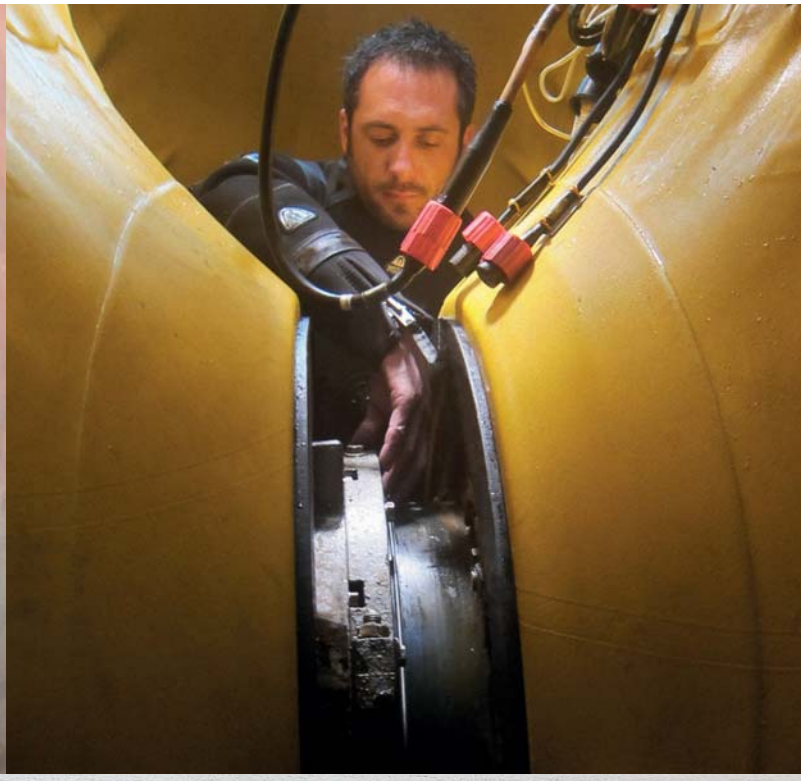
HYDREX®

UNDERWATER TECHNOLOGY

Number *195*



Hydrex offers an immediate response and a fast mobilization to vessels around the world

Through an ever-expanding, worldwide network of offices and service stations, Hydrex can provide a wide range of services. From these locations, specialized repair and diver teams can be mobilized immediately to almost anywhere in the world.

All the lightweight equipment used by the teams is stored in fast response centers which are designed specifically for the purpose of speed and are equipped with all the latest facilities and tools. A good example of the easy to transport equipment is a range of unique flexible mobdocks which are used to perform stern tube seal, thruster, rudder and other permanent repairs that require a dry working environment.

With close to 40 years of experience and well trained diving teams at its disposal, the Hydrex technical department knows how to handle any kind of situation without loss of quality or loss of time for the customer.

Because Hydrex brings drydock-like conditions to the ship, the customer does not have to take his vessel off hire and into drydock. This saves him valuable time and money

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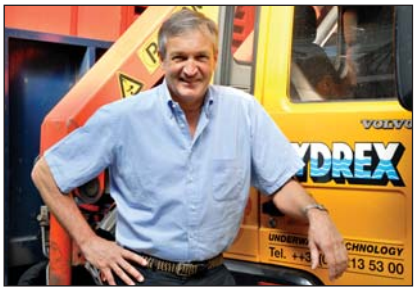
Editorial



In this magazine you can read about a wide range of on-site operations carried out by Hydrex diver/technicians around the world. These operations were all performed with the same purpose in mind: to keep the customer's vessel out of drydock and allow him to keep his ship on schedule.

We start of the magazine however with some exciting news from our headquarters. Last month two dive support workboats arrived in Antwerp. The catamarans are fully equipped as dive support stations. They allow Hydrex to mobilize even faster to operations in Belgium, the Netherlands, the United Kingdom and France.

The next article describes a bow thruster operation in Gabon. A Hydrex team mobilized to an 86-meter research vessel to replace the damaged stainless steel belt in one of its thruster tunnels. The repair had to be carried out as soon as possible and the owner of the vessel would have had to take his vessel to drydock if no on-site solution had been found.

On the other side of the Atlantic Ocean, diver/technicians performed underwater stern tube seal repairs on ships in the U.S.A. and Panama. Both vessels were experiencing oil leaks and a fast repair was required by the classification societies. Using the company's flexible mobdocks, Hydrex teams were able to perform both operations on-site and underwater.

The last article deals with several propeller operations carried out in extreme winter circumstances. Icy conditions like this will not stop Hydrex from providing the service you need. Our divers are trained to perform operations, both above and below water, anywhere in the world even in the harshest conditions.

So don't 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 out of drydock and save you precious time and money.

Best regards,

Hydrex founder
Boud Van Rompay

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

ISO 9001 certified

Underwater services and technology approved by:

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Table of contents

Hydrex Antwerp expands logistic capabilities with two dive support workboats

Last month two dive support workboats arrived at the Hydrex headquarters in Antwerp. Both vessels can be used for a wide range of operations in Belgium, the Netherlands, the United Kingdom and France.

Both catamarans are fully equipped as dive support stations.

The catamarans are fully equipped as dive support stations with hydraulic cranes and winches, nautical and communication equipment and a dive control room. (A PDF with details about the vessels can be found on our website or requested by contacting our office in Antwerp.)

The workboats are stationed at our Antwerp office, where a wide range of state-of-the-art equipment and tools is available at all times.

Hydrex has an experienced and certified team of diver/technicians ready to mobilize immediately together with the workboats. They can carry out routine operations as well as highly technical repair work within a very short time frame and without any loss of quality.

The vessels can be used for a wide range of operations.

The arrival of these two catamaran workboats allows Hydrex to mobilize even faster to operations in Belgium, the Netherlands, the United Kingdom and France.

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

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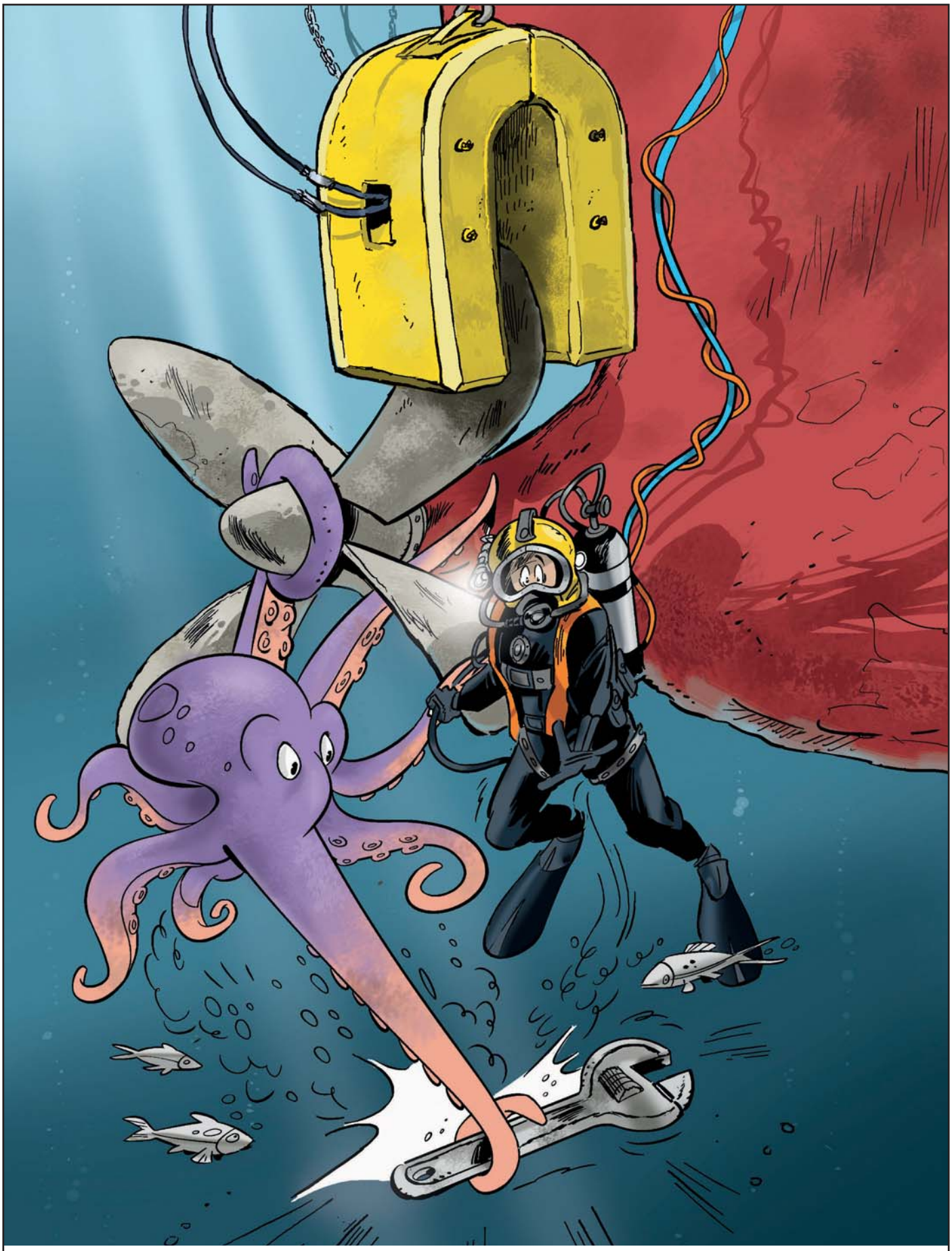
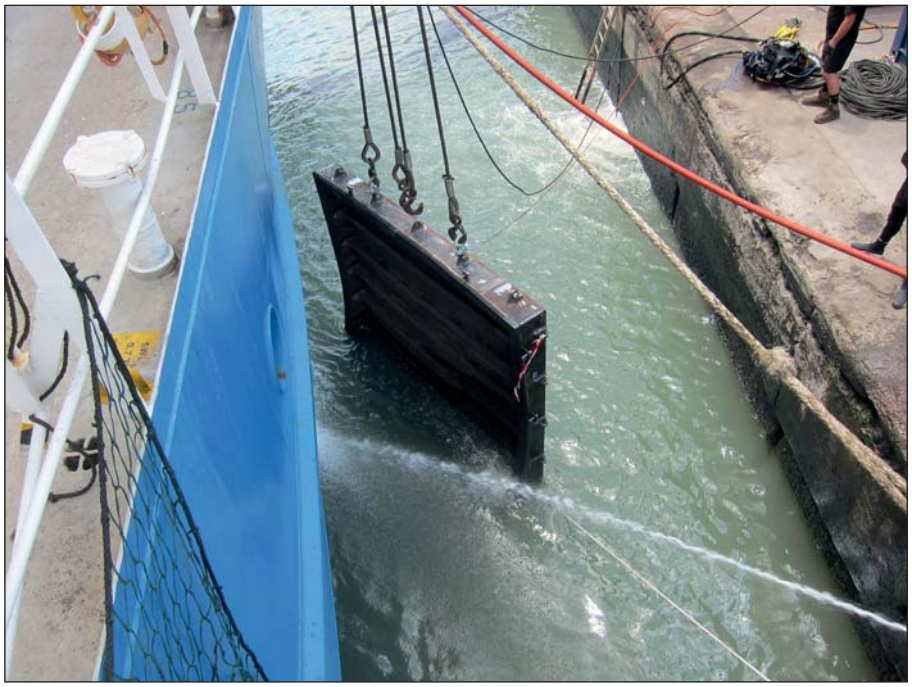


Fast bow thruster operation in Congo and Gabon avoids drydocking

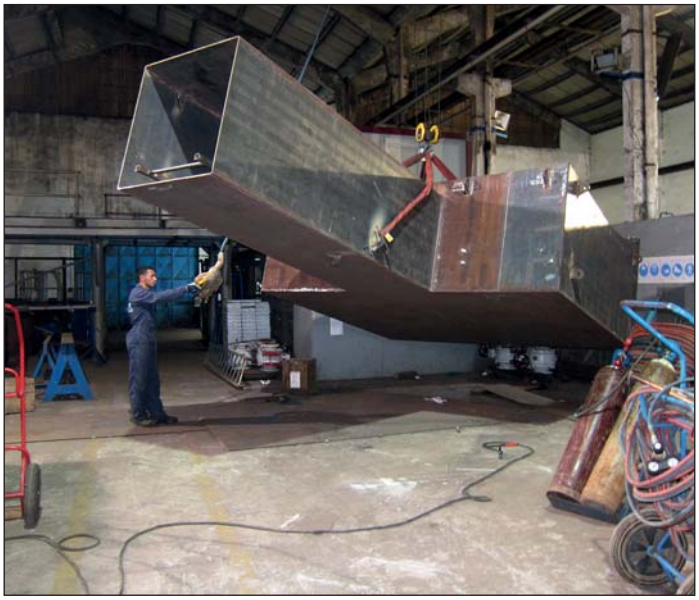
Near the end of 2012, an 86-meter research vessel needed the stainless steel belt in one of its thruster tunnels replaced. A Hydrex diver/technician team therefore flew to Pointe-Noire, Congo to perform the repairs.



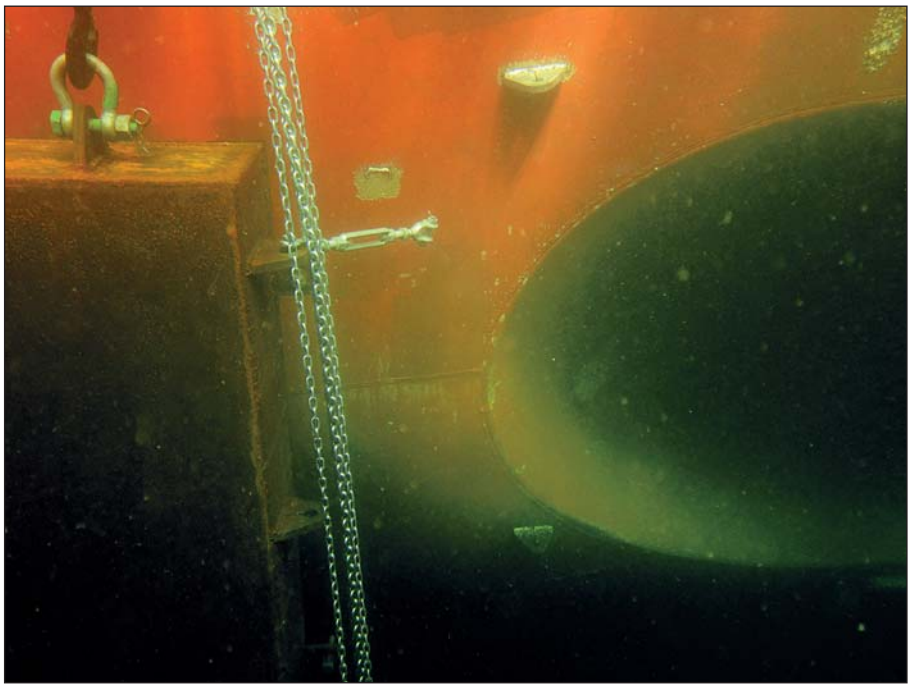
Lowering the smallest of the cofferdams into the water.

The stainless steel belt is installed around the perimeter of a thruster tunnel at the location of the thruster blades. There the impact of the cavitation caused by the movement of the blades is the most severe. Extra protection against cavitation damage is therefore essential. When the stainless steel belt in the thruster tunnel of the research vessel suffered cracks, the underlying steel was exposed to cavitation. The belt needed to be replaced as soon as possible to prevent the thruster tunnel from getting damaged too severely. The owner of the vessel would have had to take his vessel to drydock if no on-site solution was found.

Repair and maintenance to thrusters without the need for drydock saves time and money. Hydrex provides a worldwide fast-response solution to deal with most thruster problems, including complete overhaul and replacement of blades or seals of all



Two tailor-made cofferdams were constructed at a local workshop under Hydrex supervision.



The cofferdams were used to close off the thruster tunnel on both sides.

types. The work is done on-site and underwater and can usually be completed within a few days of contact.

Underwater solution proposed by Hydrex

A tailor-made open-top cofferdam was designed by the Hydrex technical department. It was constructed in a local workshop in Pointe-Noire under the supervision of Hydrex diver/technicians. At the same time a regular shaped second cofferdam was also built. Cofferdams like these are used to close off the thruster tunnel on both sides. Water can then be drained from the tunnel, creating a dry working place. This allows the team members to descend into the

One of the cofferdams had an open top to give the Hydrex technicians access to the thruster tunnel.

Underwater stern tube seal repairs with new generation flexible mobdocks

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 top specialist suppliers.

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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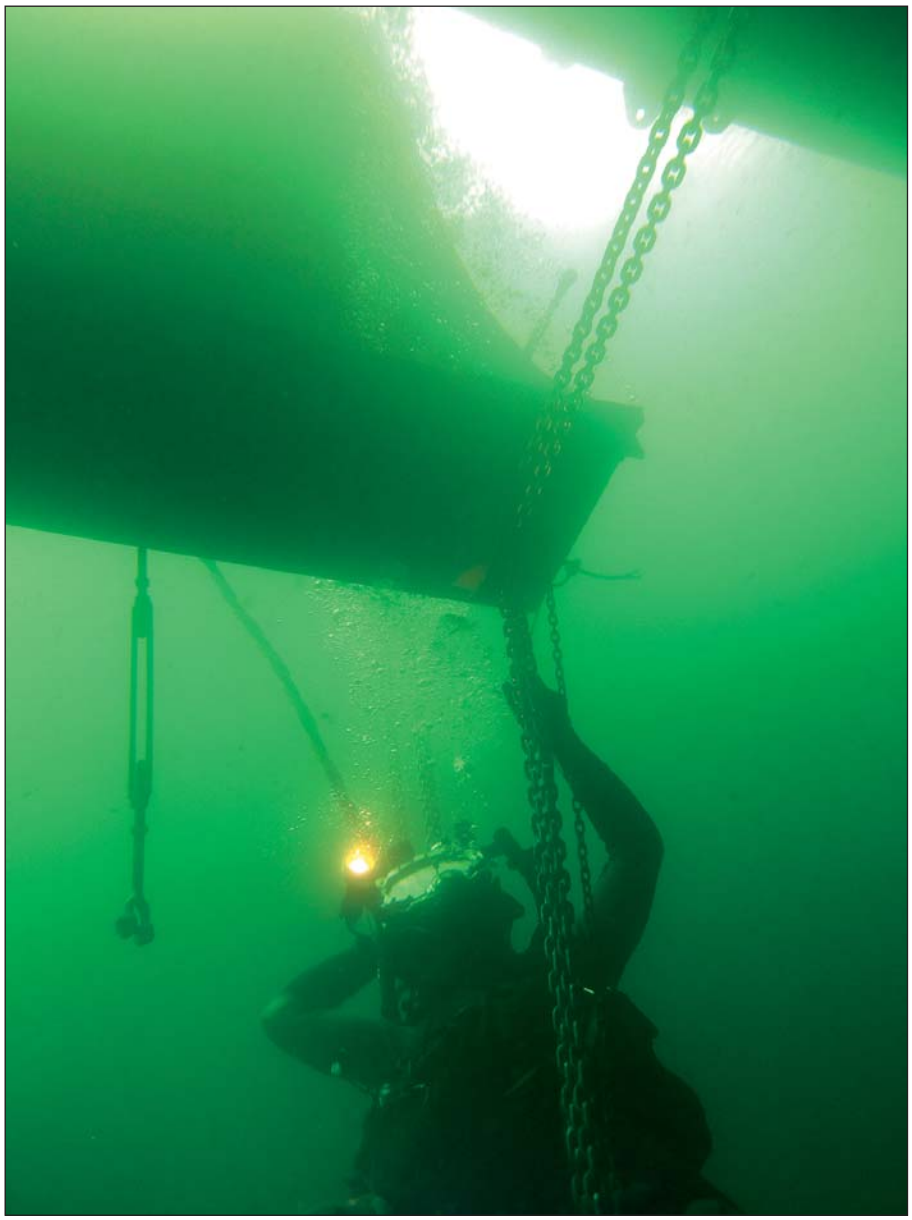
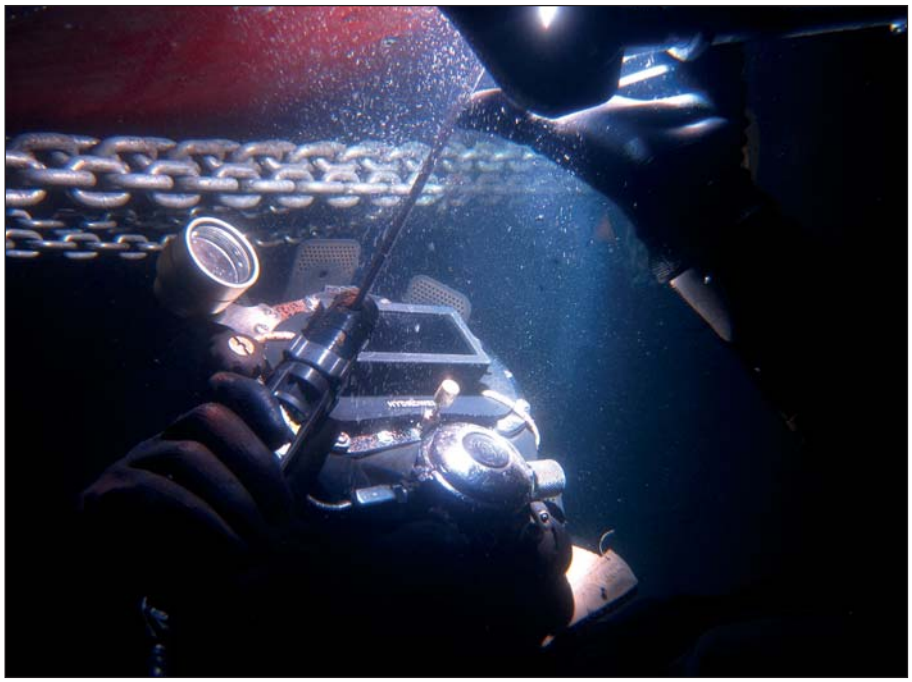


Hydrex diver/technician guiding the cofferdam underwater.



The cofferdams were secured to the hull.

tunnel through the open top. They can then carry out any necessary welding work in drydock-like conditions.

This prevented an unscheduled drydock visit for the ship and saved the owner precious time and money.

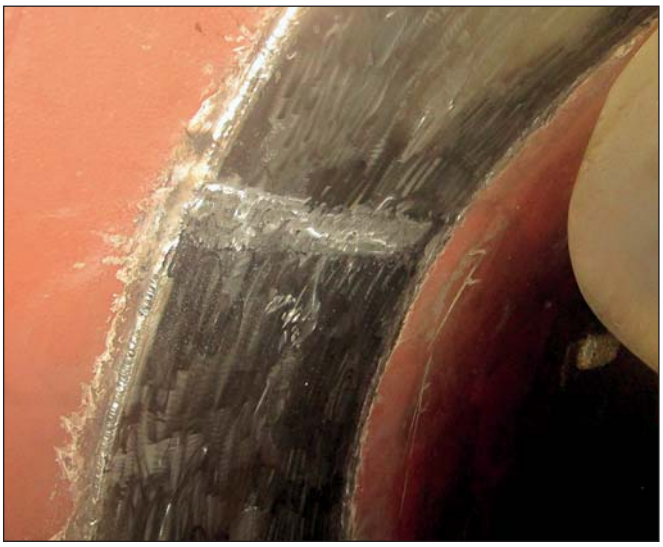
After the cofferdams had been constructed they were transported to the vessel's location in Congo. The diver/technician team then started the underwater operation. However, infrastructure and dredging work in the port of Pointe-Noire brought the visibility down to almost zero. The safety of the divers could not be guaranteed. For this reason Hydrex proposed a new location for the operation.

Moving the ship to a sheltered location close by

The owner gladly accepted the proposal to move the research vessel to Port Gentil, Gabon. Port Gentil offers safe anchorage for all types of vessels (up to ULCC) on a sand/mud seabed with depths up to 50 meters and more. Thanks to the sheltered environment of the bay the swell is limited. This makes it an excellent location to carry out repair or maintenance work on a ship, barge or rig and this in ideal conditions. The central location on the African West coast also makes Port Gentil the ideal place for a Hydrex logistic and equipment support base for the entire region. This allows us to mobilize to any other suitable location in West Africa in a very short time frame, making both emergency and scheduled operations possible.

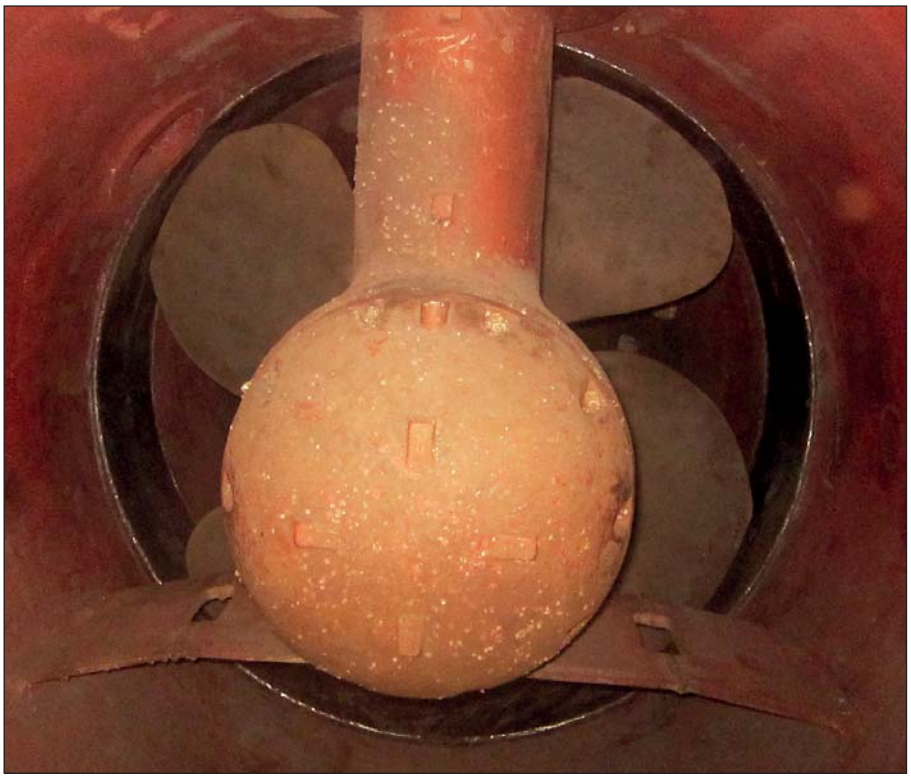
After a short trip the ship arrived in Port Gentil with the Hydrex team and all the equipment on board. A diving station was set up and the diver/technicians started the installa-

The old, damaged steel belt.



The new belt will prevent cavitation damage.

Hydrex technicians securing the new stainless steel belt.



The new belt was installed underwater, but in drydock-like conditions.

tion of the cofferdams. Next they emptied all water from the thruster tunnel. They then descended into the tunnel and carried out the repair. The old, damaged, belt was removed and replaced with a new stainless steel belt.

The actual operation was finished in only five days. The team removed the cofferdams and the ship was ready to continue its schedule with its thruster tunnel fully protected against cavitation once more. ■

KEEPING SHIPS IN BUSINESS

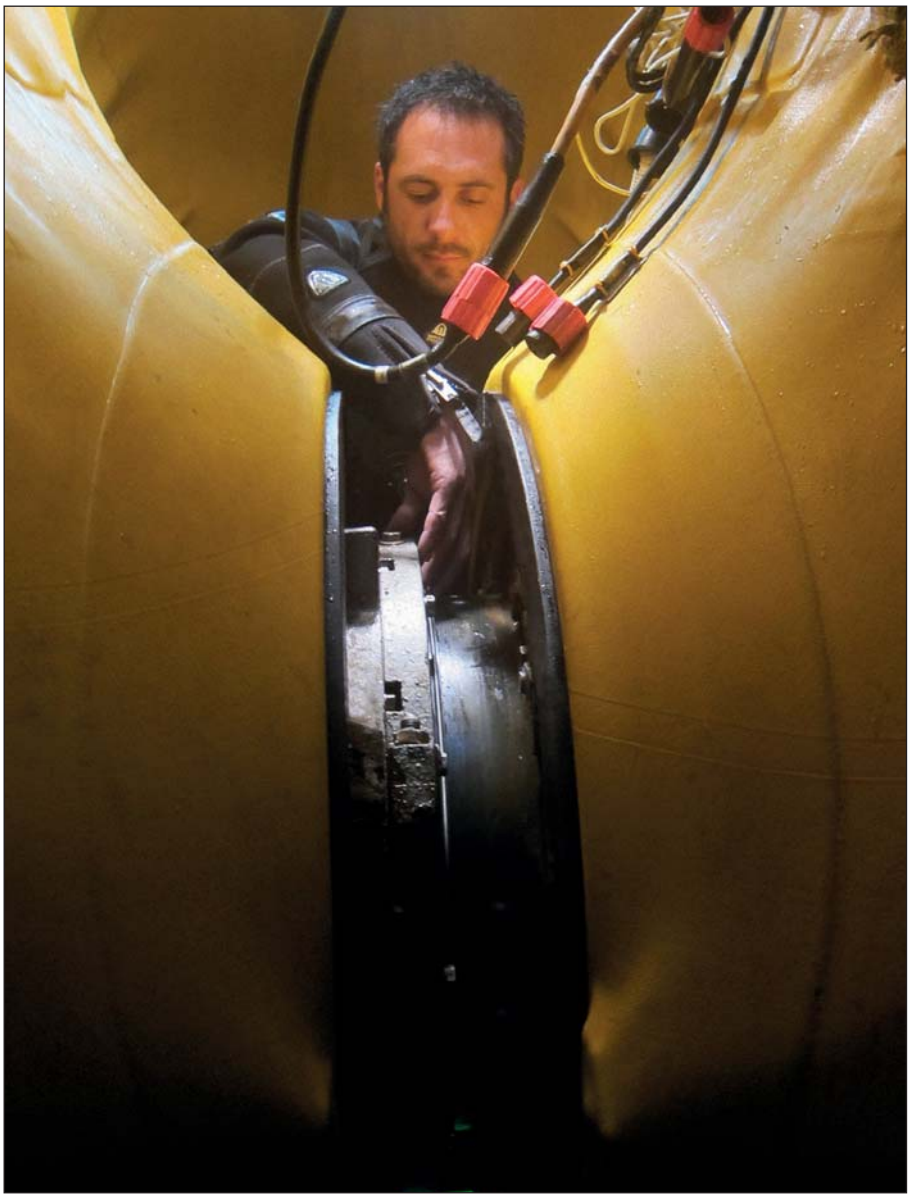
Fast underwater stern tube seal repairs in U.S.A. and Panama keep ships out of drydock

At the end of November 2012, Hydrex diver/technician teams carried out two underwater stern tube seal repairs. One on a 143-meter general cargo ship in Galveston, Texas, U.S.A., and one on a 292-meter container vessel in Panama. Both vessels were experiencing oil leaks and a fast repair was required by the classification societies. Using the company's flexible mobdocks, Hydrex teams were able to perform both operations on-site and underwater. This saved time and money for both owners.

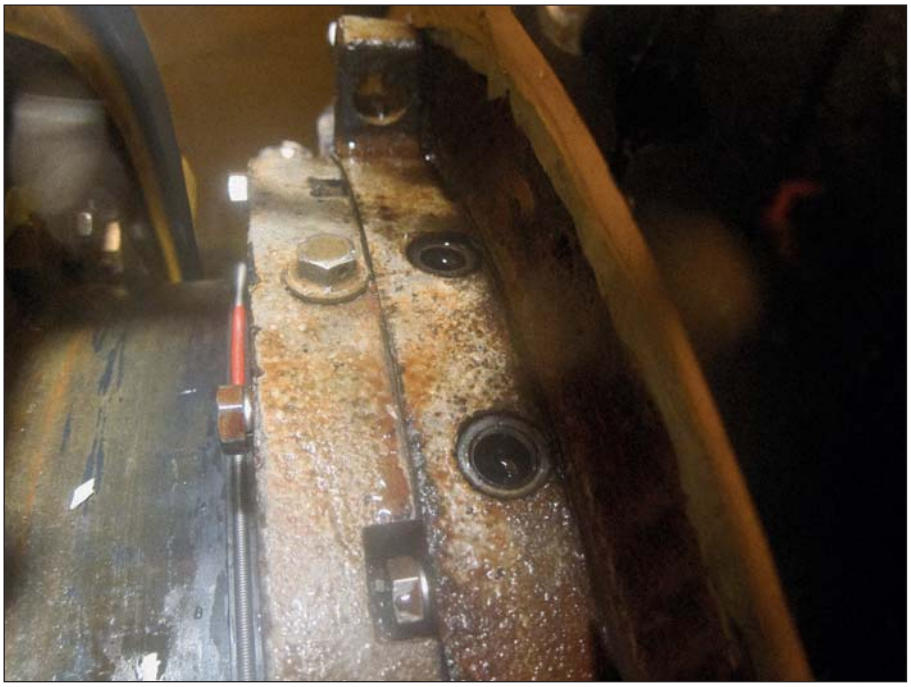
Inspection of the stern tube seal assembly prior to removal of the rope guard in Galveston.

Both stern tube seal repairs were carried out in less than perfect conditions. There was almost no water visibility in Galveston at the time of the repair. This made the diving operations a lot more challenging than expected. In Panama the circumstances were better, but still far from ideal. This did not present any problem to the Hydrex diver/technicians. They are trained to be flexible and adapt to constantly changing working conditions. On top of this, our technical department has many years of experience in dealing with all kinds of weather circumstances in locations around the world. The combination of this theoretical knowledge and the means for a practical execution, allowed Hydrex to perform both stern tube seal repairs in these harsh circumstances. This was done under the strictest safety regulations, to the highest

The Hydrex lightweight flexible mobdocks can easily be transported around the world.



Inside a flexible mobdock Hydrex divers can work in drydock-like conditions.



The running area of the stern tube seals of the vessel in Galveston prior to being cleaned.

quality standards and without any unnecessary delay.

Hydrex has carried out on-site, underwater repairs and replacements on all types of seals for a number of years now. A dry environment is created underwater, in which the divers can work. Several major classification societies have also awarded Hydrex certificates that accept the Hydrex revolutionary flexible mobdock technique to perform permanent underwater seal repairs which previously would have had to be done in drydock.

Galveston, U.S.A.

Every Hydrex office has a fast response center equipped with all the latest facilities, lightweight equipment and tools. These centers were designed specifically to increase speed of service. This allowed us to mobilize a team together with all the needed equipment to the general cargo vessel's location within the shortest possible time frame.

After the diving team had set up a monitoring station, the operation started with a thorough underwater inspection of the stern tube seal assembly. The divers then removed the rope guard.

The team then installed the flexible mobdock around the stern tube seal assembly creating a dry underwater environment for the divers to work in drydock-like conditions. This is a necessity for permanent stern tube seal repairs. After cleaning the entire assembly, the divers disconnected the split ring and brought it to the surface to be cleaned. Next the team

The rope guard of the cargo vessel ready to be reinstalled.

The assembly of the vessel in Panama needed to be cleaned thoroughly before the operation.

removed the three damaged seals one by one and replaced them with new ones.

Panama

Oil was leaking from the stern tube seal assembly of a container vessel. Hydrex diver/technicians therefore mobilized to the vessel's location in Panama, together with all the needed equipment. The diving team first set up a monitoring station. Next they started the operation with a thorough underwater inspection of the stern tube seal assembly.

The underwater inspection revealed that the rope guard was missing. Fishing lines tangled around the liner had caused the oil leak. These were removed by the diver/technicians. The team then installed the flexible mobdock around the assembly. After cleaning the entire assembly, the divers removed the first seal and replaced it with a new one which was then bonded. This procedure was repeated with the other two damaged seals.

The flexible mobdocks allow on-site stern tube seal repairs.

Both operations ended with the conducting of pressure tests with positive results, the removal of the flexible mobdock and the reinstallation of the rope guard.

Off-hire causes a substantial loss of money. The teams therefore worked in shifts to perform the stern tube seal repairs within the shortest possible time frame. This saved both owners the time and money which going to drydock would have entailed. ■

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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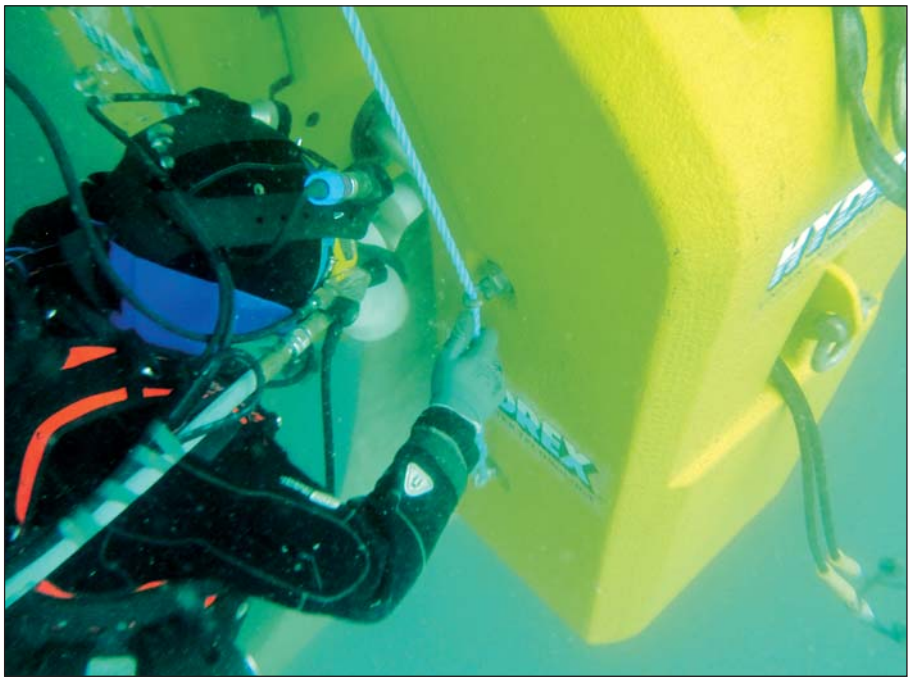
Propeller repairs in extreme conditions restore efficiency

When damage to propellers occurs due to impact with ice and other debris, Hydrex will help you, even if the damage is quite extensive. In this article you can read about propeller operations carried out underwater by Hydrex diver/technicians in Antwerp, Ventspils and Kiel.

Some of the repairs in this article were carried out in extreme winter circumstances.

Some of these repairs were carried out in extreme winter circumstances. Icy conditions like this will not prevent Hydrex 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.

Having developed different procedures for different kinds of damage, Hydrex is equipped and trained to make the best out of a bent or broken propeller. Ideally, the in-house developed cold straightening technique is used. This procedure enables Hydrex to straighten damaged blades in-water, allowing commercial operations to continue without the need to drydock.



The in-house developed cold straightening technique enables Hydrex to straighten damaged blades on-site.

Underwater propeller blade straightening in Antwerp

One of the blades of a dry cargo vessel's propeller was severely bent. The others propeller blades were also damaged, but less severely. A fast, on-site solution was required to restore the propeller's balance and efficiency. A Hydrex team therefore mobilized rapidly to the ship's location in Antwerp. The team started the underwater operation with a detailed underwater survey of the damaged propeller blades. Next the team positioned the straightening machine over the bends of the trailing edges of the first blade. The blade was then returned to its original state. The other blades were not bent. They had however suffered

smaller cracks and dents along their trailing edges. The Hydrex diver/technicians ground away the cracks and polished the edges of these blades. This restored the propeller's efficiency.

Propeller blade cropping

Should a piece of the blade be broken or if there is other damage too extensive for straightening, a section of the blade will be cropped. 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.

In the following examples cropping was the only option as the damage to the propeller blades was too great to allow cold straightening

Propeller modifications in harsh condition in Ventspils

A 180-meter tanker suffered damage to the blades of its propeller. A Hydrex team mobilized to Ventspils, Latvia, to perform the necessary repairs in extreme icy conditions. An inspection revealed that two of the propeller's four blades were severely bent and needed to be cropped. This was subsequently done in accordance with the attending surveyor of the classification society.

The team then moved the equipment to a 210-meter container vessel that was also berthed in Ventspils. Four of the five blades of the pitch propeller of this ship were bent too much to be straightened. The decision was made to cut all the propeller blades to the exact same size. By doing this the propeller's balance was restored and its hydrodynamic efficiency optimized to suit the power require-

When damage to propellers occurs, Hydrex will help you, even if the damage is quite extensive.

If there is damage too extensive for straightening, a section of the blade will be cropped.

Propeller blade croppings are carried out with the new generation of Hydrex propeller blade cutting equipment.

Hydrex divers are trained to perform a wide variety of operations in even the harshest conditions.

ments of the engine.

Propeller blade cropping in Kiel

Closer to home but in equally icy circumstances, a 180-meter container vessel berthed in Kiel, Germany, needed to have the four blades of its propeller cropped. Three of the blades suffered damage too extensive to be straightened. The blades were modified one after the other by the Hydrex diver/technicians. The area to be cropped was marked out on each blade and verified. The blade was then cropped and its edge grinded to give it the correct radius. When the cropping was complete, the blades were polished. This was done to make sure that any loss of power would be minimal.

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. By taking advantage of Hydrex's in-house developed cold straightening technique, damaged blades can be straightened underwater. In this manner optimum efficiency of the propellers can be restored. 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. These repairs are carried out with the Hydrex propeller blade cutting equipment. Both types of repairs can be performed on-site and underwater. This allows the ship to return to commercial operations without the need to drydock. ■

Fast underwater repairs keep ships out of drydock

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), Algeciras (Spain), Visakhapatnam (India), and Port Gentil (Gabon).

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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