CONTROLLING VAST WATER VOLUMES AT THE DUBAI DRYDOCKS

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GRUNDFOS **CASE STORY – DUBAI**

Dubai, United Arab Emirates: The Dubai Drydocks have moved on from their early beginnings in 1971 to become one of the leading ship repair yards in the world – and the premier yard between Europe and the Far East.

Since beginning operation in earnest in 1983, the shipyard has repaired over 5,000 vessels of all types and sizes. Many of those vessels are ULCCs and VLCCs, representing a large proportion of world's tanker fleet. The yard employs over 5000 skilled employees, a workforce which is supplemented by up to 1,500 workers from local subcontractors when required.

The situation
In 2005, the Dubai Drydocks decided to strengthen their position within the markets for marine ship repairs, conversions, and shipbuilding. This was to be done by upgrading the yard to include launching facilities for newbuilt ships as well as for large fabricated steel structures and offshore modules. The expansion would allow the Dubai Drydocks to build vessels and/or hull sections of 120 x 60 m. To bring about the upgrade, the Drydocks launched the so-called Safina project, a USD 60 million undertaking with the objective of creating a new building facility. The new complex was to include a sea-water pumping system for an innovative hydrolift to handle ship launches.

The hydrolift explained
The hydrolift is used to safely transfer large sections of hull from land to sea, and then into the drydock for final assembly. First, the hull sections are transferred via rails from the manufacturing area onto a platform within a walled basin. A gate located across the transfer route enables the basin to be pumped full of water, causing the hull section to float. The hull section is then manoeuvred into a deeper part of the basin from where it can be taken out to sea after the water level is lowered and the main seaward gate is opened.

The project involved the construction of diaphragm quay walls, impounding walls, a concrete transfer platform, massive entrance abutments and two gates, including a floating steel caisson weighing in excess of 1,400 tonnes.

The hydrolift system will enable the launching of hull sections up to 120 m x 60 m. As an added benefit, the transfer process can also be used in reverse with ships being recovered onto the platform for general repairs.

Large-scale pumping requirements
The hydrolift required large-scale pumping capacities. The tender materials specified four mixed-flow propeller pumps, each with a nominal capacity of 2200 l/sec at a 10 m head. The pumps are installed in chambers on the seaward face of new dock gate, while the installation was designed with the discharge pipe located below the sea level. The overall dimensions of the floatout basin are 131 x 66 m, bringing the total volume of water to be pumped up to 122,050 m^3. The installation was designed with the discharge pipe located below the sea level.

The Grundfos solution
When it was time to select the specific pumps used to fill the hydrolift's basins, the consultant, Royal Haskoning U.K. Ltd, invited bids from major companies such as Grundfos, Flygt, KSB, ABS, and WEIR. Based on a thorough assessment of the task at hand, Grundfos recommend a mixed-flow pump – specifically the 1000KWM300 12T4, a KWM pump with a nominal power rating of 300 kW and a 425 rpm motor. Like all K-range pumps, these pumps would be adapted to perfectly match the intended application. In this case, highlights include an epoxy coating and zinc anodes for additional corrosion protection – and the inclusion of all monitoring devices.

Grundfos package proved most attrative
While most bidders were rejected on technical grounds, a non-Grundfos European manufacturer seemed most likely to get the order, having been involved in the project from an early stage. However, in the end the customer was convinced that the Grundfos package offered convincing arguments.

Grundfos input counteracted cavitation
A key point behind the final decision to use K pumps was the fact that Grundfos offered more than just the product. For example, the Grundfos team took at good look at the tender specification and then recommended what they would change.

With the original design, the pump would have been subjected to cavitation caused by a siphoning effect created by the fact that the discharge end of the pipe was located below sea level. The Grundfos engineers suggested some modifications to the discharge pipe; changes which were accepted by the consultant. Grundfos also provided detailed information on how to create the best possible cable and chain supports system.

The outcome
Completed in 2006, new hydrolift system is now working perfectly, with vast water volumes controlled reliably by the KWM pumps. Distinctive features such as the pumps' low rpm and excellent NPSH help ensure efficient operation as well, adding more benefits to a project in which Grundfos is very proud to have taken part.

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