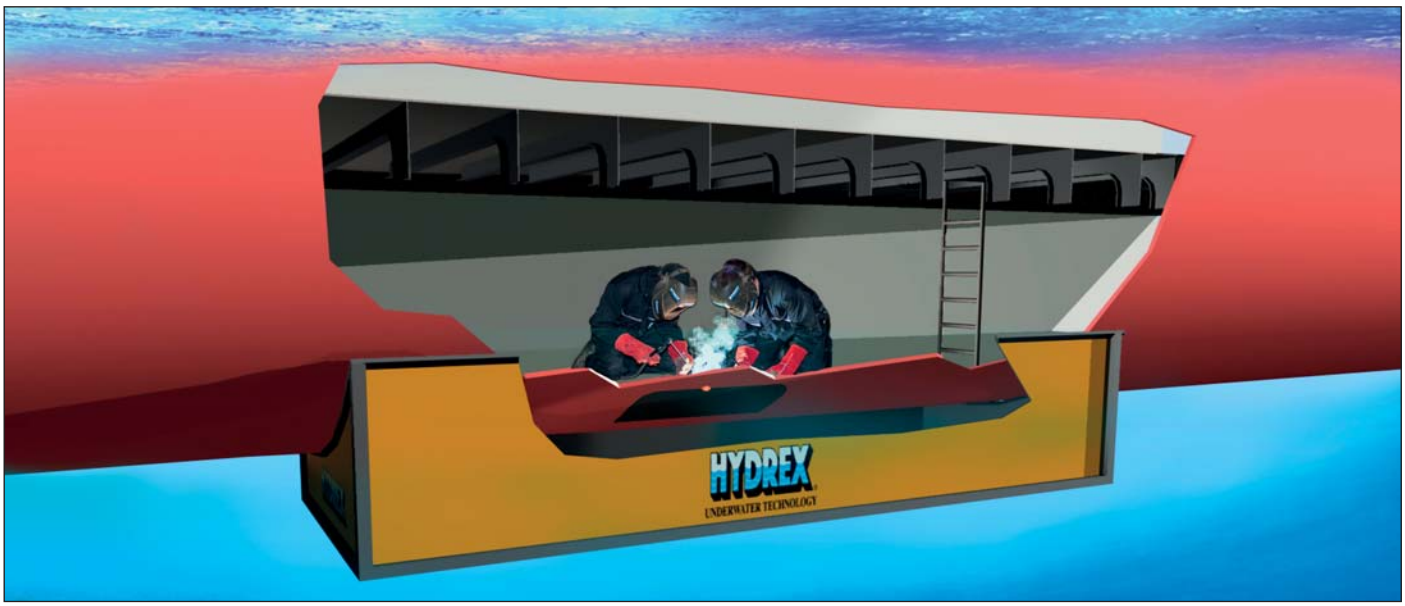
Repairs to thrusters, propellers, rudders, stern tube seals, damaged or corroded hulls and all other underwater repair as well as maintenance services are done while the vessel is afloat. This eliminates the need to drydock.

All used methods are fully approved by all major classification societies.

Hydrex US
604 Druid Rd,
Clearwater, FL 33756
Phone: +1 727 433 3900 (24/7)
Fax: +1 727 433 3990
info@hydrex.us

www.hydrex.us

Hydrex *permanent* hull repairs out of drydock

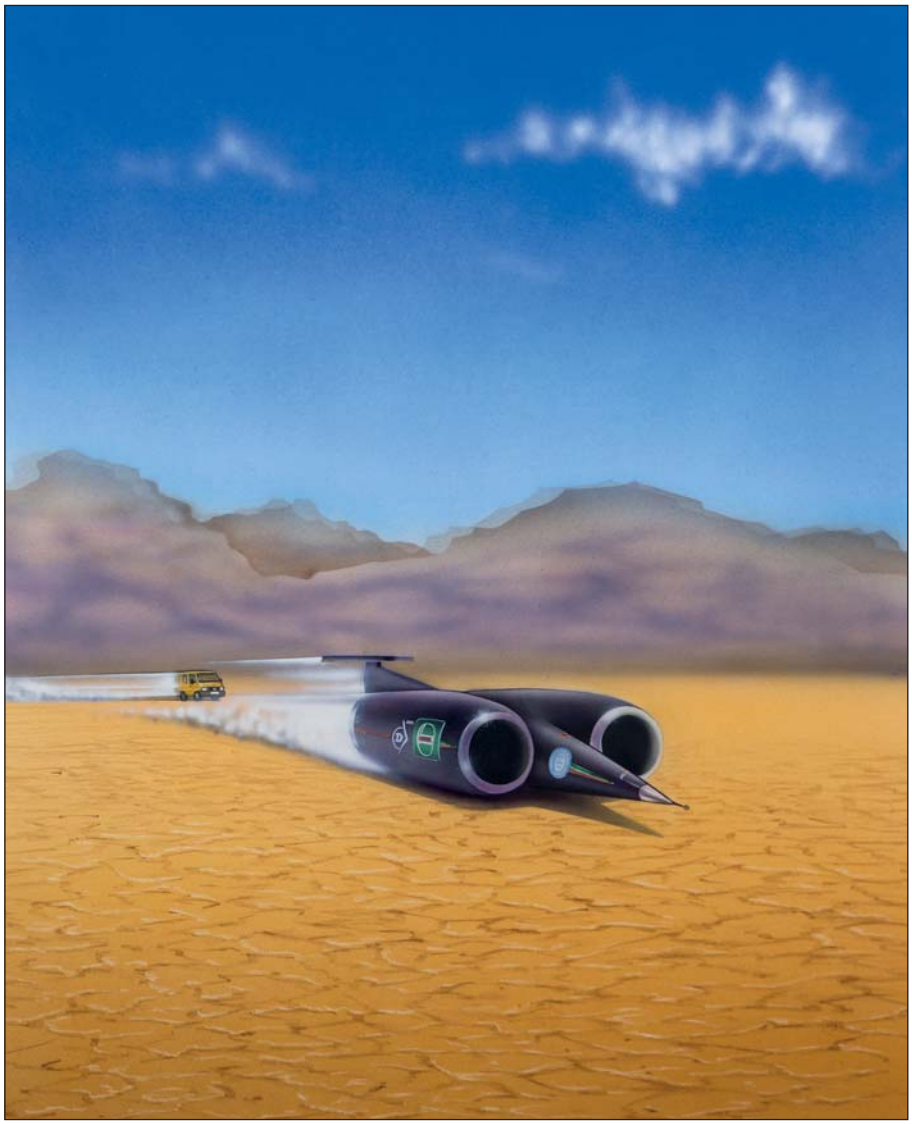


Hydrex carries out permanent hull repairs without interruption of operations, approved by all major classification societies.

Hydrex developed and delivers *permanent* hull repairs on vessels afloat, fully approved by all the major classification societies. No need to go to drydock. No need to redo later in drydock. Gets your ship back in business fast, saving time and money.

How do we do it?

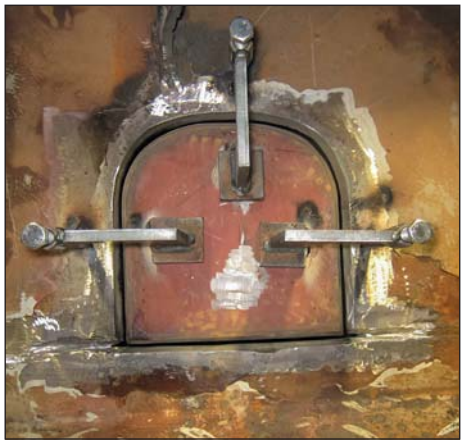
1. We start off with an inspection to determine extent of defect.
2. Made-to-measure cofferdam secured on outside of hull to keep water out and create a dry environment during repair
3. Crack removal/defective plating cropped
4. Insert fitted
5. Insert tacked in place
6. Class approved full penetration welding from inside the ship and frame renewed as needed
7. Independent ultrasonic testing to verify the welding.
8. The cofferdam is then removed.



Cofferdam placed over crack.

Opening in plate prepared inside tank.

Preparing the edge of the opening for the new insert.



Insert cut and fitted.

Insert tacked in place.

Full penetration weld.

Independent testing.

New frames welded.

Each step is checked by class before proceeding.

Example of permanent hull repair:

Inspection of a 172-meter general cargo vessel located in Rotterdam last month revealed a crack in the port side water ballast tank. An insert measuring 300 x 300 x 15mm needed to be welded and the frame renewed. The Hydrex team located the crack and installed a cofferdam large enough to cover the crack. They created a dry environment so that the plate could be cropped and the insert welded from inside the ballast tank. The cropped area was prepared, the insert fitted and then full penetration welding was carried out. Following ultrasonic testing the frame was fitted and rewelded.

This is just one example of the many permanent insert repairs carried out by Hydrex over the last few months. Don't wait to go to drydock. Get hull cracks and damage repaired now, afloat, *permanently*. ■

KEEPING SHIPS IN BUSINESS

Keeping ships in business

Hydrex offers turnkey underwater repair solutions to shipowners wherever and whenever they are needed. Hydrex's multidisciplinary team will help you find the best solution for any problem encountered with your ship below the water line. We will immediately mobilize our diver/technicians to carry out necessary repair work without the need to drydock.

Hydrex has a long track record of performing complex permanent underwater repairs to thrusters, propellers, rudders, stern tube seals and damaged or corroded hulls. By creating drydock-like conditions around the affected area, our diver/technicians can carry out these operations in port or at anchor.

All the projects we undertake are engineered and carried out in close cooperation with the customer and any third party suppliers, relieving the customer of all the hassle of coordination, planning and supervision.

Headquartered in the Belgian port of Antwerp, we have offices in Tampa (U.S.A) and Algeciras (Spain).

All Hydrex offices have fully operational fast response centers where an extensive range of state-of-the-art equipment is available at all times.

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

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