



Container terminal Gdansk – winning new land for enhancing global trade performance

Poland is a growth market and since joining the European Union this rate of growth has increased. The continuously growing movement of goods in Eastern Europe is testimony to the region's growing economic market.

These prospects were the main reason for the British consortium DCT Gdansk to construct Europe's first privately financed container terminal in Gdansk. The new terminal is meant to turn the historic Hanseatic city into a hub for merchandise traffic in Eastern Europe. To attain this goal, more than a hundred million euros were invested into constructing the deep-sea harbour and into building a container terminal.

HOCHTIEF Construction AG was responsible for the turnkey construction of this ambitious project.

By combining HOCHTIEF Polska's regional know-how and the technical execution expertise of our competence centre, HOCHTIEF Construction Civil Engineering and Marine Works, we were able to offer the client a one-stop-shop for the professional realisation of the project.

The challenge of constructing a deep-sea harbour

The outstanding feature of Poland's biggest deep-sea harbour is the pier. It consists of two berths and RoRo equipment for handling containers. From the coastline the pier projects some 800 metres into the Baltic Sea. The newly created land measures some 44 hectares. Seven million cubic meters of sea bed had to be moved for this purpose.

We drove sheet-pile walls into the ground to construct the outlines of the new container terminal in the Baltic Sea off the coast before Gdansk, but first the ground had to be subjected to exhaustive tests. Around the axis of the quay wall the soil stratum were not able to support the load. Consequently, we excavated the earth up to a depth of 15 metres with bucket-ladder dredgers and used suction hopper dredgers to replace it with sand to provide a better load bearing capacity. This procedure was cho-

sen as the best solution following a number of investigations on the optimisation of materials to be used for constructing the quay wall.

We subsequently began construction work on the combination sheet pile wall, using HOCHTIEF's own jack-up platform „Odin“ to carry out the driving work. This also served as a safe and secure working platform for fitting the flap anchors in the stormy Baltic Sea. Using a tried-and-tested method, we first of all lowered the anchor block onto the sound foundation material and then precisely settled it into place with vibrations. We carried out the important driving work for the load bearing piles with an IHC S15 pile driver using the pile driving lead of the Odin. Through using our own technical equipment HOCHTIEF Construction was able to ensure the highest quality of driving operations for the load bearing and intermediate piles.





Marine and land-based construction site

After subsequently constructing the rearward sheet pile wall we washed in the sand lengthways behind the quay wall. Sometimes vertical drains were used to ensure controlled settling of the terminal site in areas filled with sand.

Following completion of the sand construction work up to a top edge of +1.3 metres we were already able to use the newly reclaimed land as a base for building the foundations

piles for the steel-reinforced superstructure of the quay wall.

Two to three rows of Franki piles with a diameter of 56 centimetres were used here. We then laid steel-reinforced concrete section-for-section in conventional construction.

Simultaneously we constructed the crane runway on deep foundations for supporting the rails of the container cranes. Prefabricated sand-

wich panels were used for the pier head facing the water.

Following completion of the steel-reinforced concrete work we fitted the installations and reinforced the areas for the terminal site. Parallel to the construction of the two berths, we built the rail and road links connecting the terminal to existing transport networks and also constructed other infrastructure installations.



steel-reinforced concrete screening panel built on in-situ driven piles.

In addition to construction of the terminal, the project also included construction of the logistics area onshore and the infrastructure connection into the hinterland, complete with access roads, railway tracks and all utilities. On land, the terminal and its administrative buildings, workshops, storage halls, transformer buildings and gates occupy 190,000 square meters of space. A road and a railway link – each approximately two kilometres in length – connect the terminal to the existing infrastructure. This deep-sea container harbour in Gdansk means that DCT Gdansk now has an efficient container terminal with two berths and integrated RoRo equipment in Poland.

The ambitious project was realised through intensive cooperation between the British client, the local authorities, all participants in the project and an integrated planning concept from HOCHTIEF Construction.

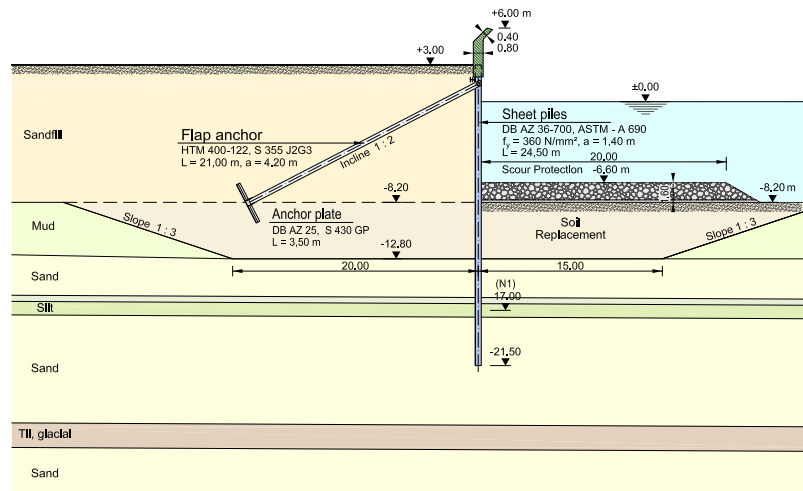
The new logistics area was enclosed by a 650-meter long quay wall on the harbour side: this is designed as a sheet pile wall combining load bearing elements (DB HZ 775 up to 28.5 meters long), fill elements (DB AZ 25) and so-called flap anchors. The sheet wall on the sea side is back-anchored, and extends across a distance of one kilometre.

Driving elements of this dimension have never been used before in Poland. The rear side of the quay wall was fitted with a deep-foundation



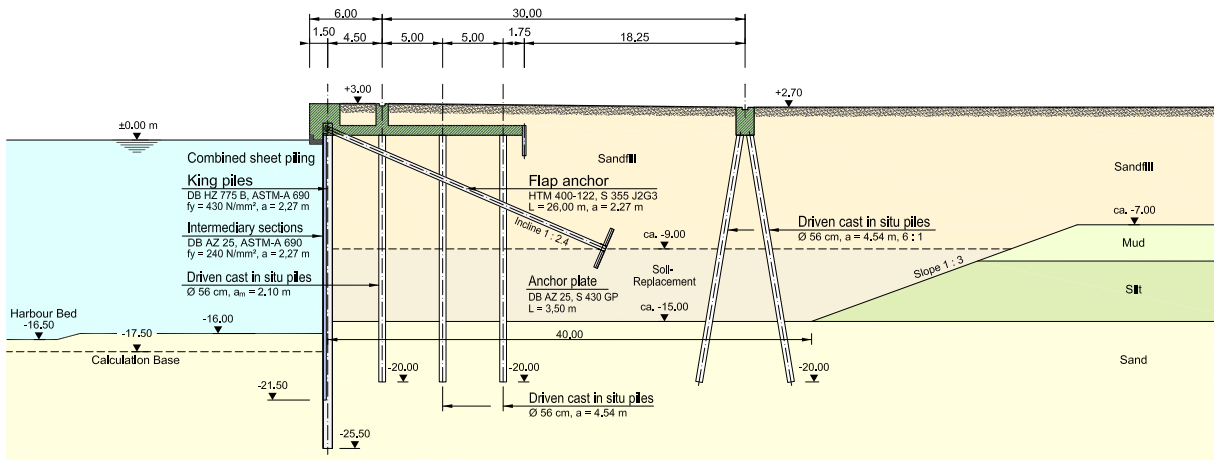
Cross Section N 5

Harbour Bed - 8.20 m



Cross Section Q 5 - Berth 1

Harbour Bed -16.50 m



Competence and know-how in Civil Engineering and Marine Works

The construction of the deep-sea container harbour in Gdansk is a textbook example for team work within HOCHTIEF Construction. The combination of regional know-how and HOCHTIEF Construction's expertise in technical execution provided a service for the client that lives up to the highest requirements placed on the operation of a modern container terminal.

The smooth progress of the project was accomplished by the precise planning of our Technical Department in Hamburg and the deployment of a highly-qualified and experienced team in Gdansk.

By using tried-and-tested local partners and competent geological consultants, as well as checking the load bearing capacity of the deep foundation elements, we were able to establish a very trusting relationship between the client and HOCHTIEF Construction.

Project data

Project address:

Głębokowodny Terminal Kontenerowy
Port Północny Gdańsk
80-750 Gdansk, Poland

Client:

Project company DCT Gdansk S.A.

General contractor:

HOCHTIEF Construction AG

Execution planning:

Engineering office Projmors, Gdansk
HOCHTIEF Construction AG

Technical data:

Steel approx.	12,000 t
Concrete	110,000 m ³
Connecting road	2,250 m
Railway link	2,000 m
Dredging works	6.7 million m ³

Administration buildings, workshops,
storage hall, complete infrastructure
link-up including media facilities

Construction period:

October 2005 to September 2007



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