Deltaport Constructors Ltd. recovers caissons weighing approximately 6,000 tons each with

the help of 28 Flygt B-pumps and specially ordered cables.

Deltaport Constructors Ltd. (DCL), a project-specific joint venture between Vancouver Pile Driving Ltd. from North Vancouver, BC and Graham Construction & Engineering Ltd., a Delta-based company, was awarded a $195-million contract for the construction of the marine works portion of the Deltaport Third Berth Expansion for the Vancouver Port Authority. The works include dredging, filling and construction of a concrete caisson berth.

In November 2007, 6 caissons were damaged and sunk to the sea bed during a storm. Deltaport Constructors Limited (DCL) decided to refloat the caissons and repair them accordingly. The overall procedure was to re-float, repair, clean and tow the caissons to their original location and re-sink them. Each caisson is constructed with re-enforced concrete (41.7 x 17.5 x 21.325 cubic meters) weighing approximately 6,000 tons each including a steel frame to raise the walls of the caisson. Each frame was placed on the caisson using a crane. Once the frames were installed, they were waterproofed by divers to stop leaks. In order to raise each caisson, the buoyancy force must be higher than the weight of the caisson and the frame combined.

One of the 6 partially sunken caissons damaged during a storm.

At this point, Deltaport Constructors Limited (DCL) contacted Kamal Singh, Dewatering Specialist at ITT Water & Wastewater in Vancouver, BC. After numerous meetings with Amy Krause and Mark Sheppard at DCL, they came up with a strategy that was rapidly accepted.

A BS 2125 pump with the specially ordered 400-foot long cable.

ITT Water & Wastewater mechanics began putting together hoses, starters and cables on the pumps. They installed 20 Flygt BS 2102 (8 HP) pumps - one per cell - to pump the water out. They also installed 6 Flygt BS 2125 (13 HP) pumps in case of emergency if they had to put water back into the caisson.

Each pump was provided with a specially ordered 400 feet cable to prevent the likelihood for water to enter through cable joints. After evaluation, we proposed an oversized cable to compensate for voltage drop along the 400-foot length. Special length 4" hoses were cut and installed with cam lock fittings to accommodate caisson/structure design. Two sensors per cell were installed to monitor the water levels and ensure they were within the design limits. The sensor readings and pump controls were installed on the transporter scow and each caisson was attached to the transporter with ropes. Kamal Singh also observed that the pumps had to operate in sea water and needed to be protected from salt erosion

by installing Zinc anodes. And finally, 2 stand-by pumps were proposed in case of an emergency.

As soon as the pumping started, a security area of 300 feet was erected around the caisson to avoid any injuries or accidents. The job had to be done right the first time with no chance for errors.

Once started, the 28 Flygt pumps operated flawlessly and at finest levels as forecasted. Within six months, DCL was able to float and re-sink all 6 caissons and was highly thankful to ITT Water and Wastewater.

The power cables were bundled together and attached to buoys.

4" diameter special length hoses shown here evacuating the water from the top a caisson.

Kamal Singh, ITT Water & Wastewater, Dewatering Specialist, Vancouver at (604) 941-6664

ITT Water & Wastewater Dewatering division
Created to meet the increasing demands for a full fledged solution driven company, the Dewatering division mandate is to engineer, manage and supply major temporary site dewatering and sewage bypass projects in the municipal, construction, industrial and mining sectors. On-site project supervision, technical expertise and equipment maintenance services are also offered.

Built on ITT's 50 years of Canadian water handling experience, the Dewatering division specializes in effective and environmentally secure water and wastewater transfer applications such as Sewage Bypass, Excavation Dewatering, Flood Drainage, Surface Irrigation and Mining Dewatering.

ITT W&WW also offers a full service rentals program. A complete line of submersible pumps, engine-driven suction pumps, generators, piping and complementary accessories are available for either long or short-term rental. With 14 coast to coast service locations, ITT W&WW is the only nation-wide company to offer complete turn-key water handling solutions, expertise and products.

Deltaport Constructors case story.En.12.08

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