River work

Jet grouting - Grouting - Drilling - Ground anchors - Civil engineering

GENK CENTRAL LOCK

GENK - BELGIUM

Rehabilitation of a river lock

Central lock: stabilization work

Genk's Albert Canal lock system comprises 2 locks of 150m in length (northern and central locks) and a third lock 200m long (southern lock). The central lock had suffered considerably from erosion, which had caused subsidence and significant cracking in the base slab and the side walls. The lock was taken out of service. With the expected increase in traffic in barge-borne containers between Antwerp and Liège, the local Department of Navigable Waterways decided to bring the central lock back into operation. Rehabilitation works

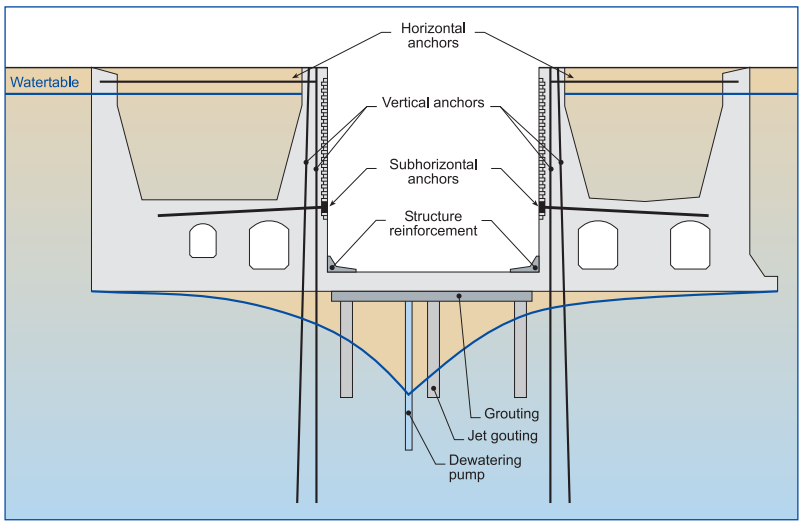
OWNER:	DE SCHEEPVAART
ENGINEER:	DE SCHEEPVAART
CONTRACTOR:	SOLETANCHE BACHY AND FONTEC
CONSTRUCTION PERIOD:	MAY 2006 - JULY 2007

MAIN QUANTITIES:

- DTH hammer drilling: 13,000m in the current concrete structure
- Grouting of cracks and voids under the slab: 700m^3
- Jet grouting:
  - 450 columns of diameter 800mm
  - 60 columns of diameter 1.00m
  - 125 columns of diameter 1.20m
  - 50 secant columns of diameter 1.60m
- Vertical anchors: 254 units of 28.50m
- Subhorizontal anchors: 166 units of 9m to 13m
- Horizontal anchors: 166 units of 6.80m to16.50m
- Civil engineering: 330m^3 of demolitions and 190m^3 of reinforcement of the existing structure

FONTEC

SOLETANCHE BACHY



Cross section

Jet grouting plant and drilling operation

were necessary to stabilize the lock structure. Soletanche Bachy and its subsidiary, Fontec, were chosen as general contractors for the job.

The lock was stabilized mainly through jet grouting work under the lock and by prestressing the side-walls, in the following stages:

- Drilling through the concrete structure using a Down The Hole (DTH) hammer.
- Grouting of voids and cracks in the structure and compaction grouting of compressible soil.
- Upstream cut-off of the groundwater circulation under the structure by installing a watertight curtain made of secant jet grouting columns 1,600mm in diameter.
- Jet grouting columns (double jet method) of Ø 800mm to Ø 1,200mm underpinning the lock structure.
- Vertical ground anchors (377kN) for prestressing the side walls and horizontal and subhorizontal anchors (300kN to 710kN).
- Minor civil engineering work for reinforcing the angles between the slab and the side-walls.

With the ground water exerting 10 to 12m of pressure on the slab, the structure was dewatered (300m³/hr.) before the jet grouting operation under the slab, to avoid having to work using an airlock.

The North and South locks remained in operation throughout the stabilisation work.

Anchors in the side walls

Jet grouting under the slab

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