HYDREX®

UNDERWATER TECHNOLOGY

Magazine

Number *201*

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.

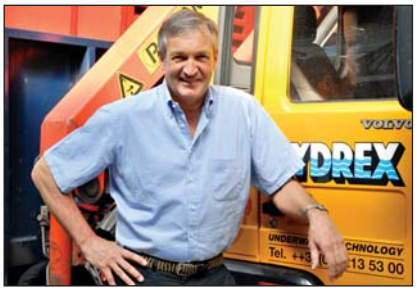
Because Hydrex brings drydock-like conditions to the ship, you do not have to take your vessel off-hire and into drydock. This saves you valuable time and money.

HYDREX®
UNDERWATER TECHNOLOGY

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

www.hydrex.be

Editorial



In this magazine we give you a summary of some of the on-site repairs that were carried out by our diver/technician teams over the last couple of months.

The first article is about an extensive hull repair that was carried out Poland. A 229-meter bulker suffered a 14-meter gash and some smaller cracks during a collision just outside the port of Gdansk. Because the classification society did not allow the ship to sail on, Hydrex sent a team to the vessel's location to repair the damage in the hull.

In New Orleans, U.S.A., another Hydrex team performed a propeller blade straightening operation on a 245-meter oil tanker. Straightening the blades back to their original form restored optimum efficiency to the propeller. This was successfully carried out without the need to dry-dock the ship.

The final article gives a summary of some of the more important recent stern tube seal repairs carried out by Hydrex underwater. By performing these repairs on-site and underwater, we make sure that a vessel can keep to its sailing schedule and does not have to go into drydock.

Our large, multidisciplinary team will find the best solution for any problem encountered with your ship below the water line. We will immediately mobilize our diver/technicians to any location around the globe to carry out necessary repair work without the need to drydock.

If you would like to learn more about the Hydrex services, please visit our website (www.hydrex.be) or call us 24/7 with your underwater repair needs, routine or emergency. We can offer turnkey solutions that include the engineering as well as the practical part of any operation. Our technical department is ready to find a solution for your specific needs.

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:

DNV · Lloyd's Register · ABS · GL · Bureau Veritas · ADC · RINA · ClassNK

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

HYDREX®
UNDERWATER TECHNOLOGY

Table of contents

Underwater repairs in Poland allow ship to sail on after severe grounding damage

In June a fully loaded 229-meter bulker suffered a 14-meter gash and some smaller cracks during a collision just outside the port of Gdansk, Poland. The classification society did not allow the ship to sail on until a temporary repair was made. Because the ship had just been loaded in Gdansk, it was essential that a solution was found that would allow the vessel to sail on. For this reason Hydrex sent a diver/technician team to the vessel's location to close off the damage in the hull. The operation was carried on in cooperation with salvage expert SVITZER.

Hydrex truck with equipment leaving the Antwerp headquarters.

An initial inspection of the damage revealed a 14-meter longitudinal crack on the flat bottom that was up to 1 meter wide in the middle. A second crack was found on the portside near the collision bulkhead, measuring 2 meters by 15 centimeter. Several smaller cracks were also discovered in the same area.

The results of this inspection were used to propose a repair plan to the customer. After the final order was given, a truck with all the necessary equipment mobilized from the Hydrex headquarters in Antwerp.


Hydrex equipment on board bulker.

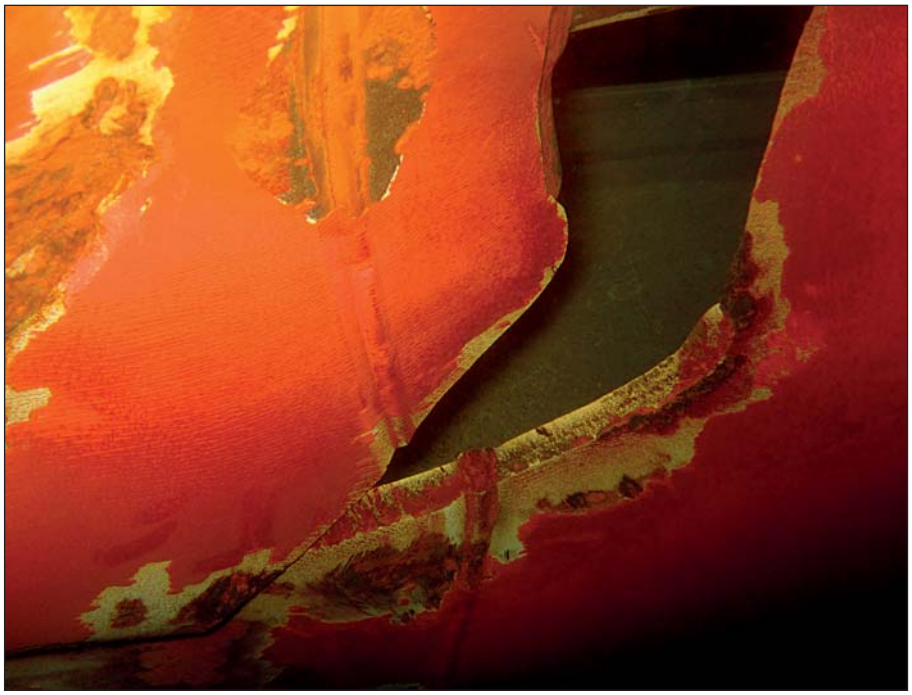
Large flat doubler plate lowered onto deck prior to installment.

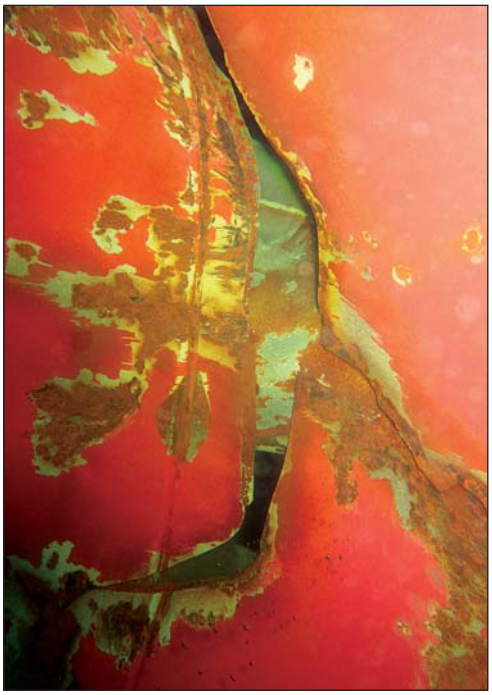
Creating a doubler plate that fit the deformed hull

In Gdansk the operation started with the installation of a flat doubler plate over the largest part of the 14-meter crack. The area around the last part of the crack was too badly deformed and required a special doubler plate that would fit the new shape of the hull.

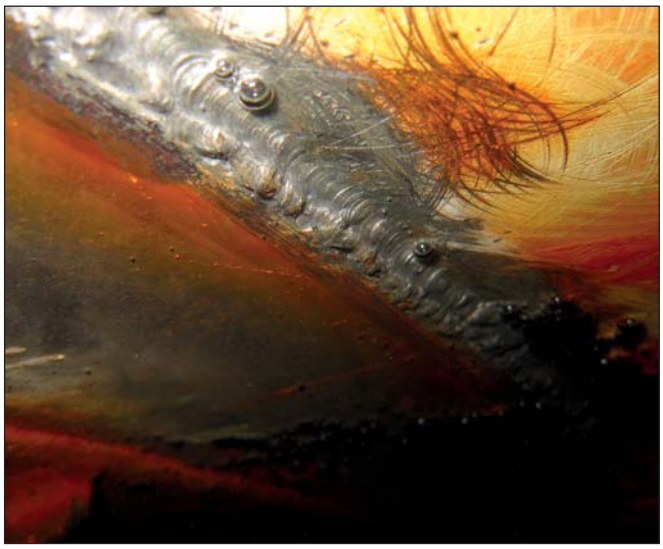
The first step was to get accurate measurements for the area of damage on a hull that was badly deformed, pierced and indented. These measurements were subsequently used in the fabrication of the doubler plate. The plate was made at a local dockyard under supervision of a Hydrex diver/technician. Extra stiffeners were welded on the doubler plate as additional reinforcements.

The doubler plate was then secured to the hull with a weld all the way around. With the large crack completely closed off, the Hydrex team moved on to the 2-meter crack in the bulkhead.



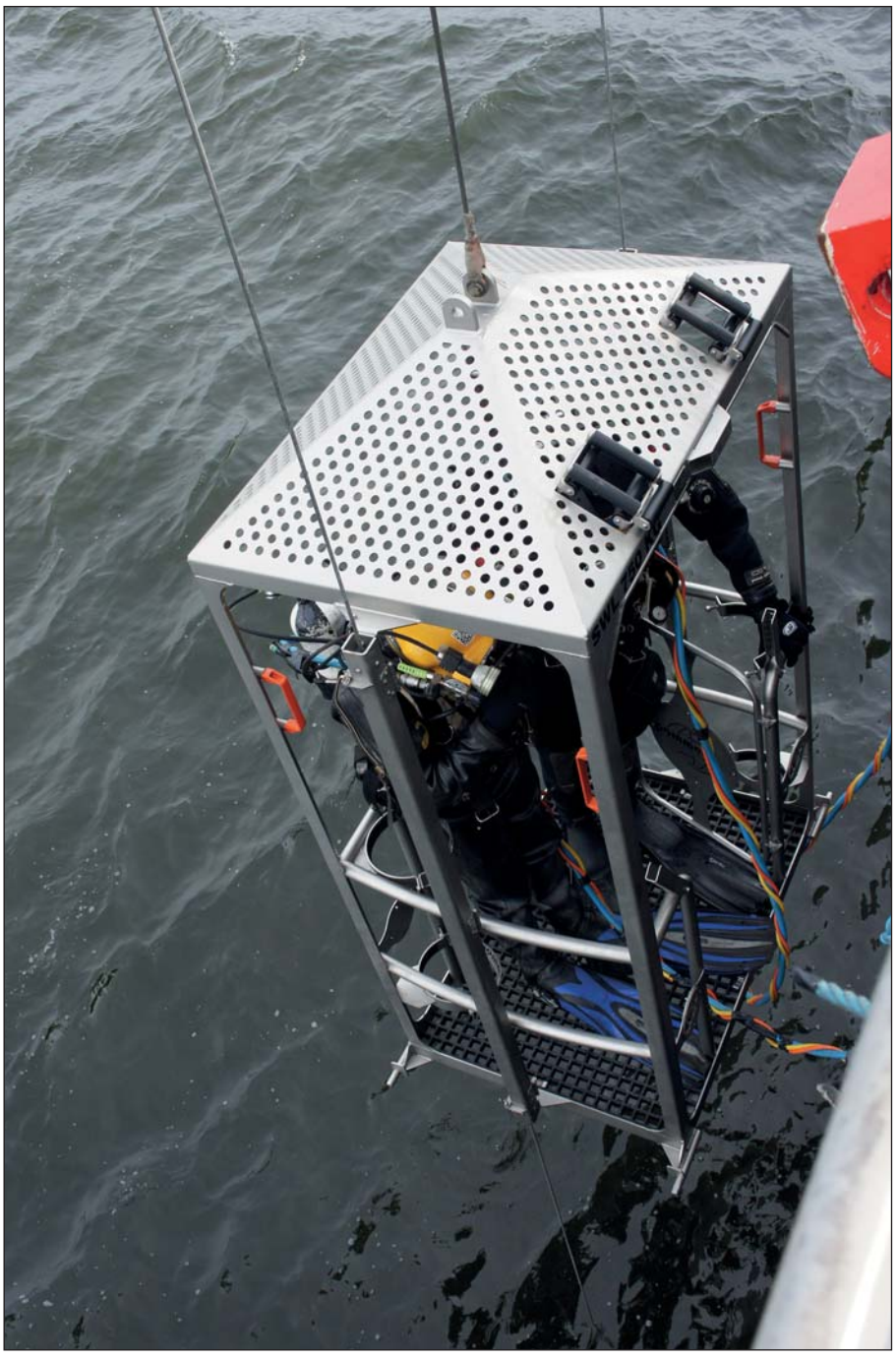


The bulker had suffered severe grounding damage.



The doubler plates were secured all the way round with a full penetration weld.

Hydrex diver/technician performing weld work.



Diver/technicians lowered into the water for underwater operation.

Closing off the other cracks

Because the area around the second crack was deformed too extensively for a regular doubler plate, a special cofferdam was constructed. After it had been constructed, the cofferdam was positioned over the crack and welded all the way around.

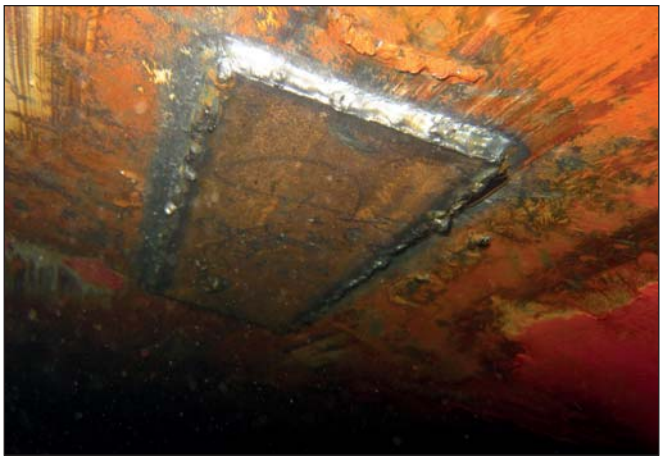
During these repairs several smaller doubler plates were installed over the other cracks, closing off the hull

Cofferdam used for the second crack arriving on site.

Extra reinforcements were installed around the cofferdam.


Hydrex team leader monitoring the operation.

The doubler plates and cofferdam were tailor-made to fit the shape of the hull.


Smaller additional doubler plates were also installed over minor cracks.

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

You can contact us at:
hydrex@hydrex.be
or at
+ 32 3 213 53 00

completely and allowing the vessel to sail on. After unloading its cargo in Hamburg, the ship went to dry-dock for permanent repairs.

Conclusion

Without the underwater repairs carried out by Hydrex, the ship would not have been given permission by the classification society to continue its journey. By providing the owner with a solution for a seemingly unsolvable problem, Hydrex saved him a great deal of time and money. ■

Underwater propeller blade straightening in New Orleans with Hydrex new generation equipment

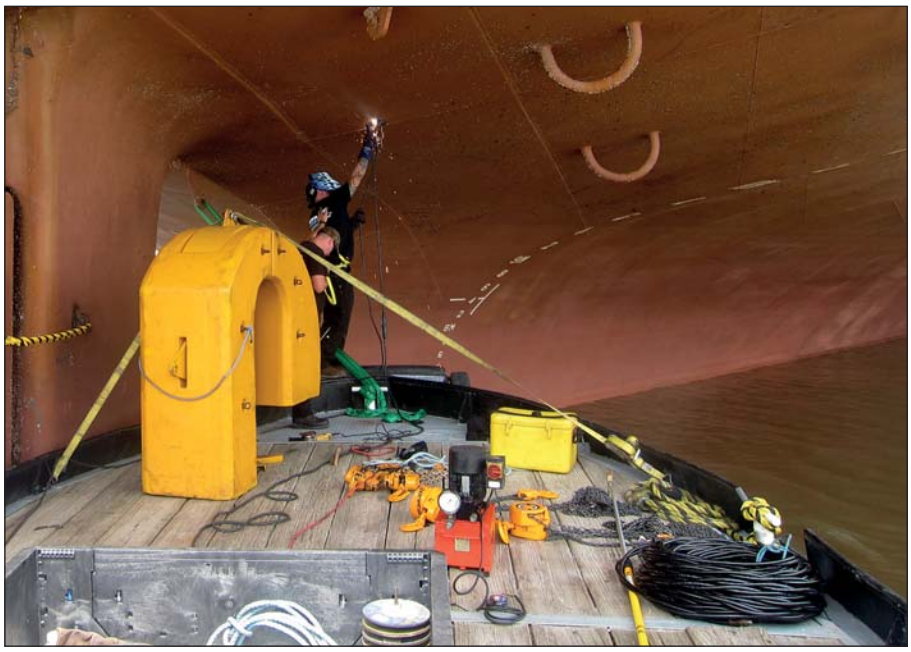
Last month, a diver/technician team performed a successful propeller blade straightening operation on a 245-meter oil tanker at anchorage in New Orleans, U.S.A.

By taking advantage of the in-house developed cold straightening technique, damaged blades can be straightened underwater. This allows a ship with a damaged propeller 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.

With one of the blades of its propeller severely bent, an oil tanker 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 from the Hydrex office in Tampa Bay, Florida, was therefore rapidly mobilized to the ship's location in New Orleans 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 operation with a detailed survey of the affected propeller blades.

With the survey completed, the team positioned the straightening machine over the bend in the trailing edge of the damaged blade. In close communication with the team leader



Preparation of the stern area for installation of the Hydrex straightening machine.

One of the bent propeller blades of a 245-meter oil tanker.

Straightening machine being removed after propeller blade straightening.

Tests showed that the straightening had been successful.

in the monitoring station on-shore, the divers returned the bent blade to its original state. When the straightening was complete, the Hydrex technicians polished the blade to make sure that any remaining loss of efficiency would be minimal.

Conclusion

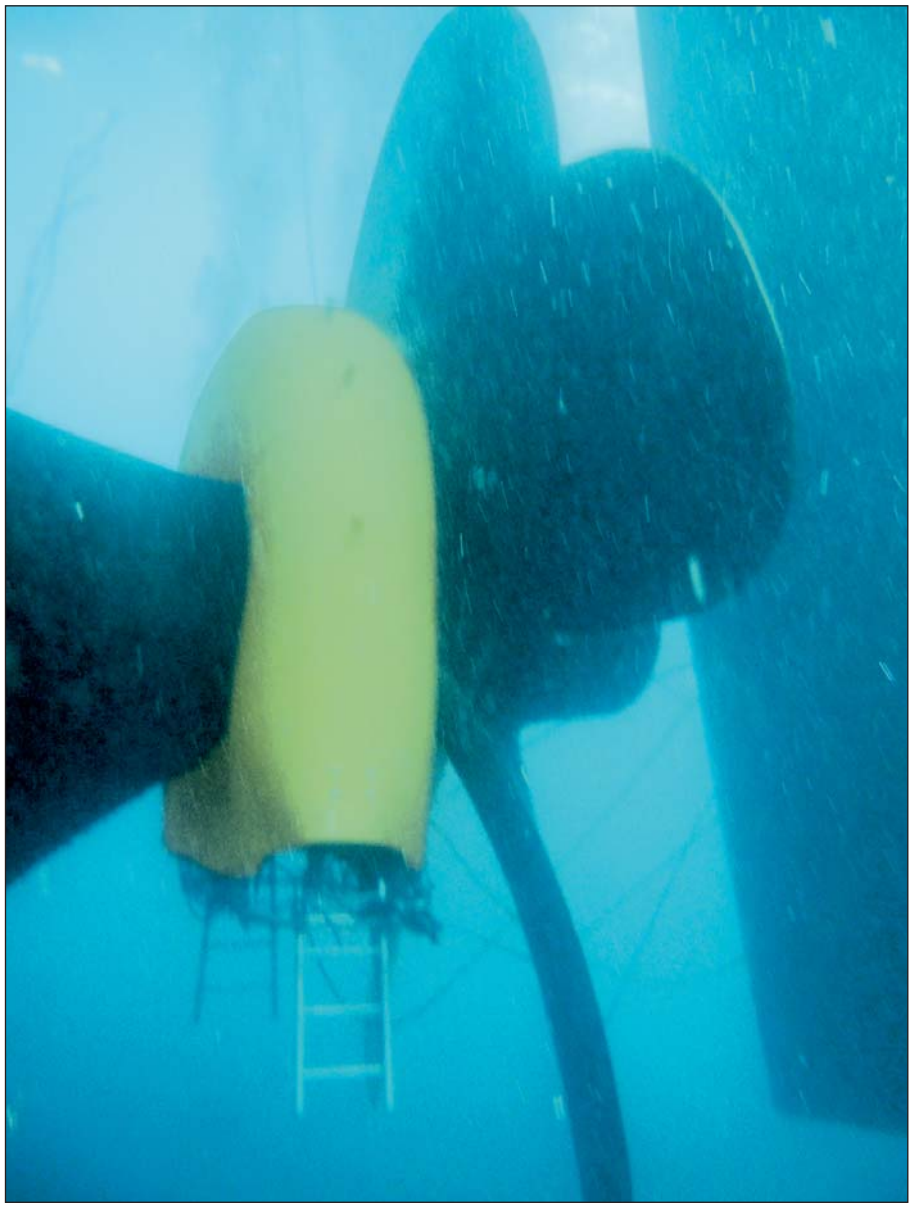
Our R&D department is constantly looking into ways to enhance the available propeller repair techniques even further to improve our services. New models of the straightening machines have recently been put into service. These allow us to straighten blades that could previously only be cropped. This type of repair can be carried out on-site, allowing the ship to return to commercial operations without the need to drydock. ■

Fast underwater stern tube seals repairs with new generation mobdocks

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.

Every Hydrex office has a fast response center equipped with all the latest facilities, equipment and tools. These centers were designed specifically to increase speed of service. The lightweight flexible mobdocks packed in flight containers allow for a very fast mobilization and a timely arrival of Hydrex teams on any location around the world with everything they need to successfully complete the job.

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 any other part of the underwater vessel without the vessel needing to go to drydock. The latest generation of flexible mobdocks allows Hydrex to carry out on-site replacement of virtually any type of stern tube seals very quickly.



The Hydrex flexible mobdock creates a dry environment around the stern tube seals.

The following case studies give an account of some of the more important recent underwater stern tube seal repairs performed by Hydrex.

Underwater stern tube seal repair in Port Gentil allows vessel to continue its schedule

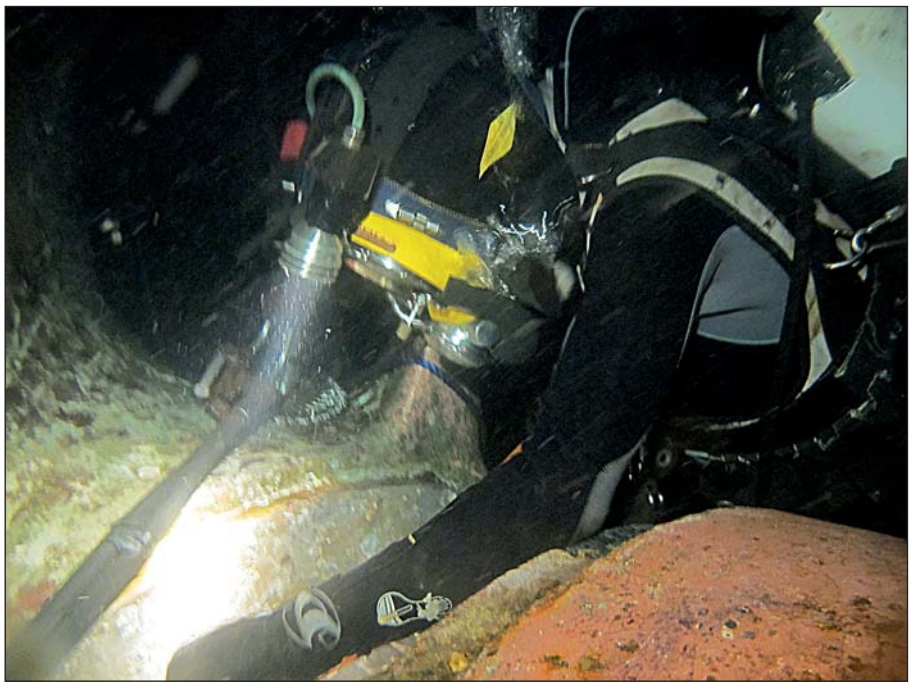
When the fore as well as the aft stern tube seals of a 247-meter tanker were leaking, the vessel was not given permission to enter any port. Unloading at sea and going to

Hydrex diver working on stern tube seal assembly in Gabon.

drydock seemed the only option for the vessel, until Hydrex sent a diver/technician team with one of the company's flexible mobdocks to the ship's location in Port Gentil, Gabon, to replace both sets of stern tube seals on-site.

The team loaded the necessary equipment on a barge on which they set up a work station to monitor all underwater activities. The barge then sailed to the tanker and the Hydrex team leader met up with the vessel's owner and superintendent. The rest of the diving team made all remaining preparations for the main activity, which started, immediately after the meeting, with the removal of the rope guard. This was followed by a thorough underwater inspection and shaft wear down readings.

While the Hydrex flexible mobdock was installed to create a dry underwater environment around the stern tube seal assembly, Hydrex technicians replaced the fore stern tube seals which are located on the inside. Next the team started the work on the aft seals. This was done inside the flexible mobdock in drydock-like conditions, which are essential for stern tube seal repairs. The diver/technicians cleaned the entire assembly before they removed the damaged seals one by one and replaced them with new ones.



Diver/technician preparing the stern tube seal assembly for mobdock installation.

This allowed the owner to have his ship continue its schedule and enter the port to unload its cargo.

No drydocking needed after fast underwater stern tube seal repairs in Singapore

In May, Hydrex diver/technician teams carried out underwater stern tube seal repairs on a 292-meter, 50,644 grt container vessel in Singapore. The ship was suffering from an oil leak, making a fast repair necessary. Using one of the company's flexible mobdocks the team was able to carry out the entire operation on-site and underwater, saving time and money for the owner.

After the diving team had set up a monitoring station, the operation started with a thorough underwater inspection of the stern tube seal assembly. This revealed that a fishing line had caused the leak.

After the inspection, the team detached the rope guard. The fishing lines entangled around the liner were then removed. The divers then installed the flexible mobdock

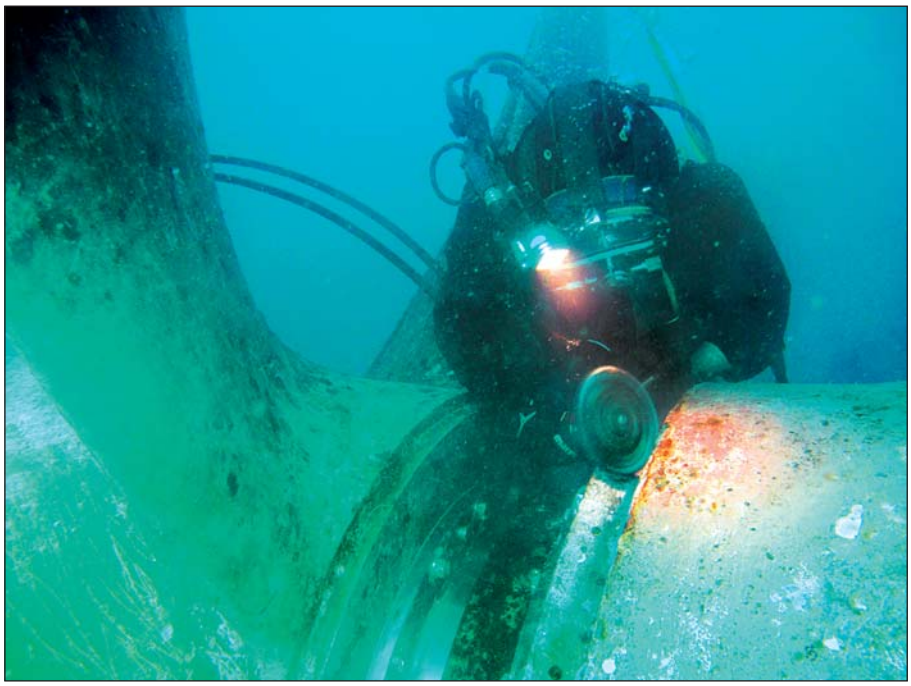
Fast underwater ship hull repairs save time and money

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.

HYDREX®
UNDERWATER TECHNOLOGY



Grinding work on the stern tube edge.

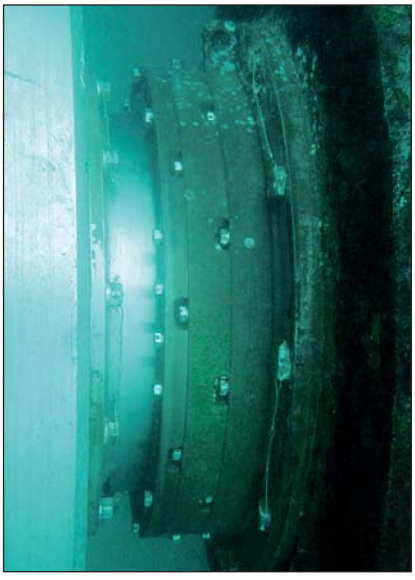
around the stern tube seal assembly creating a dry underwater environment for the divers to work. The split ring was then disconnected and brought to the surface to be cleaned. After cleaning the entire assembly, the divers removed the first seal and replaced it with a new one which was then bonded. This procedure was repeated with the other two damaged seals.

Thanks to the underwater operation, the vessel could sail on with the oil leak fixed.

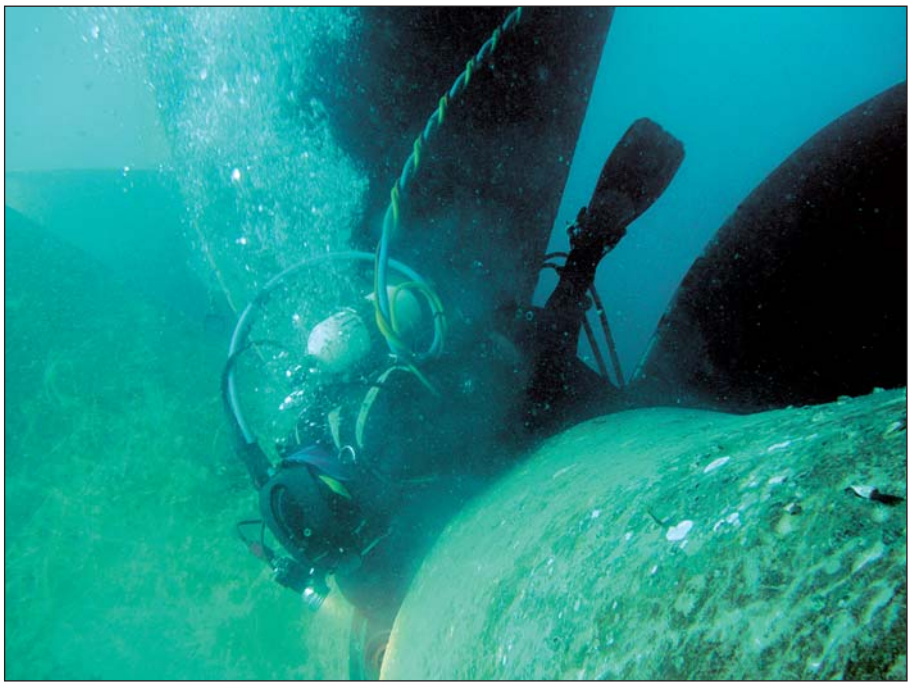
Underwater stern tube seal replacement in Kusadasi and Istanbul (Turkey) and Piraeus (Greece)

When a 204-meter cruise vessel suffered an oil leak in its stern tube seal assembly, Hydrex was asked to perform a permanent seal replacement. The repair was carried out with the Hydrex flexible mobdock technique and performed in stages to allow the ship to keep the tight schedule of the cruise it was on. A small Hydrex diver/technician team met up with the ship in Kusadasi, Turkey and removed the starboard side rope guard. This was done to shorten the time required for the actual replacement of the stern tube seals. It was essential in fitting the operation within the short stop the vessel made in the next harbor on its trip. The team was then completed with additional diver/technicians and sailed to Greece on board the cruise ship.

As soon as the vessel arrived in Piraeus, the Hydrex diver/techni-



Stern tube seal assembly after seal replacement.



Diver preparing the reinstallation of the rope guard.

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

cians set up a monitoring station next to the ship and made all necessary preparations for the main part of the operation. The team then installed the Hydrex flexible mobdock around the stern tube seal assembly. This created a dry working environment underwater in which to carry out the repair in the drydock like conditions necessary when replacing seals.

After the diver/technicians had opened up the assembly they removed the damaged stern tube seals one by one and replaced them with new ones. A subsequent leakage test showed that the repair was successful. The team then closed the stern tube seal assembly again and removed the flexible mobdock. This ended the second part of the operation well in time for the cruise ship to sail to its next stop with its passengers.

In Istanbul, Turkey, the team met up with the vessel again and refitted the rope guard onto the stern tube seal assembly, concluding the operation. The ship could continue its journey free of oil leaks without going to drydock and without any changes to its schedule.

Stern tube seal repairs in U.S.A. and Panama in challenging weather conditions

Hydrex sent diver/technician teams to perform two underwater stern tube seal repairs at the same time. 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.

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. 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 quality standards and without any unnecessary delay.

Galveston, U.S.A.

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 created a dry working environment around the stern tube assembly using a flexible mobdock. This is needed for any permanent stern tube seals repair. After cleaning the entire assembly, the divers disconnected the split ring and brought it to the surface to be cleaned. Next the team removed the three damaged seals one by one and replaced them with new ones.

Panama

Meanwhile, oil was leaking from the stern tube seal assembly of the second container vessel. Another team of 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.

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.

Summary

By sending the Hydrex flexible mobdocks in our special fly away cases together with all equipment, fast response to any emergency call is guaranteed to locations around the world from the various Hydrex offices.

Off-hire causes a substantial loss of money. The teams therefore worked in shifts to perform these stern tube seal repairs within the shortest possible time frame. This saved all the owners the time and money which going to drydock would have entailed. This service requires extensive resources in terms of trained and competent personnel as well as multiple sets of all the necessary equipment. ■

Hydrex diver/technicians can work in drydock-like conditions inside the flexible mobdocks.

Hydrex monitoring station during stern tube seal repair in Rotterdam.

The Hydrex flexible mobdock is used to create a dry working environment underwater.

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.

HYDREX®
UNDERWATER TECHNOLOGY

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: spain@hydrex.be

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

Hydrex West Africa – Port Gentil, Gabon
E-mail: westafrica@hydrex.be

Hydrex India -Vishakhapatnam
E-mail: vishakhapatnam@hydrex.be

www.hydrex.be