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## KEEPING SHIPS IN BUSINESS

### ISO 9001 certified

Underwater services and  
technology approved by:



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



**T**hrough 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 mob-docks 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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# Hydrex performs a wide range of propeller operations, keeping ships out of drydock

**R**ecently Hydrex teams carried out a wide range of underwater propeller operations on tankers around the world. Among them a spinner cone (Propeller Boss Cap Fin –PBCF) replacement on a 110-meter vessel in Singapore, a propeller blade straightening on a 248-meter ship in Algeciras, Spain, and a blade cropping on a 183-meter vessel in Flushing, the Netherlands.

## Underwater spinner cone (PBCF) replacement in Singapore

Hydrex was contacted to install two new spinner cones (PBCF) during a

LPG tanker's scheduled stop in Singapore.

After the team arrived at the vessel's location, they started the operation with a full inspection of both propellers. Next the diver/technicians removed the port side propeller spinner cone (PBCF) and hoisted it on board the vessel. After they had cleaned the area under the spinner cone (PBCF), the team lowered the new cone into the water and positioned it on the propeller. When this was done, grease was inserted in the space underneath the propeller cone for lubrication and the bolts were put on torque and secured with wire, finishing the replacement of



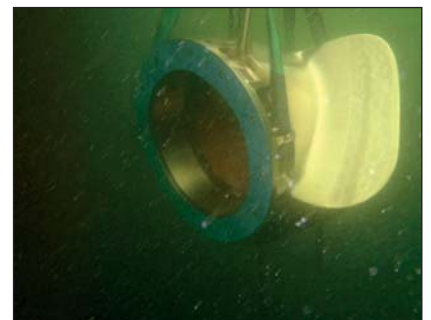
*The old spinner cone being removed on a tanker in Singapore.*



*Old spinner cone brought to the surface.*



*One of the damaged blades of the tanker in Algeciras.*



*New spinner cone lowered into the water.*



*New spinner cone installed and secured in Singapore.*

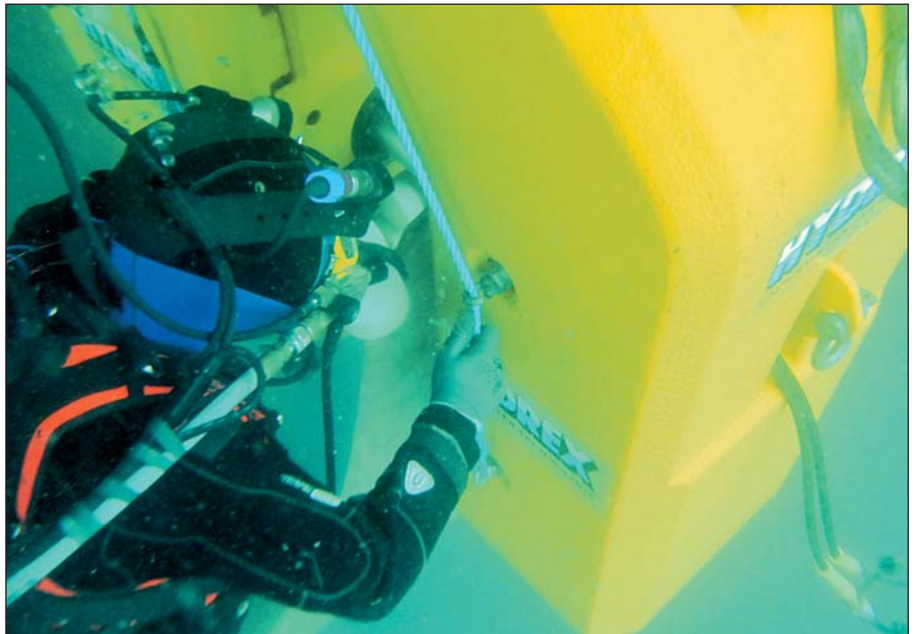
## Fast underwater ship hull repairs save time and money



**H**ydrex 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 diver/technician positioning cold straightening machine.*

the first spinner cone (PBCF).

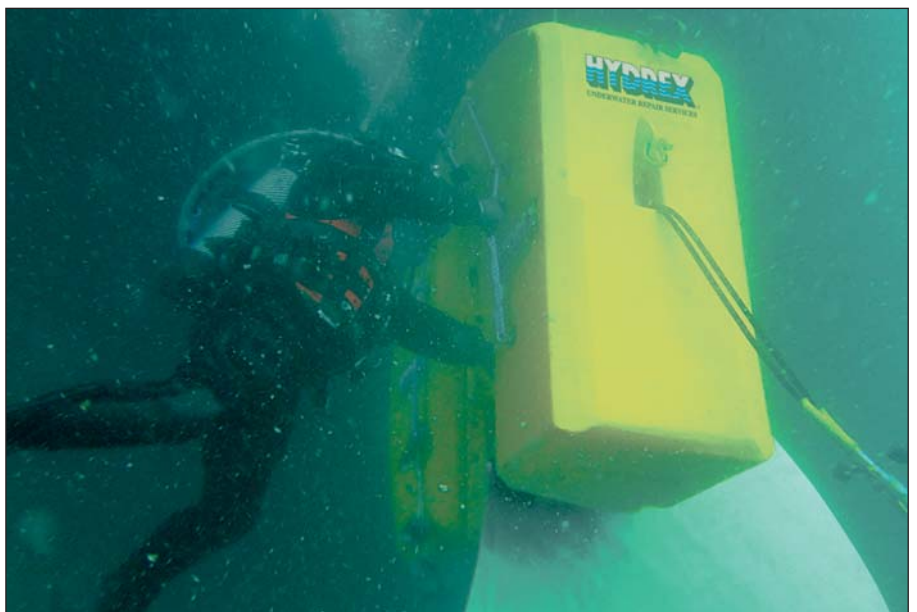
The divers then repeated this procedure with the starboard side propeller.

The PBCF alignment was monitored on an underwater CCTV camera and supervised by the maker's specialist on the diving boat. The makers informed us that this was the first installation of a PBCF underwater. The Hydrex team worked around the clock. No gas free operations were required for the above work, saving

time for the owners of the LPG tanker.

### Underwater propeller blade straightening in Spain

With three of the four blades of its propeller severely bent, a 248-meter 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 and a team was therefore mobilized to the ship's location



*With the cold straightening machine, bent blades can be restored to their original position.*



close to the Hydrex office in Algeciras Spain to perform a cold straightening of the blades.

After the equipment arrived at the vessel's location with one of the Hydrex workboats the team started the underwater operation with a detailed underwater survey of the damaged propeller blades. The inspection revealed that the three blades had suffered deformations along the trailing edges.

The team then carefully positioned the machine over the bends of the trailing edges of the first blade and, in close communication with the team leader on the work boat, applied pressure to return the bent blade to its original state. This procedure was then successfully repeated for the other damaged blades, restoring the propeller's efficiency.

## **Underwater cropping of damaged propeller blades in the Netherlands**

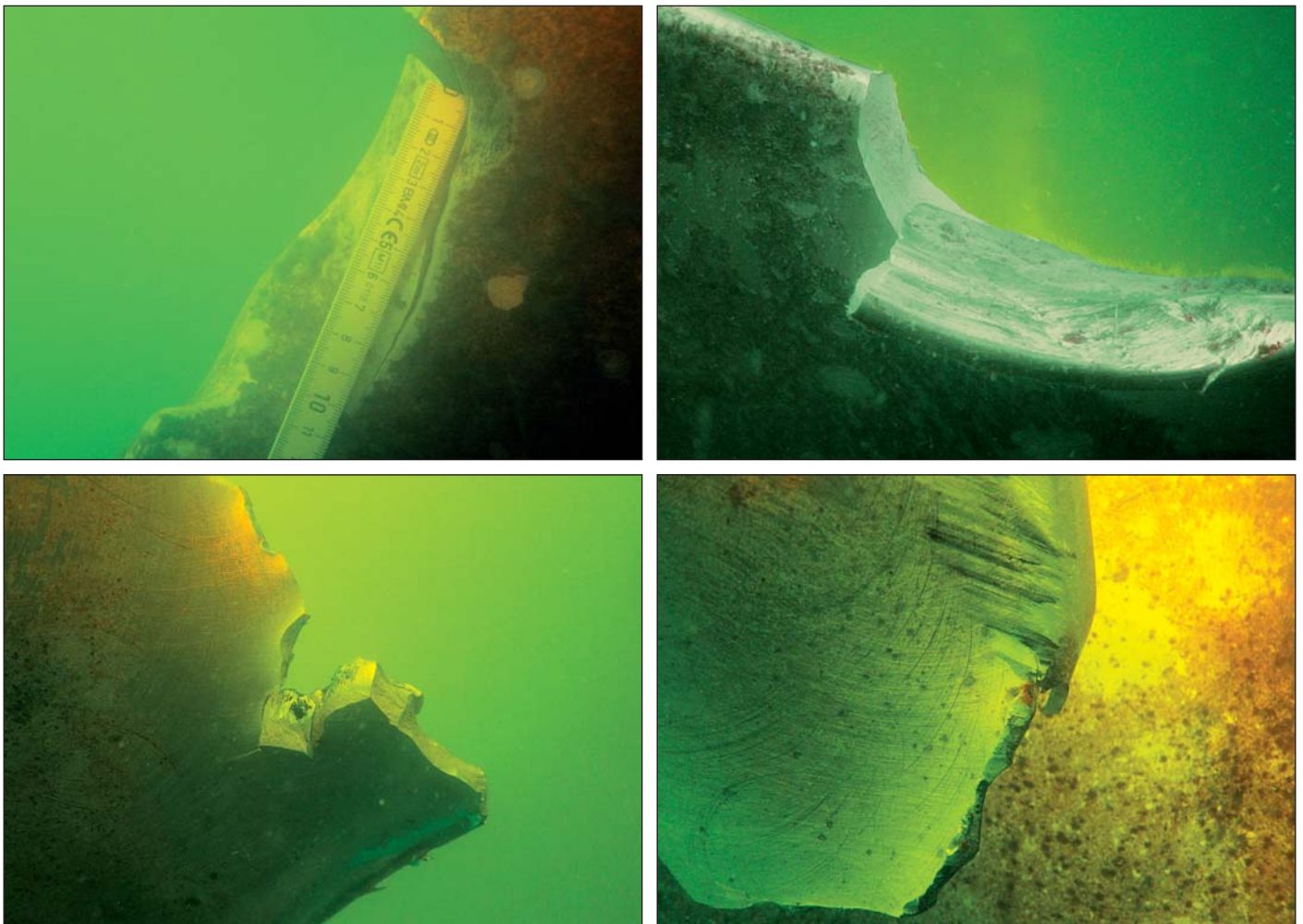
In September, Hydrex mobilized a diver/technician team to carry out a detailed inspection and necessary repair to the damaged propeller blades of a 183-meter tanker during the ship's stop in Flushing.

To make a full assessment of the damage, the team first performed an underwater inspection. This revealed that all four blades had been damaged. The affected areas of the blades therefore needed to be cropped to restore the propeller's balance. 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 propeller blades. The area to

be cropped was marked out on the four blades and verified. Next the divers cropped the blades one by one 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.

## **Conclusion**

Damaged propeller blades will have a performance below average. Should this be the case, then the engine will have a higher work load, resulting in increased fuel consumption and added stress. By taking advantage of the in-house developed cold straightening technique, damaged blades can be straightened underwater and optimum efficiency of the propellers can be restored. If straightening is not an option, the



*The four blades of a tanker in Flushing were severely damaged.*

## Swift on-site bow thruster operations



**T**he 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 re-pair 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.



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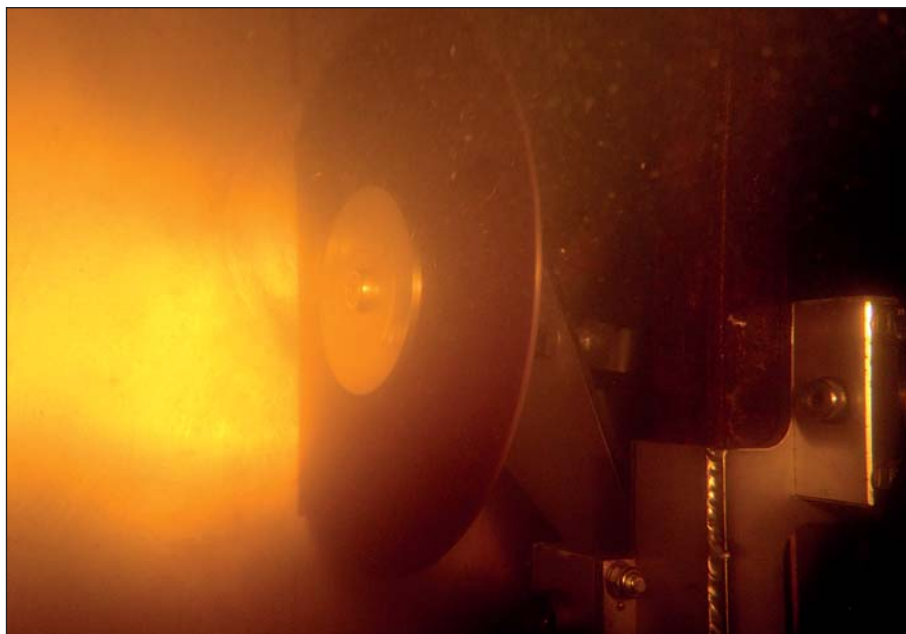
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*The cropped areas of three of the four blades.*



*The damaged areas were cropped underwater to restore the propeller's performance.*



*After cropping, the trailing edges of the blades were polished.*

affected area on the blade will be cropped to restore the hydrodynamic balance. This is done to achieve the greatest possible efficiency for the vessel. This kind of repair is carried out with the propeller blade cutting equipment that was also developed by the Hydrex research department. 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. ■



# Fast underwater stern tube seal replacement avoids need to drydock

**L**ast month Hydrex diver/technician teams carried out underwater stern tube seal repairs on a 242-meter container vessel close to the company's headquarters in Antwerp. The vessel was suffering 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 owners.

Every Hydrex office has a fast response centre 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 vessel's location within the shortest possible time frame.



*Bringing the rope guard to the surface.*

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. 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, 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 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. The operation ended with the conducting of a pressure test with positive



*The old running area of the seals was inspected.*







*Fishing lines tangled around the stern tube seal assembly caused the leak.*



*Hydrex diver/technician monitoring the operation together with the vessel's superintendent.*



*Hydrex diver/technician positioning one of the new stern tube seals.*

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. Every day a ship has to go 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 the owner the time and money which going to drydock would entail. ■

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*On shore preparation of spacer ring.*



# The Reference on non-toxic hull coatings published and available

**A**s announced in previous issues of our magazine, a new book, *Surface Treated Composites White Book – A proven, non-toxic, cost-effective alternative technology for underwater ship hull protection and biofouling control*, by Boud Van Rompay has been published by Tahoka Press and is available for purchase online at [TahokaPress.com](http://TahokaPress.com).

The *Surface Treated Composites White Book* is a complete reference on hard, non-toxic hull coating systems and in-water cleaning. It covers all related issues including the environmental hazards of biocidal coatings and the cost-effectiveness of surface treated composite hard coatings combined with routine in-water cleaning. The information in this book can save shipowners and operators between 8 and 40% of their current fuel bill while giving them an environmentally benign way to protect their ships' hulls and keep them smooth and free of fouling.

## The Book

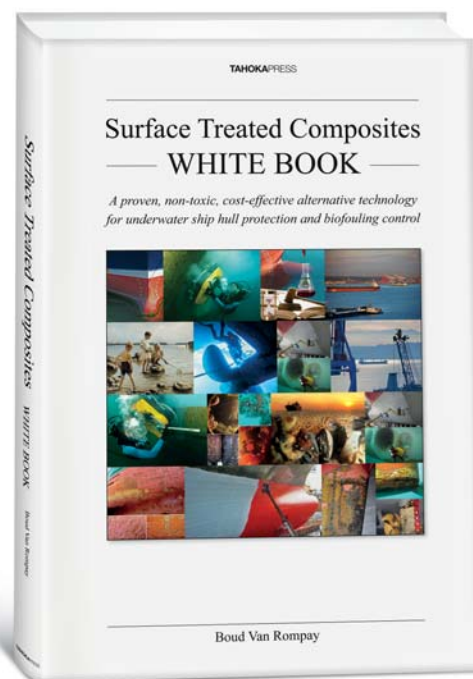
The *Surface Treated Composites White Book* is a description of a better, alternative, non-toxic, cost-effective, environmentally safe technology for protecting the underwater hulls of ships and keeping them free of biofouling. "Alternative" because it takes a 180° opposite vector to the generally used, conventional systems of painting the underwater hulls of ships with highly toxic heavy metals and biocides as a means of protecting the hulls and keeping them clean. "Better" because

its standard application can reduce the cost of maritime transport significantly while greatly lowering the environmental impact of shipping.

This alternative technology begins with the premises that the marine environment should be kept clean and free of toxic chemicals which pollute the water and contaminate the sediment, that shipping should be able to operate and expand without harming or destroying the very environment on which it operates, that there is a non-toxic answer and that that answer is also the most economical way to sail.

The *Surface Treated Composites White Book* is essential reading for anyone who has any connection with protecting the underwater hulls of ships, who is responsible for operating ships economically, for reducing the impact of shipping on the environment. Shipowners, ship operators, officers, naval architects, ship builders, the IMO, government officials responsible for maintaining a sustainable marine environment, officials in charge of navies and government owned and operated fleets, NGOs, shipyard operators, anyone who has any interest in or responsibility for the efficient and ecologically sound operation of ships and shipping.

The book is the result of 40 years of research, development, study and practical application and experience added to the wealth of information on the subject which has been researched and recorded by caring



and intelligent minds around the world.

## The book's Table of Contents is published in full here:

### 1. Introduction

### 2. Current Practices

It is easy to simply continue using the conventional methods for the protection of ships' hulls and the control of biofouling which currently prevail broadly. But are these methods the best available, and are they sustainable?

### 3. Drivers of Change

What are the factors which are currently driving change in the shipping industry with regard to ship hull coating and protection, biofouling control, hull maintenance



and cleaning? What pressures – economic, regulatory, environmental – do shipowners/ operators face today with regard to the underwater ship hull?

#### **4. The Fuel Penalty**

Hull roughness and biofouling can add 25 - 40% or more to a ship's fuel bill under existing normal hull protection and fouling management general practices, costing an estimated \$70 billion in wasted fuel worldwide with corresponding unnecessary atmospheric pollution.

#### **5. Underwater Hull Related Environmental Concerns**

The underwater hull of a ship interfaces directly with the marine environment, and its protection and the handling of fouling also has an indirect effect on the degree of atmospheric pollution caused by the ship. The methods chosen for hull protection and maintenance and biofouling control greatly influence this environmental impact.

#### **6. Regulatory Aspects**

Legislation and regulations concerning hull coating systems, their chemical content and emissions, application, underwater cleaning, biofouling control and other related issues vary from country to country and state to state. Some are international in scope such as those agreed at IMO level. In general this regulation is increasing in scope and restrictions.

#### **7. Hull Coating Systems Compared**

The main types of underwater ship hull coating systems in use have already been outlined and described briefly in Chapter 2. This chapter provides a comparison of each major coating system in light of the subjects covered in Chapters 3 - 6.

#### **8. A Better, Viable Alternative**

Having examined existing practices and concerns regarding underwater ship hull protection and fouling control and noted the shortcomings and issues, and compared the various coatings available, the next logical step is to describe the best available technology and practices in detail.

#### **9. In-water Ship Hull Cleaning**

In-water cleaning is an important part of current best available practices concerning ship hull fouling control, but for it to work without damage to the hull coating or the marine environment, circumstances, conditions and methods must be right.

#### **10. Propeller Cleaning**

Propeller roughness has been shown to increase fuel consumption by 5 - 15%. Correct propeller maintenance is probably the lowest expenditure, highest return on investment measure that can be taken to improve fuel efficiency and reduce fuel costs and atmospheric emissions. Frequent cleaning can be particularly efficient and environmentally benign.

#### **11. Rudder Protection**

Rudders are particularly prone to cavitation damage. There is a specific coating that can prevent this phenomenon, saving shipowners a great deal of money and trouble.

#### **12. Case Studies**

"All the proof of a pudding is in the eating." William Camden, 1605.

#### **13. Conclusion**

#### **Resources**

#### **Glossary**

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### **The Author**

Boud Van Rompay is the Founder and CEO of Hydrex, an international underwater technology company which delivers advanced underwater repairs and maintenance. Mr. Van Rompay began his career as a diver and acquired extensive experience with underwater technologies. He is also an inventor with a long string of patents to his name. One of these patents is for Surface Treated Composite (STC) underwater hull coating system which he researched and developed as an answer to the very serious marine pollution which he witnessed and quickly traced to the toxic antifouling coatings in use on ships and boats generally. Seeing that a non-toxic solution was urgently needed, he set out to develop one. That system and its success are fully documented in this book, with all the theoretical and practical knowledge to put it into full effect. Mr. Van Rompay sees every ship that gets off the toxic bandwagon and adopts an environmentally safe approach to hull protection and fouling control as one step closer to a clean, pollution free marine environment – his goal.

You can order copies of the book and/or download a free preview which includes the first two chapters, by visiting

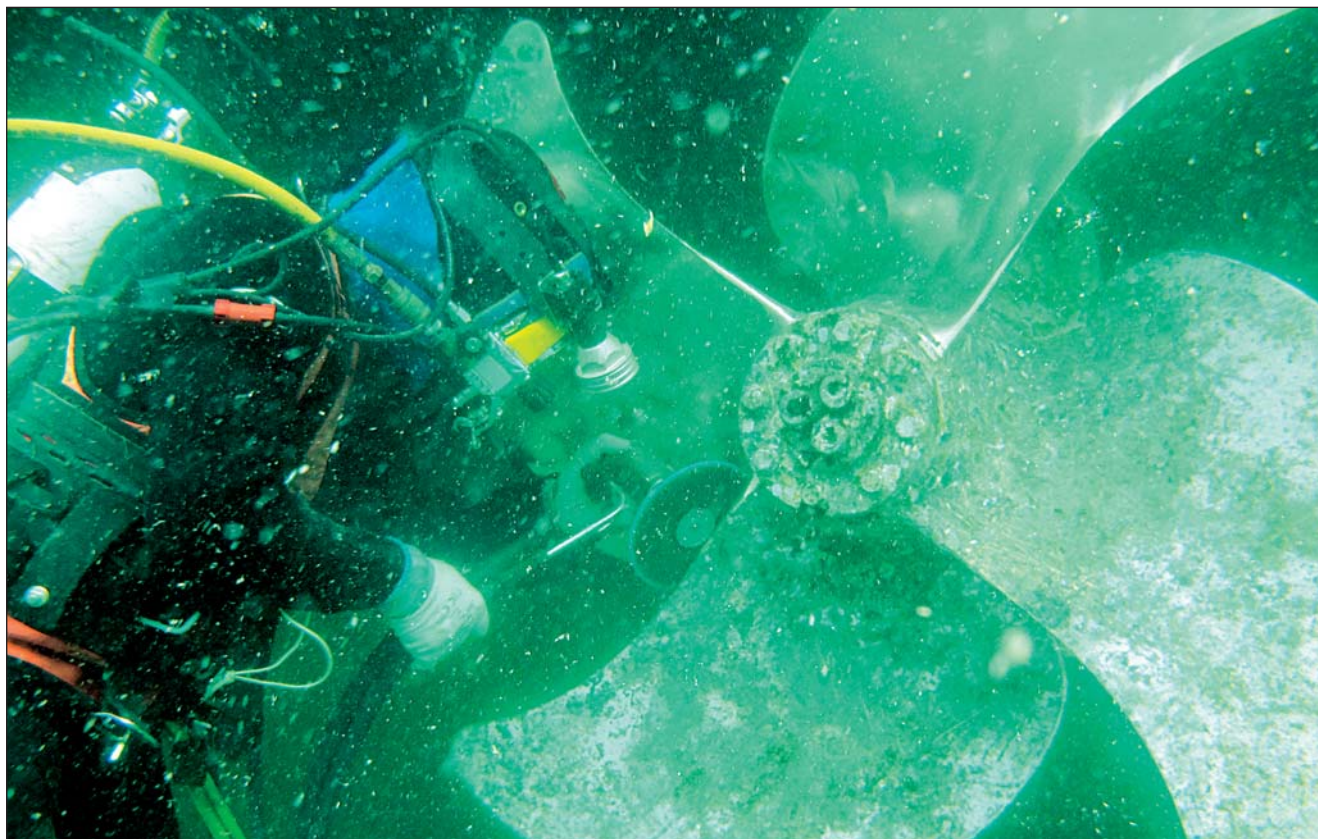
**[www.tahokapress.com](http://www.tahokapress.com)**

This book could save you huge sums of money and, perhaps more importantly, help avoid the catastrophic environmental damage caused by biocidal antifouling coating systems. ■





# Propeller cleaning offers large cost savings



**T**he effect of a rough propeller on the vessel's fuel consumption is big. The cost of remedying a rough propeller is very minor. Remedies for a rough propeller are not only simple and quick to execute, they also represent a fast, high return on investment.

A rough propeller results in a fuel penalty for the ship. How large that penalty is depends on the degree of roughness. At

current fuel prices, the fuel penalty from a rough propeller adds up to a high cost. Conversely, the savings attainable from keeping a ship's propeller clean and smooth are significant.

Cleaning a propeller once every month or every two months would in many cases be optimum. If carried out this frequently, cleaning with a relatively soft tool is adequate to keep a well-maintained propeller smooth enough for maximum fuel savings.

Thanks to its network of offices and service stations, Hydrex can offer propeller cleanings on a worldwide basis. These operations are carried out using underwater equipment designed and developed in-house specifically for propeller maintenance. Hydrex combines this service with underwater inspections where this is economically advantageous to the shipowner or operator.

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## Fast underwater repairs keep ships out of drydock

**H**ydrex offers turnkey underwater repair solutions to ship-owners wherever and whenever they are needed. Hydrex's multi-disciplinary 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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