500-ton, 70-meter long, 18-meter high drydock door repair in Cadiz

This year marks the 45th anniversary of Hydrex. We will be looking back at some of the many key operations our teams performed since the company was founded in 1974. We will do this by republishing an article from the vault of the Hydrex Magazine each month.

This month we have some very interesting and extensive work for you to have a look through. It represented another first for Hydrex engineering and the field of underwater repairs. In 2005 we took on the replacement of eight one-ton hinges of a 500-ton drydock gate. Instead of removing it to shore, as had always been done in the past when repairs of this kind were needed, we did all repairs on-site. This prevented any damage to the gate while also allowing other repair work to be done at the same time because the drydock itself remained dry.

This project was done with IZAR (now Navantia), at that time Spain's leading state-owned shipbuilding firm and Europe's second largest shipbuilding company.

This was a major project that lasted two months – all meticulously planned in advance. We kept to the time schedule regardless of some unexpected bad weather and delivered a fully repaired gate to the owners so that their drydock would continue to be operational. ■

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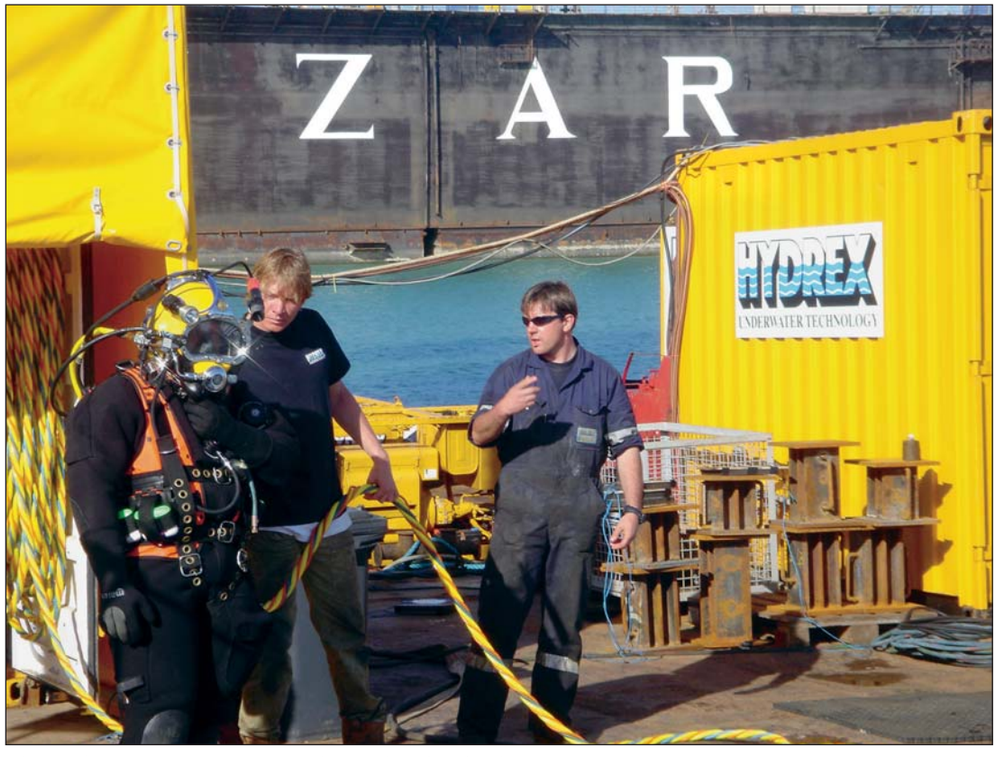
Major work done to render drydock operational

Hydrex completed a major project repairing a drydock gate at the IZAR shipyard in Cadiz, Spain. This was an especially interesting project because normally this job would have required removing the 30-year-old gate from the drydock, taking it out of the water and transporting it to shore. Then some of the work would have been carried out on shore while the most important part of the job would still have to be done underwater on the foundations of the gate.

We took a very different approach to the whole concept of these repairs. The work activities were arranged so that the drydock could remain in operation for most of the repair rather than be flooded with water and completely out of use. The owners decided to use this repair time for the maintenance of the drydock itself.

Our team carried out the project on-site using advanced underwater techniques: supporting the gate

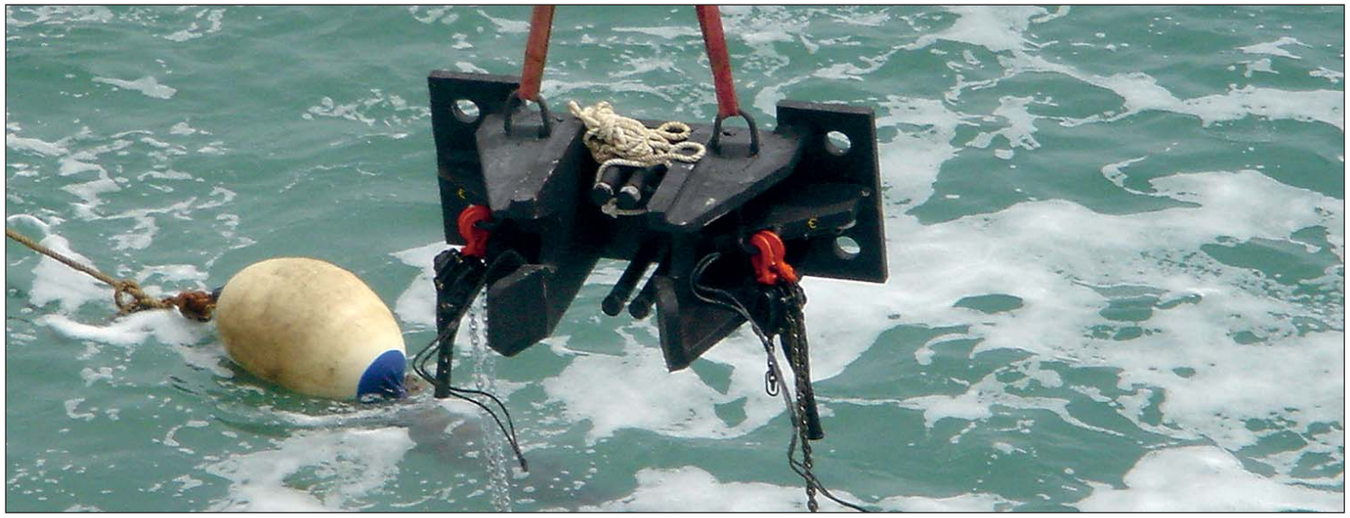


Diver in prepration to work on the drydock gate.

Work pontoon before IZAR drydock gate.

Some of the new hinges that were put in place under the drydock gate.

Examples of ones that were removed.



Lowering a new gate hinge into the sea.

Dredging work that was necessary at the start of the project.

on hydraulic jacks and replacing all 8 hinges while the gate remained in place. The other major benefit to this method was that the potential damage to the 30-year old gate during the transportation was avoided completely. This was important because the pressure exerted on a door of that age could have very easily resulted in extensive damage.

To give an idea of the scope of the project, the gate weighs 500 tons, is 70 meters long and 18 meters high. Each of the hinges weighed over a ton.

The operation required us to be on-site for approximately 2 months. A 60-day schedule was worked out for the repairs and the work was done within that time, despite the bad weather conditions at the start of the operation.

The preparations for the project were quite extensive. First the sea-bed in front of the gate hinges had to be dredged and all the accumulated debris and silt had to be removed. To do this a couple of dredging pontoons were established before the lock gate. With the use of divers, mobile cranes and hydraulic pumps all the excess material was then removed.

This gave enough room and visibility for the diving team to go down to the hinges and start the disengagement procedures to disconnect the hinges from the gate. What had actually happened over time was that the gate had sunk 60mm due to wear of the hinges and axle. The teams were then able to go into the work area, jack the door up to its original level and remove the old hinges.

A mobile crane within the drydock.

The drydock seen from the inside during the operation.

After all eight hinges were removed and brought to the surface our men spent hundreds of hours underwater gouging, cleaning, welding and preparing the positions for the new hinges. A new axle was put in place at the bottom of the gate. Through a detailed and complicated procedure (worked out carefully in advance) new hinges were then swiveled and rotated into place, with only millimeters to spare. These were positioned on the concrete foundations beneath the gate.

The divers had to work with very low space clearances. They had a work space of just one meter for this maneuver. As each hinge was correctly positioned, it was secured using special chemical anchors.

The technical detail of the above was of course extensive and far more complex than this simple description portrays. Even though this work required highly skilled underwater professionals it saved an enormous amount of time and expense. We were able to deliver a highly professional and operational drydock to its owners at far less cost and much more quickly than with any other method. ■