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Underwater bow thruster repairs adapted to your schedule

KEEPING SHIPS IN BUSINESS

ISO 9001 certified

Underwater services and technology approved by:



BUREAU
VERITAS



ClassNK



Scrubber pipe repairs and lasting protection



Exhaust scrubbers filter out all harmful toxins from exhaust gasses 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 dam-

age. 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.

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

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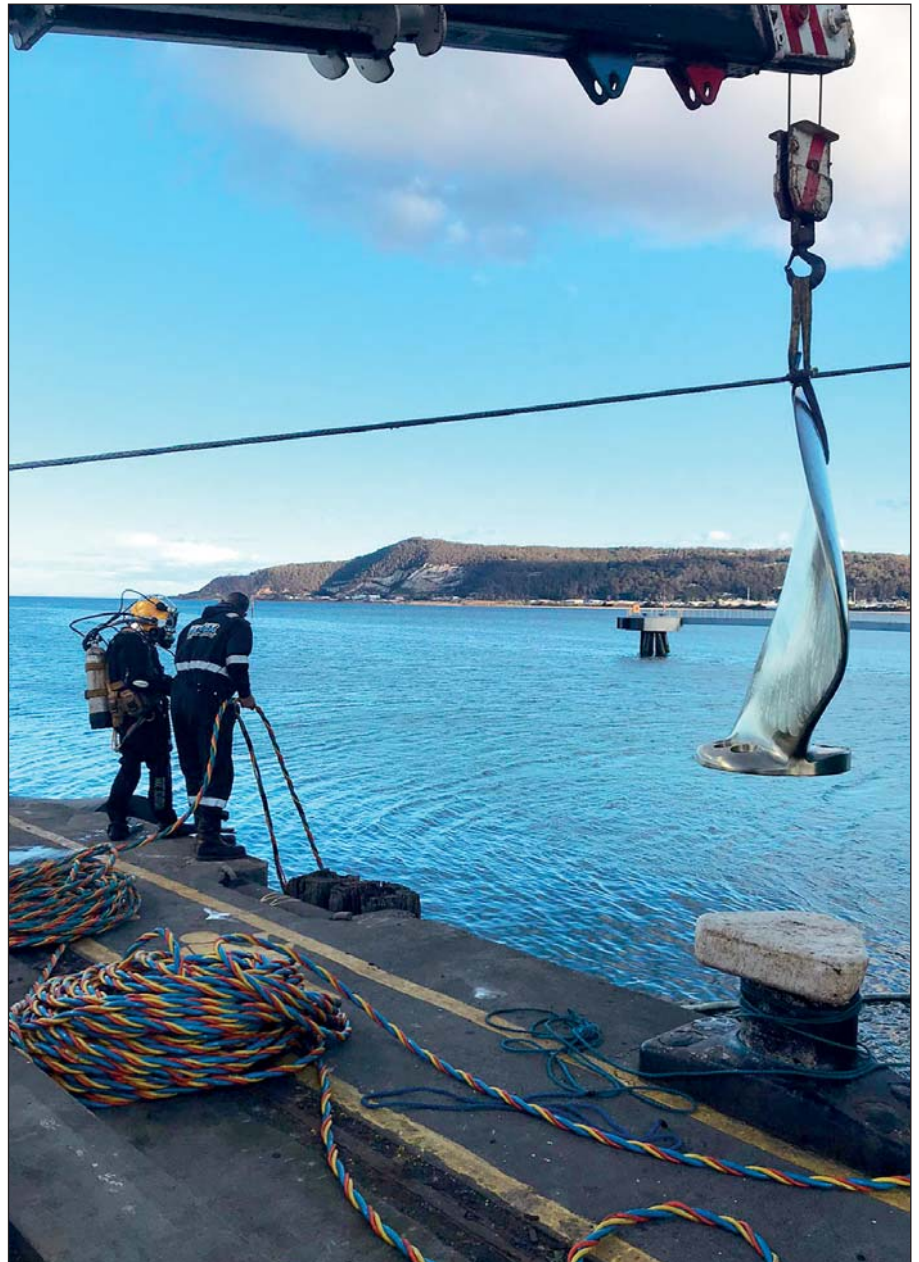
Propeller repairs restore efficiency and save money

When damage to propellers occurs due to impact with ice and other debris, we will help you, even if the damage is quite extensive.

A ship with bent or cracked propeller blades might experience severe vibrations while sailing. The classification society might demand a repair before the vessel is allowed to sail on. By straightening the blades or cropping them, we can restore the propeller's balance, resulting in a green light from the class.

A propeller modification can easily be combined with any other maintenance or repair operation that needs to be carried out on the vessel. Thanks to the flexibility of our teams this allows a vessel to keep its schedule.

Prior to a propeller repair a detailed underwater inspection is carried out by our divers. They are certified to make a full assessment of the condition of the propeller. The exact dimensions and position of the damage can then be communicated to the technical department supervising the operation. This is essential because the calculations need to be perfectly accurate to achieve an ideal result with the repair. Hydrex team members have experience in dealing with many different situations and circumstances. They are trained to think with the staff in the technical department. As diver/technician experts, they can assist in working out the best solution and have the skill and experience needed



Hydrex diver getting ready to take the plunge for installation of a new blade.

to implement the solutions that have been worked out.

Propeller blade straightening and cropping

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. Optimum efficiency of the propellers can be restored by bringing the blades back close to their original form. The cold straightening machine has been in use for quite some time now but our research department has been looking into ways to improve the technique even further.

Permanent in-water 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 light-weight and can be mobilized very rapidly in our special flight containers.

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 on-site, 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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One of our divers guiding a new propeller blade during installation.



Severely bent propeller blades like this can be cropped to restore efficiency.



We have developed our propeller cold straightening machine in-house.



Both propeller blade straightening and cropping can be done underwater or on a trimmed vessel.

A new model of the straightening machine was recently put into service. It is compatible with the existing model and is used to restore more severely bent propeller blades.

If straightening is not an option, the affected area on the blade will be cropped. This is done to achieve the greatest possible efficiency. This kind of repair is carried out with our propeller blade cutting equipment. First a detailed underwater inspection is performed by a Hydrex diver/

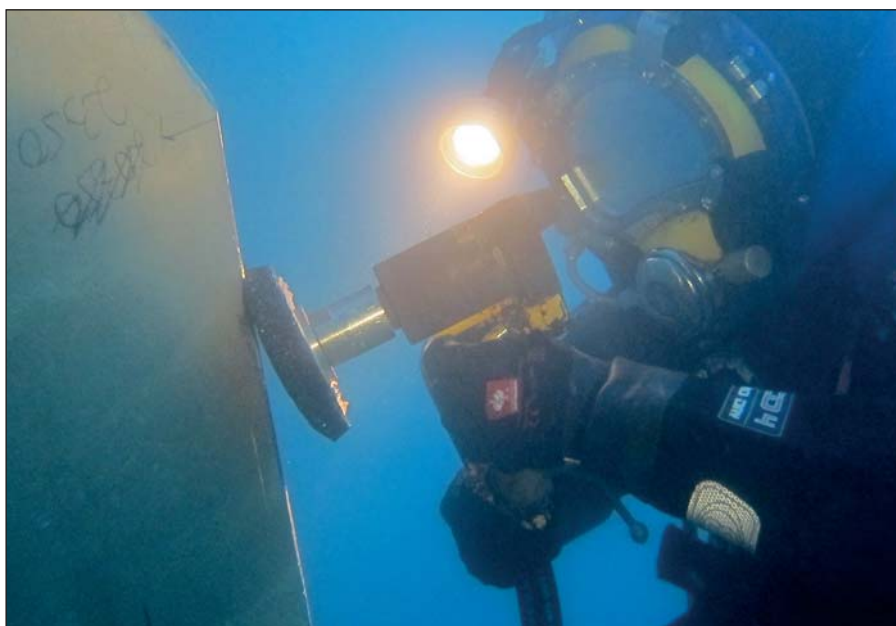
technician team to obtain the exact extent of the damage which is then used for a detailed calculation of the ideal cutting line. This allows the customer to know in advance what the result of the operation will be.

We also have the tools to carry out detailed crack inspections on propeller blades. An informed decision can then be made concerning any required follow-up action. Catching problems early can save much time and money.

Restoring optimum propeller performance

Aside from our repair services we can also help customers when they have the need for preventative or other special custom projects. For example, preventative modifications were made in Bremerhaven to the blades of three ice-going ships. When several of this customer's vessels suffered damage and the propellers needed cropping after the winter, the owner wanted to find a way to prevent this from occurring to his other container vessels. When the next winter promised to be equally harsh, he wanted to give the blades extra strength and make them less susceptible to damage from ice or other debris. This was done by modifying the blades to a very specific design that made them less prone to damage while keeping the performance of the propeller as close to optimum as possible. The operation was performed in close communication with the manufacturer of the propellers.

By performing these repair and maintenance operations underwater and on-site Hydrex saves ship owners precious time and money. It allows ships to return to commercial operations without the need for dry-docking. ■



One of our divers grinding the edge of a cropped blade.

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:
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or at
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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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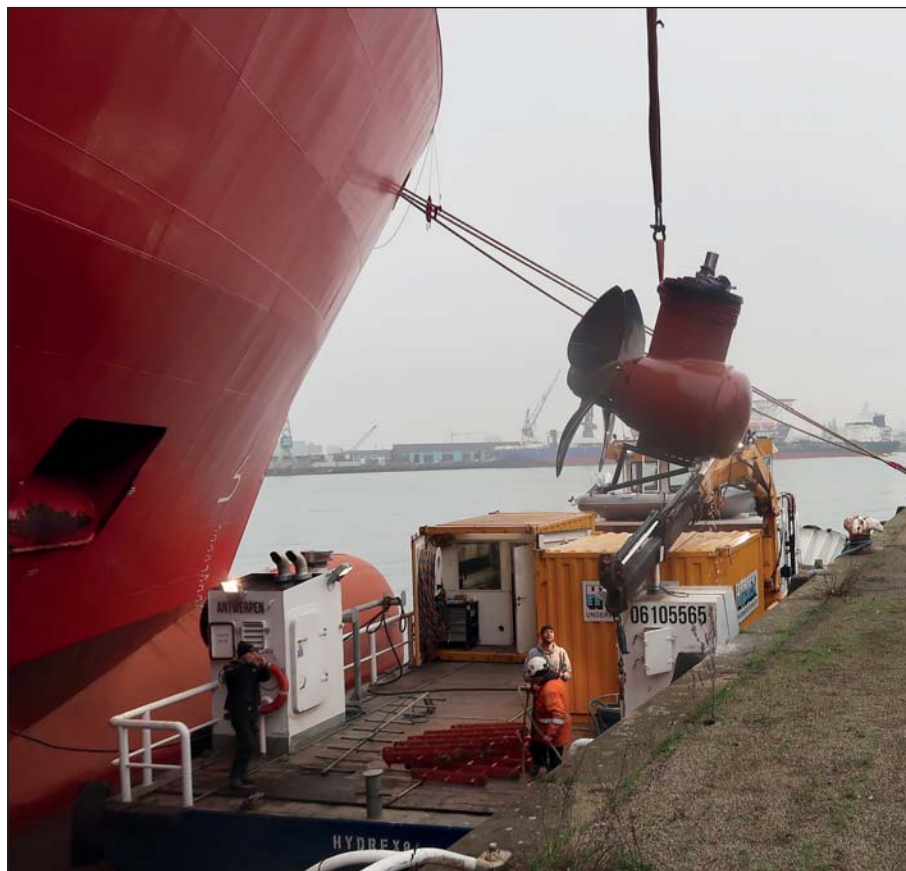
Underwater bow thruster repairs adapted to your schedule

Our diver/technicians can perform a wide range of repair or maintenance work on bow thrusters. An entire unit can be overhauled, propeller blades and seals can be replaced or repair work on another specific part of a thruster can be performed on-site. These repairs are performed in cooperation with all OEMs and can be carried out while the ship stays afloat with minimum impact on its schedule.

Our goal is to offer you the most efficient solution while maintaining the highest safety and quality standards. This article gives an overview of some of the more important recent bow thruster repairs carried out by our teams.

Underwater bow thruster removal in Rotterdam

One of our teams removed a bow thruster from a 170-meter container ship. This was done during a stop in



Thruster lifted out of the water and onto the quay.

Rotterdam. The unit needed to be overhauled and the operation had to be carried out within a very short

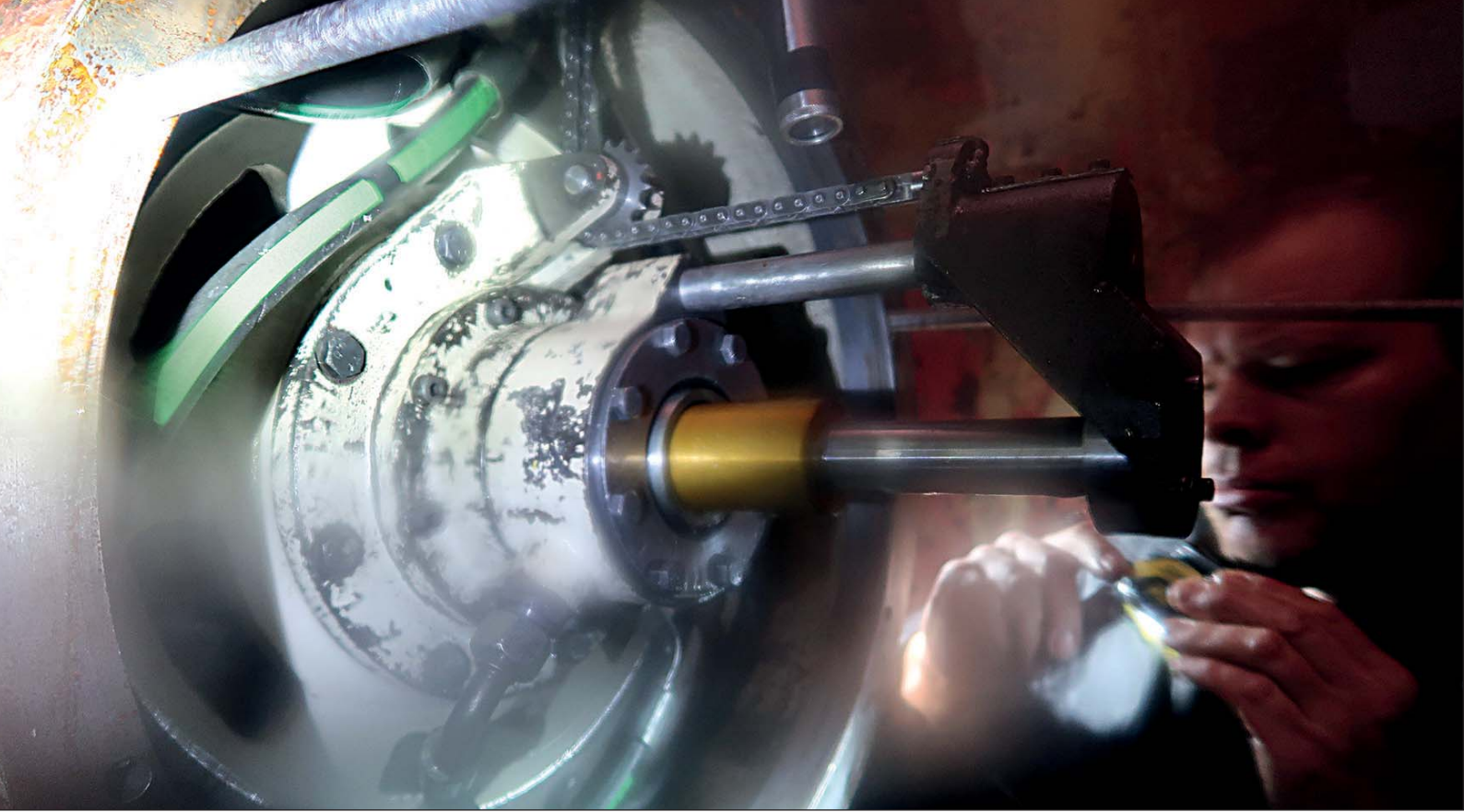
window that would fit the schedule available to the vessel's owner.

The team mobilized to the ship's location using one of our workboats loaded with all the needed equipment. These workboats are stationed in Antwerp and Rotterdam and can be used for a wide range of operations. This enables rapid deployment. It also increases flexibility, which was essential during an operation like this.

We carried out the removal following the specific procedures required by the involved OEM. This allowed us to remove the thruster unit with the blades still attached, speeding up the operation. Simultaneously the



Inspection of the thruster prior to transportation to the workshop.



Installing the repaired part of the feedback system.



Removing the cover of the bow thruster gearbox.



After installing our flexible mobdocks, all water was removed from the thruster tunnel.

team sealed off the tunnel from the bow thruster room. Once the unit was lifted onto the quay it was prepared for transport to the workshop.

By performing the operation 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. They finished the job well within the available time frame. This allowed the ship to sail on schedule, which was a key benefit for the owner.

Thruster repair afloat in Phuket

A 200-meter cruise ship experienced a problem with its bow thruster. We therefore mobilized a team to Phuket, Thailand to perform the necessary underwater repairs with the use of our flexible mobdocks.

A breakdown occurred in the feedback system that specifies the position of the vessel's bow thruster blades. Taking into account the strict

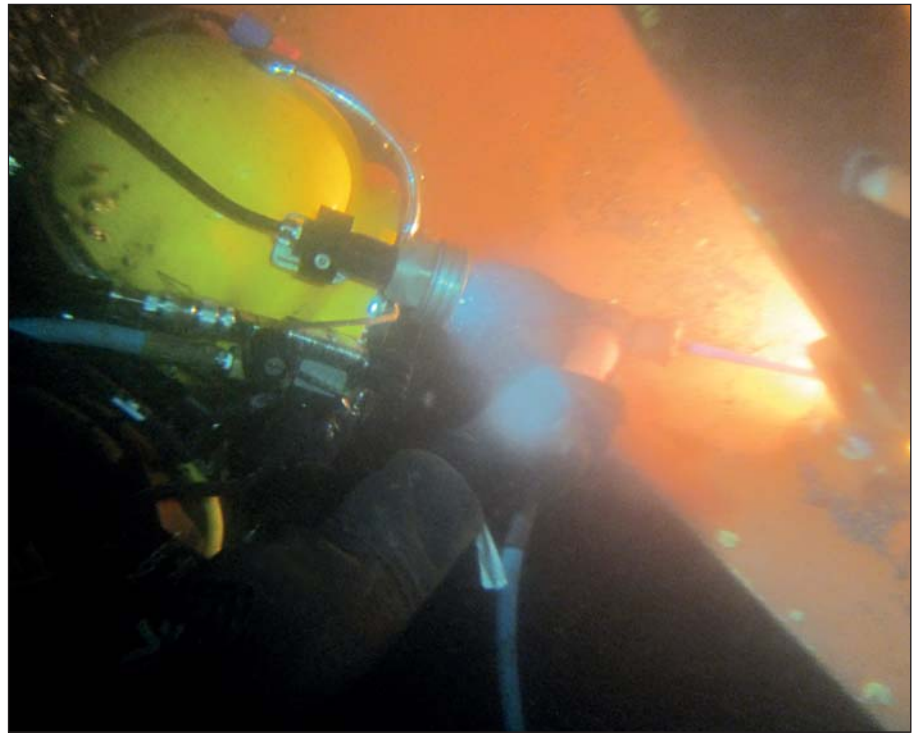
schedule of the cruise ship, keeping it sailing was essential. We were contacted by the customer and asked to find a fast, on-site solution

In cooperation with the manufacturer of the thruster, a plan was devised by our technical department. Our diver/technician team would carry out an inspection and any necessary repairs afloat without removing the unit from the thruster tunnel. The customer gladly accepted this proposal as it meant he did not need to take his ship into dry-dock. This saved him substantial time and money.

Our team had a very pleasant and smooth cooperation with the crew of the ship, the manufacturer of the thruster and all other parties involved. This helped us to perform the operation as fast as possible.

Underwater bow thruster operation in Algeciras

We removed a bow thruster from a 229-meter bulk carrier. Two weeks



Removing the thruster tunnel grids.

later the overhauled unit was reinstalled. Both operations were done during stops in Algeciras, Spain and had to be carried out within the tight schedule available to the charterer.

To keep the impact on the ship's schedule to the absolute minimum our divers performed an inspection

of the bow thruster unit and tunnel, followed by some preliminary work while the vessel was berthed at a lay-by. The ship could then shift and start cargo operations while our men performed the rest of the operation without any hindrance to the loading schedule.



Overhauled unit in closed off thruster tunnel.



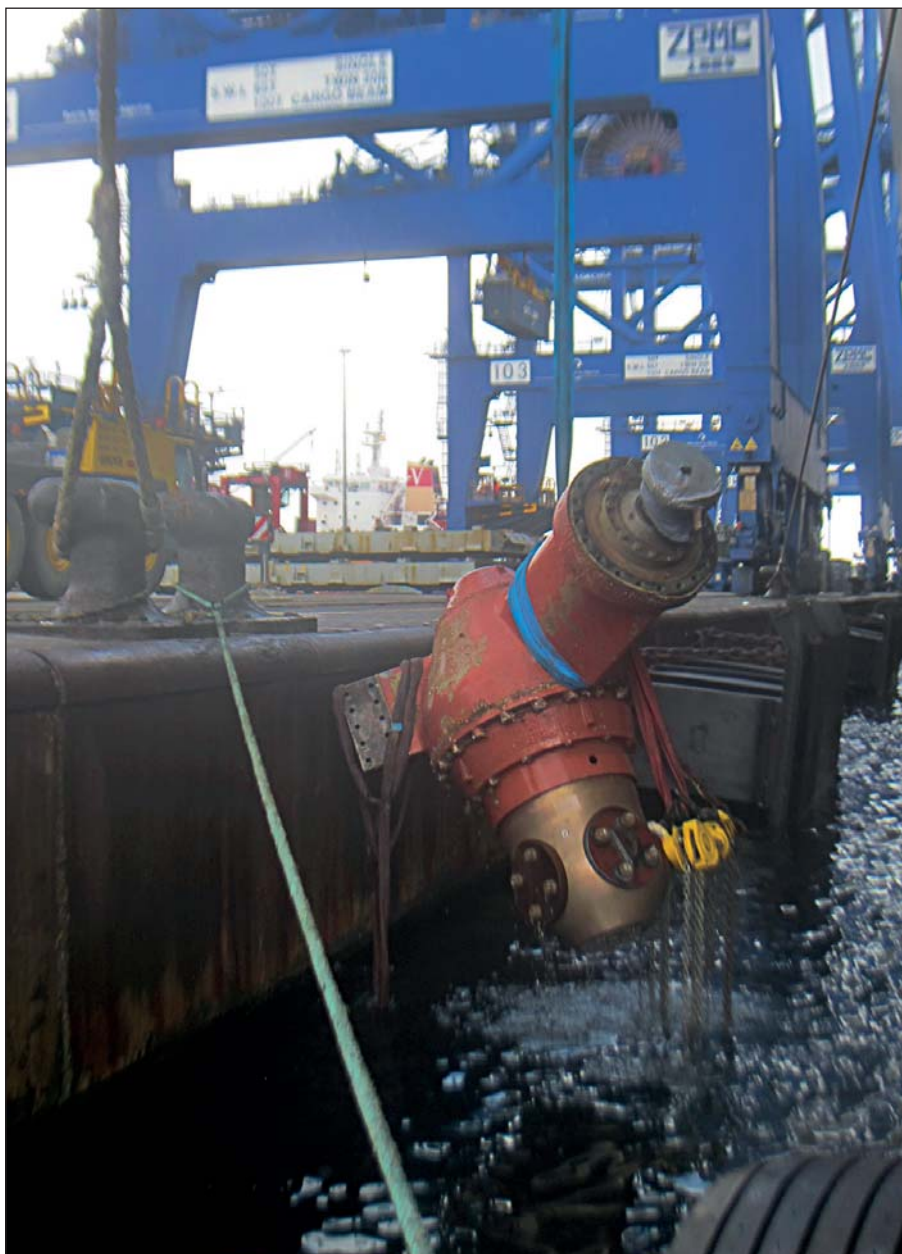
Reinstalling the bolts of one of the thruster blades.

Information

If you have any questions regarding a possible bow thruster repair, do not hesitate to contact us.

An animation of the procedure used can be found on our website. For more information on thruster or other underwater repairs, please contact one of our offices. We are at your disposal 24/7 and ready to mobilize almost immediately. ■

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The thruster was removed while the ship stayed afloat.

Bow thruster operations are carried out using our flexible mobdocks that close off the thruster tunnel on both sides. These lightweight mobdocks can quickly be transported to any location around the world.

In most cases a thruster overhaul is planned during a scheduled dry-docking. This usually means that the unit is removed in drydock. The ship then has to wait for the repaired thruster to return and be reinstalled before the vessel can leave drydock. This means a longer drydock time

and consequent cost. We can however remove the unit while the ship is still afloat so it can already be brought to the manufacturer to be overhauled. When the vessel enters drydock the overhauled unit will be ready for reinstallation without any delay.

The reverse procedure is also possible. If the thruster is removed in drydock, we can reinstall it in dry conditions underwater at a later date. In this way the ship can already leave drydock while the unit is still being repaired.

Large fuel savings with new propeller surface treatment technique



We discovered an unsophisticated but very efficient technology to enhance propeller blade surfaces. With this method we can achieve surface conditions that were never seen before. This can only be done underwater.

We have four workboats equipped to deliver this service on a very short notice in the Rhine-Scheldt delta from Antwerp to Rotterdam.

When a comparison is made between the surface condition of an average propeller, as our divers regularly see it, and the smoothness that is obtained with our cleaning technique, savings are in the 5-10% range. These results are easily achieved. The cost of such an operation is very attractive and is very easily gained back in a matter of days (or even hours).

Regular maintenance is easy to schedule and results in ultra-smooth

propeller surfaces. Continuous and large fuel savings are now possible.

This award-winning surface treatment technique justifies having the propeller cleaned every time it calls a port.

Please contact us for more information, we will gladly discuss the benefits of this new technology with you.

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We fix ships worldwide



*This drawing was made in 1979
and symbolizes our care and
attention for ships.*

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