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KEEPING SHIPS IN BUSINESS

ISO 9001 certified

Underwater services and technology approved by:



BUREAU
VERITAS



Swift on-site bow thruster operations



The 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 repair work on a specific part without 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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Emergency afloat rudder operation in Le Havre

In December the rudder of a 250-meter crude oil tanker started showing wrong readings. An inspection uncovered that the rudder was not calibrated correctly and that its movements did not match the readings. The ship was unable to sail any further and an on-site solution was needed. A Hydrex diver/technician team therefore mobilized to Le Havre, France to perform an emergency repair operation.

After arriving, the Hydrex team performed a detailed inspection of the rudder. This revealed that the rudder pintle needed to be removed to perform a permanent repair. The stormy weather conditions in Le Havre could cause the rudder to move, which would make it impossible to reinstall the pintle on-site. For this reason it was decided that the ship needed to be towed to the nearest available drydock, in Brest for



Hydrex truck and equipment next to crude oil tanker.

permanent repairs. This changed the scope of the work completely. Because our teams are trained to handle challenging and constantly changing circumstances, they adapted to the new task without any problem or delay.

The Hydrex team pulled the rudder to a zero angle. They also took the exact measurements needed to fabricate four securing plates that would fully lock the rudder in the neutral position. Once the plates were delivered, they were modified by the team to the correct size. Next they installed the stiffeners on both sides of the rudder. This would prevent the rudder from moving and causing further damage while the ship was towed.

Upon completion of the operation, the attending surveyor, together with the superintendent and captain of the ship, inspected and approved the repairs. The ship could be towed safely to Brest for permanent repairs.

Permanent on-site repairs with new technology

Because of the extent of the damage to the steering gear, drydocking was the only option for this ship. In most



Hydrex technician preparing the rudder for the operation.



While the first plate was installed, the next plate was prepared.



After the securing plates were installed, the ship could be towed safely.



Hydrex certified welders securing the stiffeners.



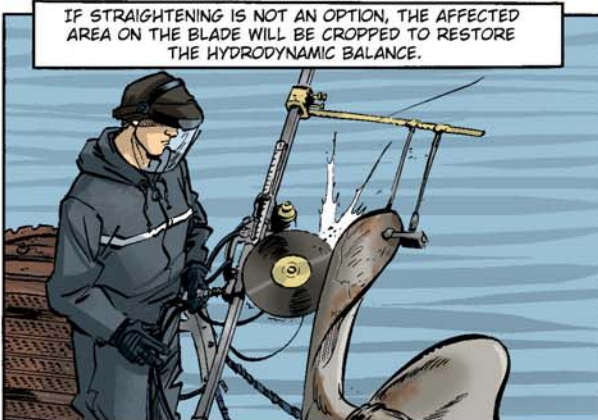
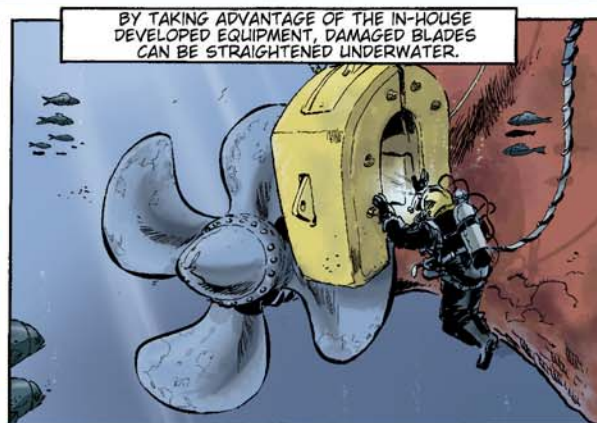
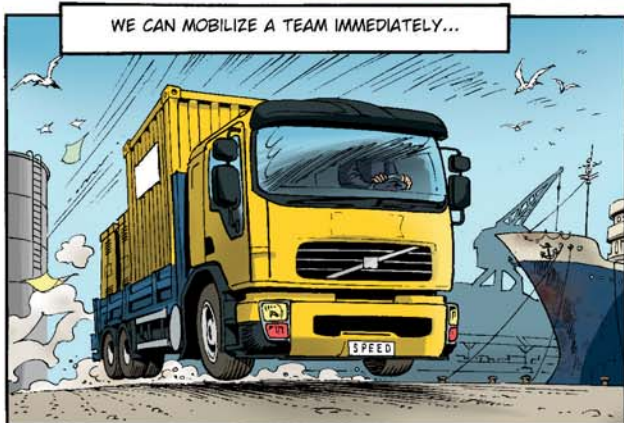
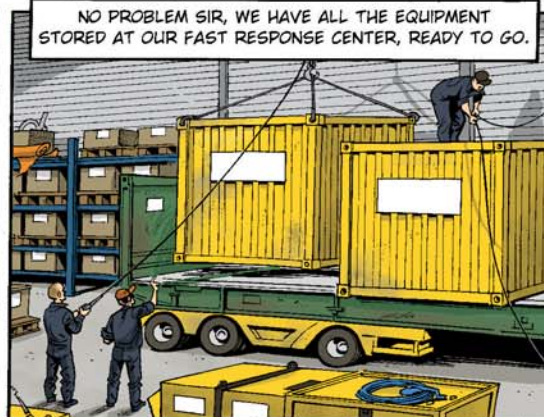
cases, however, in-house developed rudder repair techniques allow Hydrex to perform permanent repairs while the vessel remains at anchorage. Cargo operations can continue uninterrupted, saving the owner precious time and money.

The equipment can be mobilized within hours to any port in the world. This allows Hydrex to offer this service on a worldwide basis. The technique enables engineers, welders and inspectors to perform their tasks in dry conditions with the vessel still afloat. Class approved permanent repairs in-situ are possible. Steel repairs and replacements can be performed and pintle and bushing defects can be remedied without the loss of time and money associated with drydocking. ■

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On-site propeller operations keep your ships sailing



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HYDREX
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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 mob-docks. 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



Hydrex diver/technician cutting away the damaged area during an insert repair.

owners to keep to their schedule and have a permanent repair carried out during the next scheduled drydock visit.

Building on an ever-expanding world-

wide network of offices and support bases, Hydrex can provide these repairs at reasonable costs across the globe. All offices are fully equipped and can mobilize immediately. As part of the Hydrex Group they can take advantage of the company's many years of experience.

Repairs of this kind can only be done successfully by trained divers/technicians who are familiar with them and who have the relevant know-how to resolve all of the technical difficulties encountered during underwater operations. This is why all Hydrex technical staff from all offices undergo stringent training after which they are able to perform a wide range of operations. They can achieve the same high quality without unnecessary loss of time.

The following case study gives an account of a recent hull repair performed by Hydrex.



Certified welding securing a new insert plate.



Fully welded insert plate with frames reinstalled.

Underwater doubler plate installation in South-Korea

Hydrex was contacted to install a doubler plate over a crack in flat bottom plating of one of the water ballast tanks of a 225-meter bulk carrier during her stop in Yeosu, South-Korea.

Shortly after arriving at the location, our diver/technicians performed an underwater inspection to make a full assessment of the damage. Next the team prepared the area around the crack for the installation of the dou-

Hydrex underwater inspections

Underwater inspections are an essential aspect of ship repairs. Building upon conventional technical skills and know-how while also taking advantage of the latest technology, Hydrex offers a unique hull monitoring service to its customers. This gives ship owners total control of the underwater hull and the underwater gear of their vessels. An informed decision can then be made concerning any required follow-up action. Catching problems early can save much time and money.



Hydrex diver/technicians can carry out inspections underwater and on-site very swiftly without disturbing the vessel's sailing schedule.

With fuel costs amounting to 40% of operational expenses and continuing to rise, reducing fuel consumption is a vital concern of ship owners. This is the reason why hull monitoring pays for itself. Underwater hull roughness, marine foul-

ing, bent propellers and poor paint condition are all factors that will increase fuel usage due to the drag or inefficiency created by the damaged or affected area. The data gathered can then be used for a wide range of actions.

Our diver/technicians are trained for a wide range of operations and they can carry out the inspections in port or at anchor anywhere in the world.

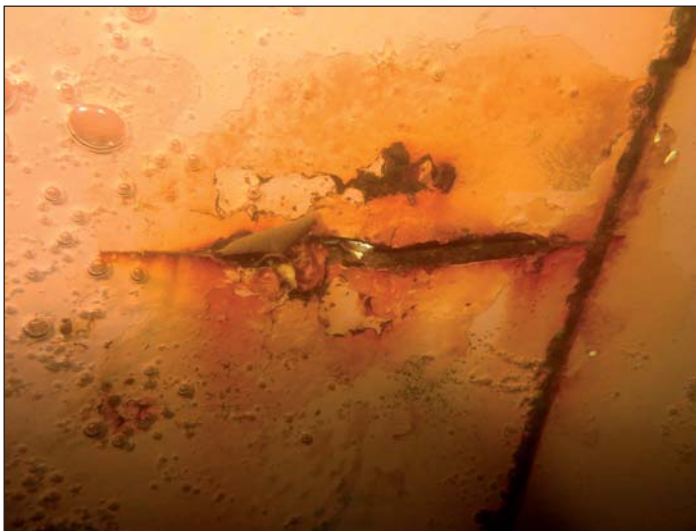
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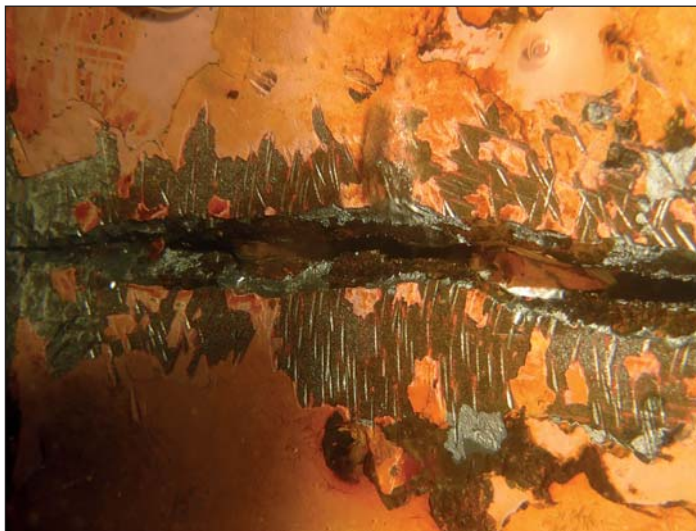
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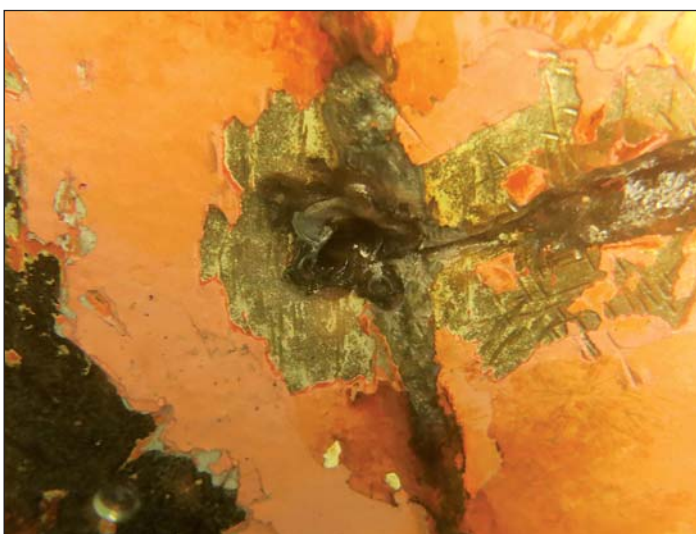
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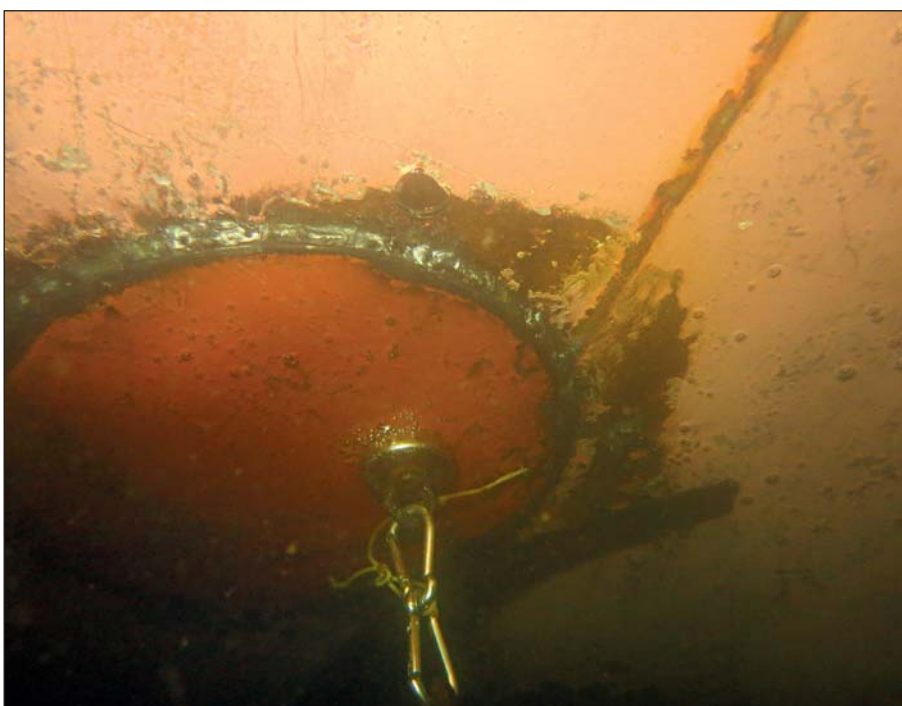
Crack in the bottom plating of a bulk carrier in South-Korea.



The area around the crack was prepared for the operation.



Crack arrest were made on both sides of the crack to prevent it from spreading.



The installed doubler plate.

bler plate. Crack arrests were burned on both sides of the crack to stop it from growing bigger. The plate was then welded in place over the damaged area on the underwater hull.

The repair was performed according to the Hydrex class approved procedures. As in all operations we carry out, essential professional standards were upheld to ensure the future safety of the ship.

Despite the relative size of such operations they can be nonetheless vital for a ship owner if he wants to keep his ship on schedule without unnecessary loss of time or money. ■

Hydrex custom solutions

There is a little-known service Hydrex offers shipowners, ship operators, technical departments, ship superintendents and others who have a need for underwater repair and maintenance: custom solutions to vexing problems. The only trouble is that people often don't come to us for these solutions because it never occurred to them that an out of drydock solution was possible.

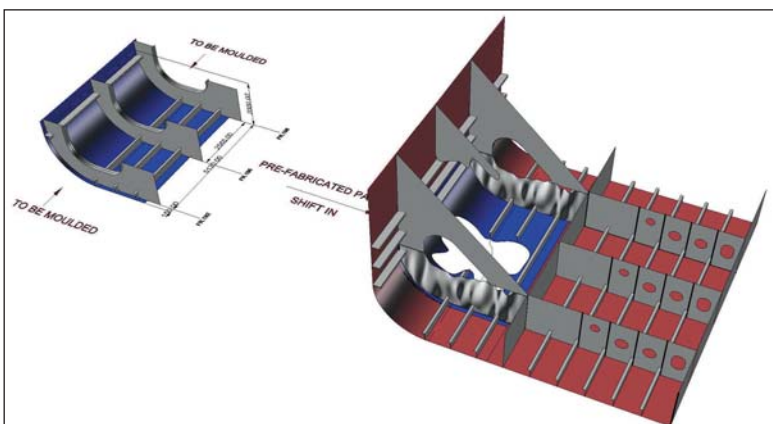
Hydrex offers custom solutions which require know-how, experience, engineering skill, R & D and a certainty of what can and what cannot be done with or to a ship out of drydock. Think of Hydrex as an underwater technology company, not a diving company. Although we certainly know how to dive! We also do customized solutions for ships and underwater structures.

Here are some examples:

- One OEM delivered some ships with the wrong spinner cone bolts. These then had to be replaced under warranty but this could only be done in a dry environment. Drydock right? Wrong. Hydrex developed a cofferdam based solution which made it possible to replace the cone bolts without the huge extra expense and hassle of drydocking the ships. Once developed for one ship, the same system could be used on others which had the same problem.
- A ship builder delivered a new vessel to a navy but found during an inspection that there was a possible problem with the propeller blades. The ship was under warranty. The manufacturer needed to do a dry inspection, preferably without going to drydock. Hydrex designed and engineered a dry underwater repair technique which permitted the inspection to be done.
- A ship was grounded with major damage which made it look like it would have to go into drydock locally in the Persian Gulf.



Hydrex certified technician during a complex underwater operation in Greece.



A custom solution was designed in cooperation with naval architects to perform the replacement of an entire section of an underwater hull.





A special cofferdam was constructed to replace spinner cone bolts without going to drydock.

Hydrex worked with naval architects and in-house engineering to come up with a solution which would repair the damage and provide enough strength for the ship to sail on to its Chinese destination where it was due to drydock. This was done and saved enormous expense and delay.

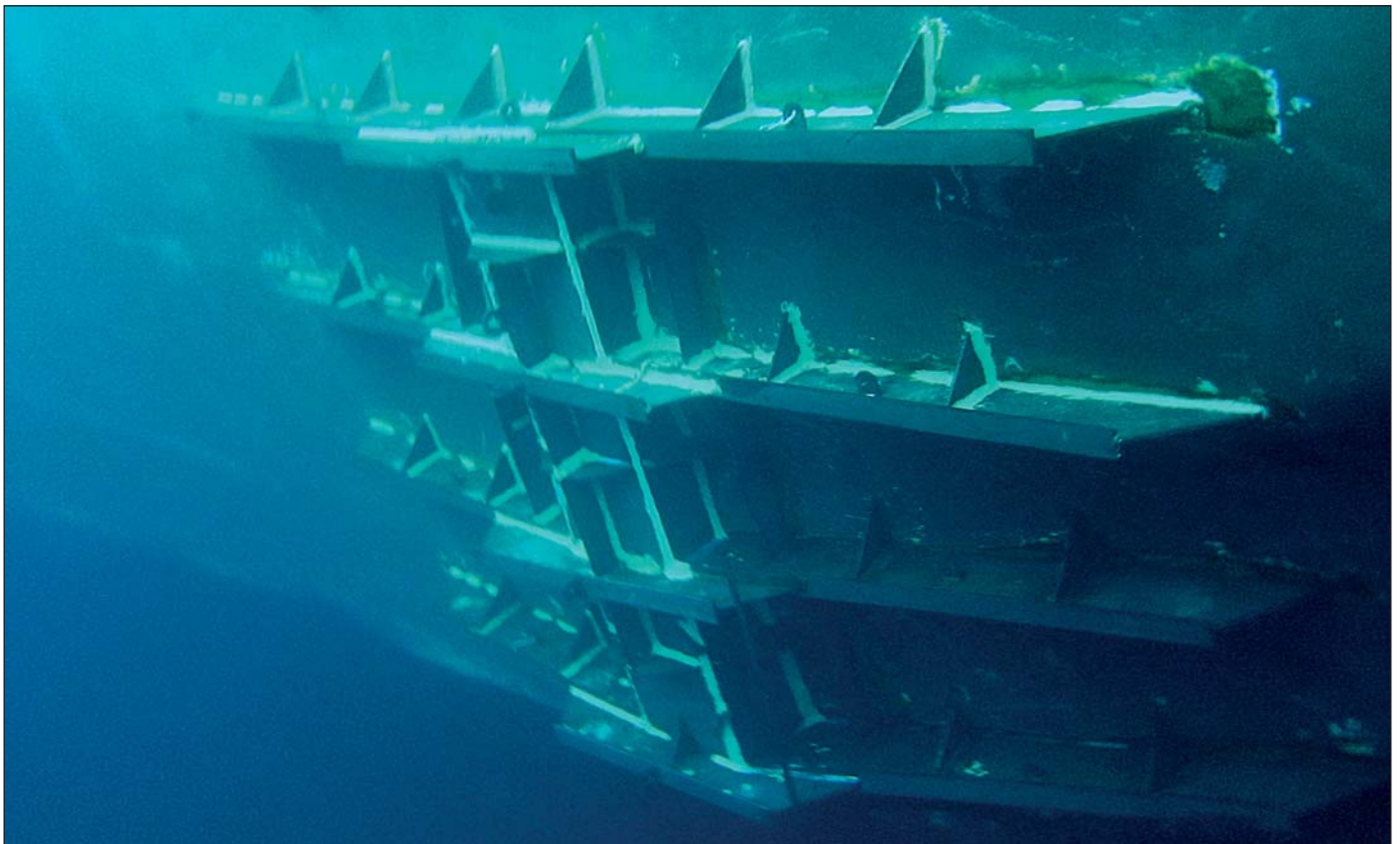
There are many, many more examples. In some cases a problem with a specific vessel, once solved, opens the door to remedying the situation in a whole fleet or at least a number of vessels. In all cases the solution found requires knowledgeable engineering and advanced underwater technology and techniques which

only a very few companies can deliver. Hydrex is at the fore-front of such solutions.

So, where is this leading? If you have a problem with a ship or a fleet, or any underwater structure for that matter, which you are not sure can be solved out of drydock, give us a call. We will evaluate the problem and let you know whether an underwater solution is feasible and, if it is, how much it would cost and how rapidly it can be carried out.

You'd be amazed at what can be solved without the need for drydocking.

If you have any problem with your ship or fleet that you feel might be resolved with a custom solution without drydocking, our Technical Department would be happy to discuss it with you and let you know if we can help with it. ■



Even for very severe grounding damage Hydrex can create a tailor-made solution for you.

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 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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Keeping ships in business

Hydrex 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) and Algeciras (Spain).

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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