Container quay along the Scheldt River, Antwerp (Belgium)

5. Container Quay along the Scheldt River, Antwerp (Belgium)

Owner:	*Ministry of Public Works, Administration of Waterways and Harbour Board, Port of Antwerp*
Design:	*Administration of Waterways, Scheldt Left Bank and CFE – Design Department*
Contractor:	*Joint Venture Containerkaai (N. V. CFE – Brussels, N. V. MBG – Antwerp, N. V. J. Denul – Aalst, N. V. van Laere – Burcht, N. V. SBBM & Six Construct – Brussels)*
Work Duration:	*32 months*
Service Date:	*April 1990*

General

As a consequence of the large increase in the container traffic in the port of Antwerp in recent years and in the absence of available sites on the Right Bank behind the locks, a new berth accommodation was decided upon and built on the riverside itself, outside the dykes. This new facility, capable of handling more than 500 000 containers every year, is intended for large vessels with draughts of between 11 and 12.80 m. Thanks to the natural river depth of up to 12.80 m, the vessels are able to reach Antwerp virtually without being affected by the tide, which varies between 0.00 level and + 6.00 level at the site.

Quay Wall

The quay wall, with an overall length of 1407 m, is composed of 46 circular, reinforced concrete caissons placed next to each other, and sunk by means of internal excavation.

The caissons have an outer diameter of 29 m and a wall thickness of 0.95 m. The foundation level is at 21.00 while the river bed in front of the quay wall is dredged at level of 14.30.

Fig. 1: Overview

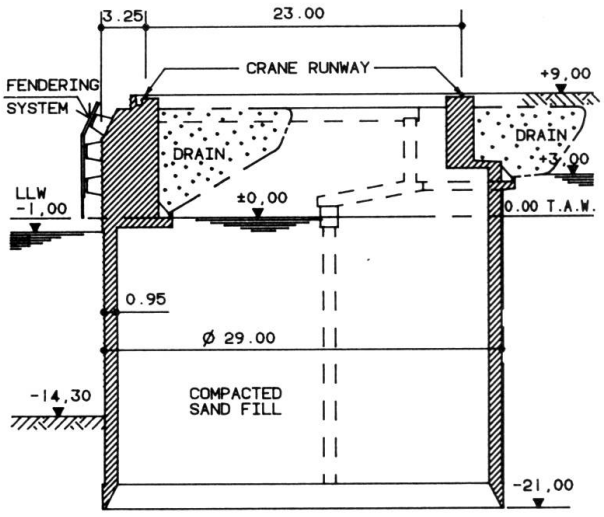

Fig. 2: Cross-section of the caisson

The upper structure which comprises two reinforced concrete beams for the foundation of the gantry runway, reaches level + 9.00.

After sinking, the caissons will be filled with sand, while behind and inside each caisson drains will be provided in order to lower the groundwater to levels + 3.00 and + 1.00 respectively.

The space of 1.00 m between the circular caissons is made sandproof using the Jet Grout method and hydro-substitution. Each wall consists of three gravel columns injected with cement and placed like an arch against the two adjacent caisson walls.

On top of them a turbulence room is created in order to break the energy of the waves. Finally, adequate fenders adapted to the shape of the ships, are provided on the front of each caisson so that ships are able to moor without damage.

Construction

To protect the site against flooding a temporary cofferdam was erected in front of the riverside.

Inland, a working zone was created at level + 3.00 through hydraulic reclamation. In this area 46 caissons are being built and sunk. The concrete is poured into a ring-shaped formwork 3.50 m high and the sinking operation is carried out in three of four phases.

In order to reduce the external soil friction during the sinking process, a cement-bentonite film with decelerator is put around the caisson.

At the final stage, the cohesion of the cement-bentonite mix increases and becomes equivalent to the soil friction against the concrete wall.

Quantities of Materials

Concrete
Caissons: 106 000 m^3
Upper structure: 45 000 m^3

Reinforcing steel
Caissons: 11 000 t
Upper structure: 6400 t

(M. Le Begge)