WIVENHOE DAM, QLD

PERMANENT GROUND ANCHORS

Client: SEQ Water Corporation Limited
Consultant: Department of Commerce

Contractor: Leighton Contractors Pty Limited
Specialist Contractor: Menard Bachy Pty Ltd

THE PROJECT

Wivenhoe Dam is the major water supply source for South East Queensland, and is located approximately 40km west of the Brisbane CBD on the Brisbane River.

Revised Rainfall predictions found that the existing spillway at Wivenhoe Dam was inadequate to handle the estimated maximum probable flood. As part of the upgrade works to the dam, the existing concrete spillway was strengthened to ensure the dam could safely manage any conceivable flood and an earthquake of magnitude 7.5 on the Richter scale.

MENARD BACHY'S ROLE

The project required Menard Bachy to undertake the supply and installation of 19 x 63 strand monitorable post tensioned near vertical anchors just below the crest of the existing radial gated spillway. In addition 2 x 14 strand anchors were installed in the existing downstream spillway training wall.

To ensure the spillway could operate in the event of a flood during the construction period, temporary work platforms were designed and fabricated so the spillway could be evacuated with as little as 12 hours notice, while providing safe access to the steeply sloped spillway face.
The project was subject to stringent safety, environmental and quality requirements. All waste and spoil from drilling and grouting had to be contained and disposed of so that no contamination of the water supply occurred. The project team exceeded these requirements, with no lost time injuries or reportable environmental incidents occurring.

The original design required the excavation of several cubic metres of concrete from the spillway to accommodate each anchor head. Menard Bachy proposed the use of a diamond cored excavation and precast concrete head block, which was accepted by the client. The change significantly reduced the time necessary to prepare the anchor heads as well as the associated costs, the savings shared with the client.

Drilling of the 350mm dia boreholes to a maximum depth of 72 metres was achieved using a drill rig mounted on a customised frame that was capable of traversing under its own power between each hole within a bay. A 150mm diameter pilot hole was drilled first and then the hole was reamed to its final size. This method proved quicker than drilling the full diameter of the borehole in one operation. It also enabled any water proofing to the spillway foundations to be undertaken from the pilot hole, reducing redrilling time and the amount of cement grout used.

The installation of the anchors presented several challenges to the project team due to their size and length (some 73 metres), the load limitations that could be imposed on the service bridge of the existing spillway, and the location of several anchors under the arms of the radial gates. These were overcome by modifying the standard stressing blocks so that they could be used to lift the anchors, employing a mobile hydraulic crane to lift the nose of the anchors into position, and erecting a Favco tower crane on a travelling base that utilised the rails for the existing gantry crane, which could lower the anchors into the bore holes.

All 19 anchors in the spillway were successfully grouted and stressed to their designed load of 1100 tonnes, with the project completed in August 2005.

SYDNEY
13-15 Lyonpark Road, Macquarie Park NSW 2113
Tel: 61 2 9491 7100 Fax: 61 2 9491 7111

BRISBANE
3 Harvton Street, Stafford QLD 4053
Tel: 61 7 3354 9100 Fax: 61 7 3354 9111

MELBOURNE
41 Boundary Road, North Melb. VIC 3051
Tel: 61 3 9321 1333 Fax: 61 3 9326 8996

AUCKLAND
PO Box 72734, Papakura, Auckland NZ
Tel: 64 9 236 3385 Fax: 64 9 236 3385