HYDREX®

UNDERWATER TECHNOLOGY

NEWS

LETTER | *198*

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KEEPING SHIPS IN BUSINESS

ISO 9001 certified

Underwater services and technology approved by:

Fast response

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 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, you do not have to take your vessel off-hire and into drydock. This saves you valuable time and money.

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New generation mobdock used for fast underwater stern tube seal replacement in Port Everglades

In February Hydrex diver/technician teams carried out underwater stern tube seal repairs on a 139-meter container vessel in Port Everglades, Florida, close to the company's office in Clearwater. The vessel was suffering from an oil leak, making a fast repair necessary. Using one of the company's next generation flexible mobdocks the team was able to carry out the entire operation on-site and underwater, saving time and money for the owners.

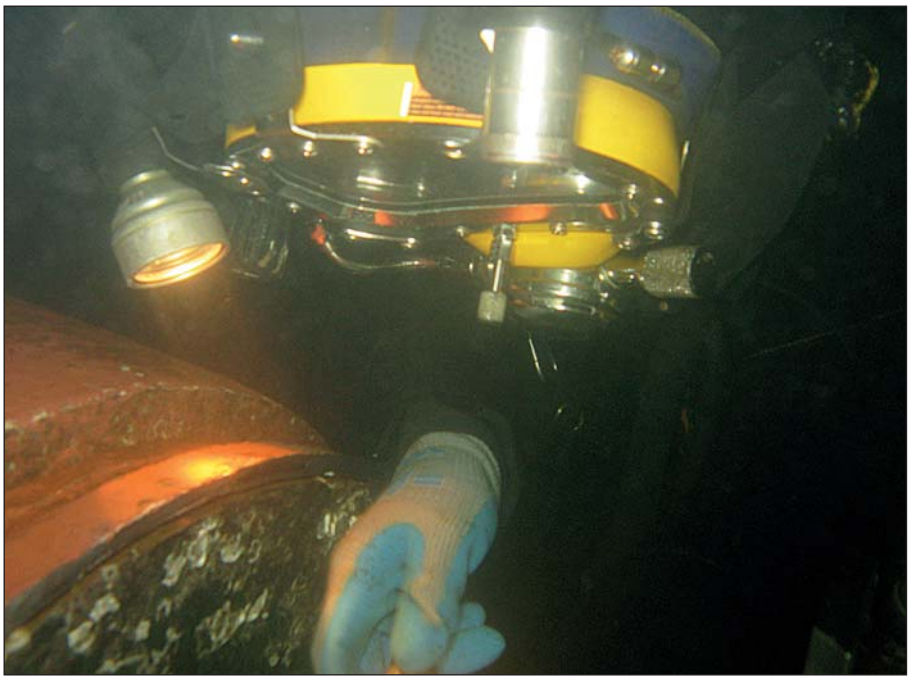
Hydrex van and equipment next to the container vessel in Port Everglades.

Hydrex constantly invests in the research necessary to continue to evolve repair techniques and procedures. Over the years the Hydrex R&D department has constantly improved the flexible mobdock (mobile mini drydock) technique to make it possible for Hydrex diver/technicians to perform permanent repairs on seals, thrusters and almost any other part of the underwater vessel without the vessel needing to go to drydock.


The Hydrex flexible mobdocks allow Hydrex divers to perform permanent underwater stern tube seal repairs.

The latest generation of flexible mobdocks allows Hydrex to carry out the replacement of virtually any type of stern tube seals very quickly on-site.

These flexible mobdocks are stored at the fast response centers. Designed specifically to increase speed



Hydrex diver/technician preparing the assembly for mobdock installation.

The remains of the rope that cause the oil leak.

of service, these centers are equipped with all the latest facilities, lightweight equipment and tools. This allowed us to mobilize a team together with all the needed equipment to the container 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 of the vessel as well as the fishing lines tangled around the liner that had caused the oil leak.

Next the team installed the flexible mobdock around the stern tube seal

Permanent 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 lightweight and can be mobilized very rapidly in our special flight containers. Therefore this new service is now available worldwide.

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 onsite, 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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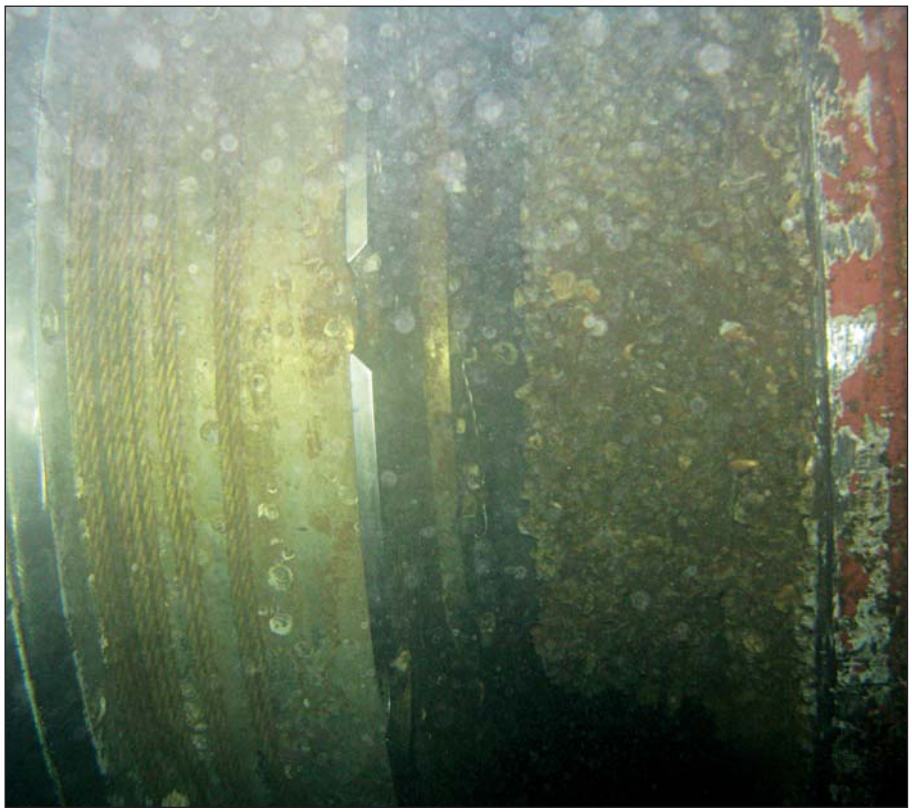
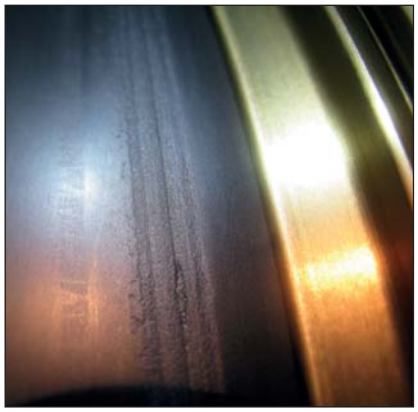


The stern tube seal assembly prior to cleaning and removal of the rope.

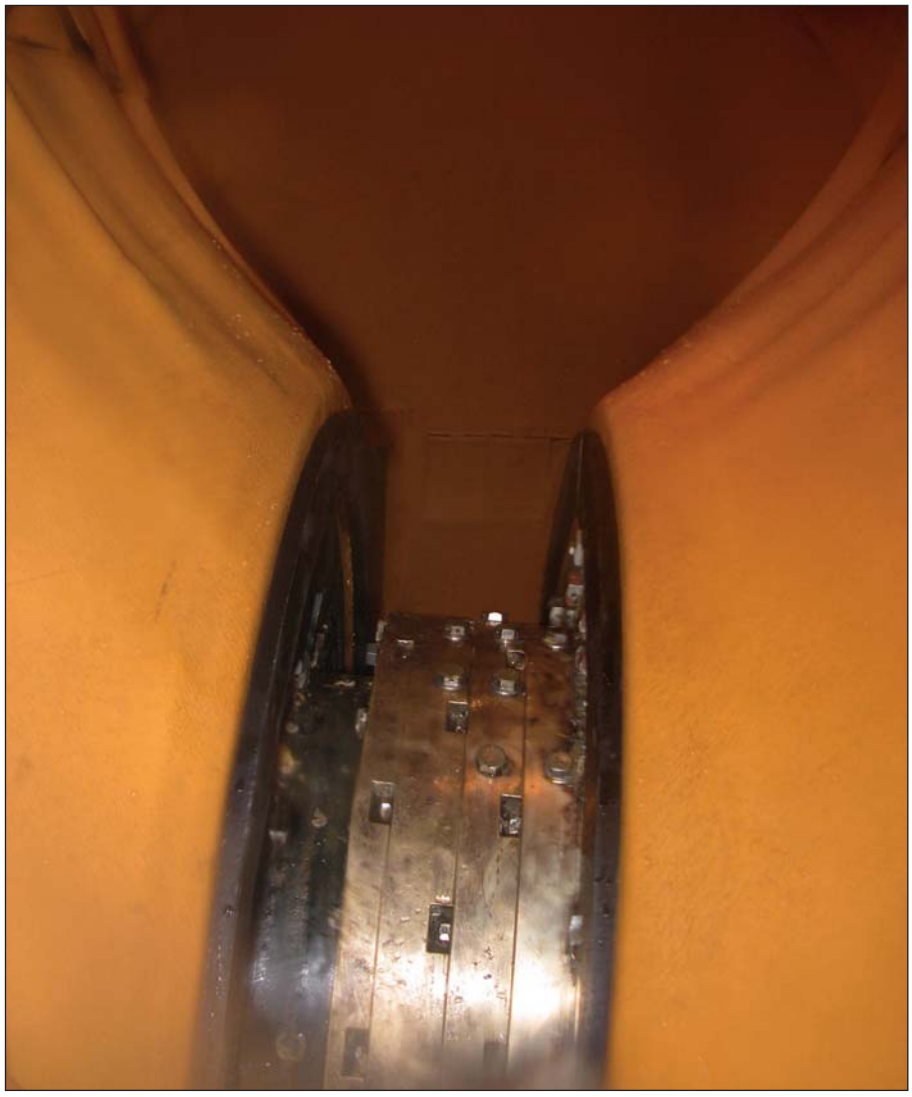
The operation ended with the conducting of a pressure test with positive results, the removal of the flexible mobdock and the reinstallation of the rope guard.

By creating a dry environment underwater, the divers were able to rapidly complete the required work on-site. The teams worked in shifts to perform the stern tube seal repairs within the shortest possible time frame. The in-situ repair saved the owner the time and money which going to drydock would have entailed. ■



The old, worn down running area of the stern tube seals.

assembly creating a dry underwater environment for the divers to work in drydock-like conditions, 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. Next the team removed the three damaged seals one by one and replaced them with new ones. Because the existing running area was completely worn down, the diver/technicians also installed a spacer ring to create a new running area for the seals.



Hydrex divers can perform work in drydock-like conditions inside the mobdock.

Rapid underwater bow thruster removal avoids drydocking

A Hydrex diver/technician team mobilized to Tacoma, Washington, U.S.A. last month to remove the bow thruster of a 294-meter container vessel. The unit needed to be overhauled. Hydrex performed the operation underwater in a very short time frame. This made it possible for the owner to keep his vessel out of drydock.

Bow thruster unit lifted from the water.

Together with all the necessary equipment, the team mobilized from the Hydrex office in Clearwater, Florida to the vessel's location. After they set up a monitoring station on a workboat, the divers started the operation with a detailed inspection of the bow thruster unit and tunnel.

One by one the diver/technicians then detached the blades and replaced them with blind flanges to prevent oil from leaking from the thruster. 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 the unit was taken out.

Pad eyes were installed in the thruster tunnel to secure the unit during removal.

The next step was to secure the gearbox with hoisting equipment. The team then disconnected the bow thruster unit from the engine room and lowered it onto a cradle. This cradle was designed especially for thruster operations. It can be adjusted to the size of the unit. In this manner the thruster is prevented from tipping over and Hydrex divers can remove the unit in one take.

Simultaneously the team installed a blind flange to seal off the thruster tunnel from the engine room. Once the unit was lifted onto the workboat, the team prepared it for transport to the manufacturer.

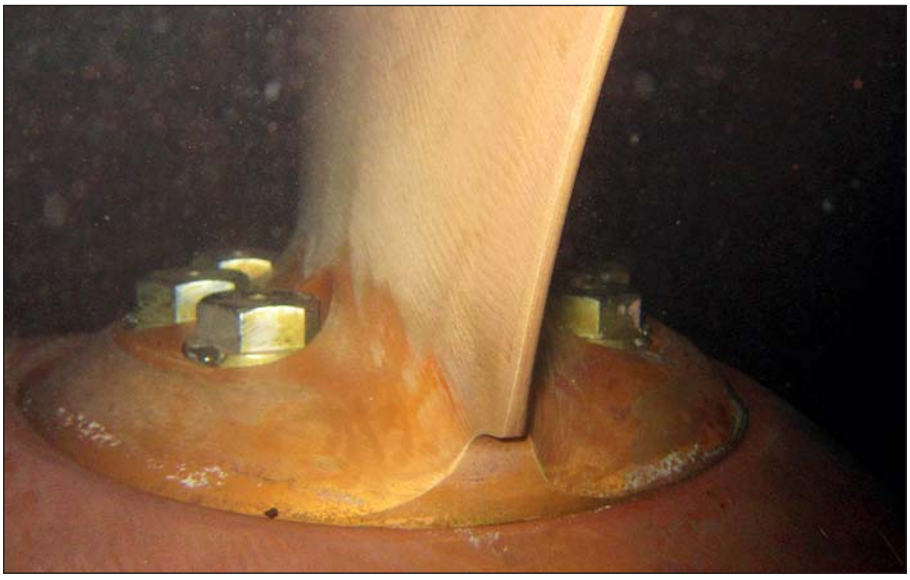
Performing a job like this on a tight schedule takes a lot of planning.

This can only be done successfully by staff who have familiarity with such operations and have the relevant know-how and equipment.

One of the bow thruster blades being brought to the surface.

Hydrex has a technical department capable of executing all the required planning. Our diver/technicians are trained and qualified to perform the full range of required class-approved repair procedures in even the harshest conditions.

Off-hire time causes a substantial loss of money. The teams therefore worked in shifts to perform the bow thruster removal within the shortest possible time frame. This saved the owner the time and money which going to drydock would have entailed. ■



The bow thruster blades were removed one by one by the Hydrex team.

Hydrex diver/technicians preparing the unit for transport to the manufacturer.

Fast underwater ship 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 mobdocks. 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 the 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.

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Underwater propeller blade straightening in Denmark with Hydrex new generation equipment

In April, a diver/technician team performed successful propeller blade straightening operations on two vessels at anchorage in Kalundborg, Denmark. First the bent blades of a 225–meter bulk carrier were restored. The team then straightened the damaged blades of 158-meter reefer in the same location.

Hydrex cold straightening machine and diving equipment on workboat.

By taking advantage of the in-house developed cold straightening technique, damaged blades can be straightened underwater. This allows a ship to return to commercial operations without the need to drydock. Optimum efficiency of the propellers can be restored by bringing the blades back to their original form.

Blade repairs in Kalundborg restore propellers' efficiency.

The Kalundborg Fjord is a perfect location to carry out repair work. Vessels at anchorage there are sheltered from the current. This makes it



Bent propeller blades of 158-meter reefer in Kalundborg.

Cropped and polished blade of 225-meter bulk carrier.

ideal for underwater repair work to be performed – a nice change for the Hydrex diver/technicians from the sometimes harsh conditions they are faced with during their travels around the world.

With three of the five blades of its propeller severely bent, a bulk carrier needed a fast, on-site solution to restore the propeller's balance and efficiency. Hydrex diver/technicians are trained to carry out repairs underwater in the shortest possible time frame. A team was therefore rapidly mobilized to the ship's location in Kalundborg to restore the damaged blades to as close to their original condition as possible.

After the equipment arrived at the vessel's location the team started the underwater operation with a detailed survey of the affected propeller

Diver/technicians getting ready for underwater propeller operation in Denmark.

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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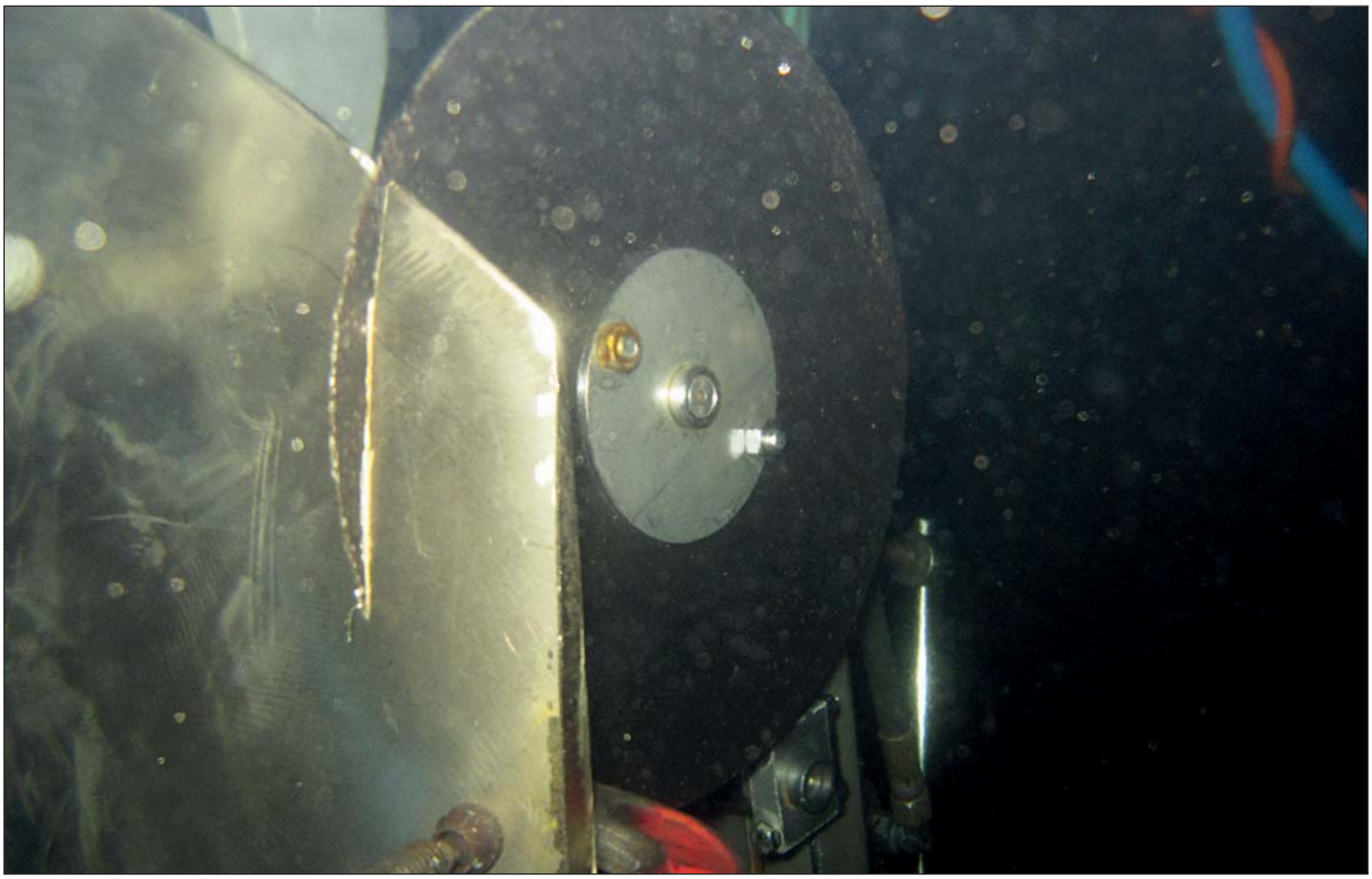

Cutting a propeller blade that was damaged too severely to straighten.

blades. The inspection revealed that two blades were damaged too severely to be straightened and needed to be cropped, but that a third one could be straightened. The other two blades were unaffected.

The team positioned the straightening machine underwater over the bend in the trailing edge of the first blade. In close communication with the team leader in the monitoring station on-shore, the divers returned the bent blade to its original state. The team then used the information acquired during the inspection to calculate and determine the correct measurements needed to modify the trailing edges of the other propeller blades. Next the divers cropped the blades and ground their edges to give them the correct radius. When the cropping was complete, the Hydrex technicians polished the blades to make sure that any remaining loss of efficiency would be minimal.

After they had completed the repair, the team stayed in Kalundborg until the reefer arrived the next day. Two of the four blades of the propeller of this ship were severely bent. They could both be straightened. The other two blades were not damaged.

After the divers had restored the bent blades with the new generation cold straightening machine, they also performed a hull repair on the same vessel. The team installed a 300 x 300 mm doubler plate over a small hole in the hull plating of the ship. Performing both repairs during one operation saved the owner of the reefer from having to take his vessel to drydock.

Conclusion

Our R&D department is constantly looking into ways to enhance the available propeller repair techniques even further to improve our services. New models of both the straightening and the cutting machines have recently been put into service. These allow us to straighten blades that could previously only be cropped and to crop extremely damaged blades with only a minimal loss of efficiency for the propeller. Both types of repairs can be carried out on-site and underwater, allowing the ship to return to commercial operations without the need to drydock. ■

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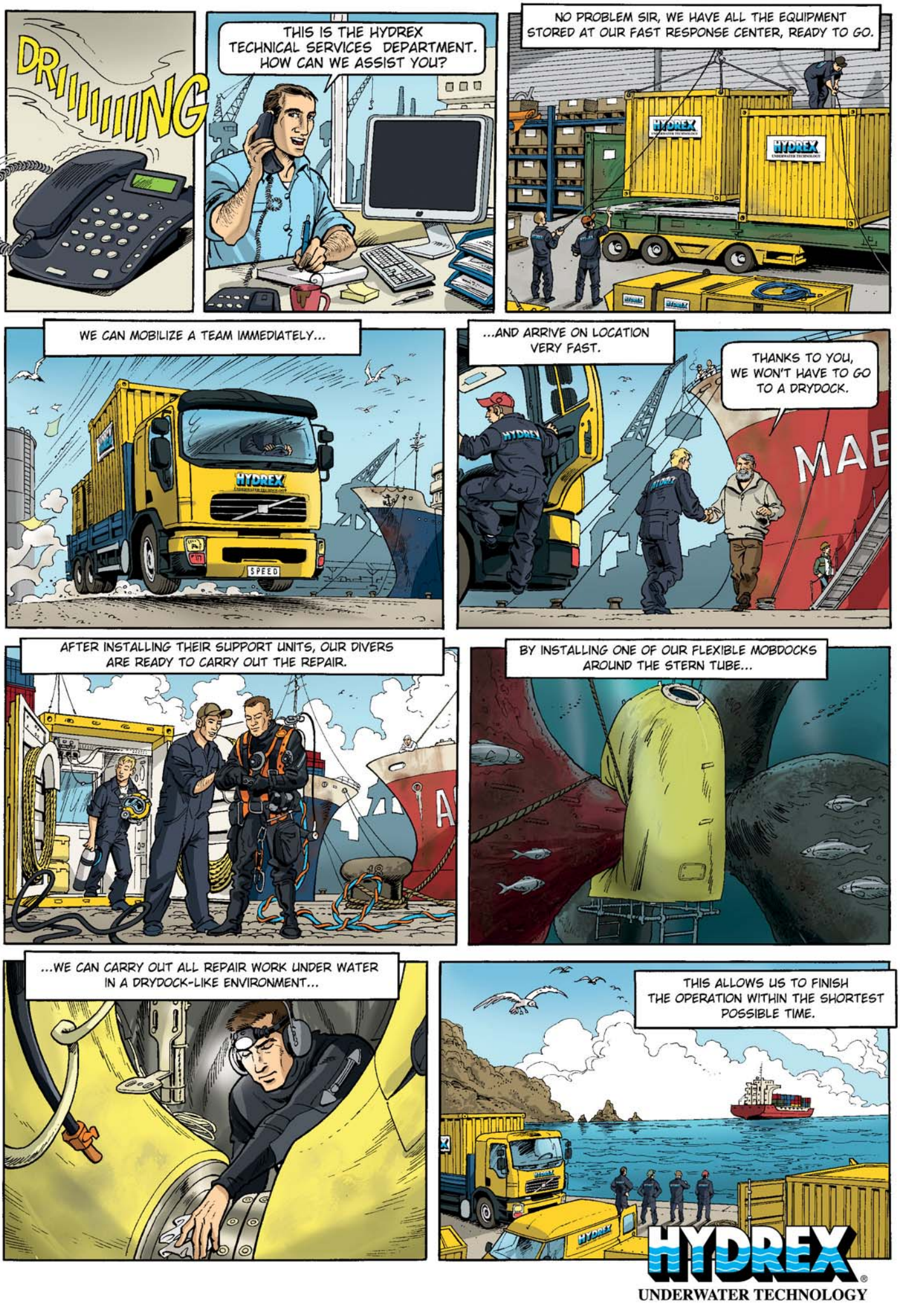
Keeping ships in business



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), 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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