

Columbus Quay Wesel

Project Owner:

Hülskens Wasserbau GmbH & Co. KG

Client:

Hülskens Wasserbau GmbH & Co. KG

Quick Info:

Tie-back of a harbour sheet pile wall from the waterside at the Rhine city harbour in Wesel with Schroeder-ground anchors, service load up to ca. 1.400 kN

Technical Information:

System:	Schroeder-permanent anchor, type 3¾ and 4½, steel grade S355 JO
Quantity:	39 pcs.
Length:	26,50 – 30,00 m
Service Load:	up to 1.394 kN
Test Load:	up to 1.811 kN
Technique:	overburden drilling
Building Ground:	sandy grit / silty sand
Time Frame of Works:	February – March 2011

An approx. 100 m long extension of the harbour quay wall in North-Rhine-Westphalian Wesel was planned. For this purpose, a new sheet pile wall was placed into the harbour bed parallel to the old one. The area in between is going to be filled and rendered useful, such that the new sheet pile, embedded in a concrete capping beam, constitutes the new quay wall. While the southeast section of the bank wall was secured with wall anchors, the northwest section was tied back with ground anchors. Because of the large anchor forces and the strict requirements with subject to the corrosion protection in steel / water engineering, the Schroeder-anchor system was favoured for this type of heavy-duty anchoring of the quay wall.



Image 1

We conducted all our anchor works from a swimming water pontoon and were therefore subject to adjusting water levels. First, an air length of up to 9,00 m had to be bridged, in parts also through water, before reaching the actual drill starting points. Then, we perforated the sheet pile in a vertical angle of up to 40°, after which we drilled down to a depth of up to 30 m in an overburden method. Our heavy steel bars of type Schroeder \varnothing 3¾ and 4½ were inserted in one piece with a lift crane (see Image 1). Two lifting points were necessary due to the bending of the steel bar caused by its large weight.

In order to transmit the test loads of up to 1.800 kN, a fixed anchor length of 17,00 m was chosen while taking into account the deep sliding plane. In the free anchor length we sheathed the Schroeder

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steel bar in the area of the air and water length with a protective PE casing and filled it up with grout to ensure additional corrosion protection. The only unplanned event occurred when we hit an extraordinarily resistant bore obstacle that turned out to consist of durable and very aggressive blast furnace slag after pulling several samples wedged in our destroyed drill bits. Because further efforts to perforate were deemed uneconomical, the pathway of three anchors was changed by 12° to the horizontal axis in an attempt to circumvent the drill obstacle.

A simplified example of the planned anchor head structure is depicted in Image 3. In order to establish an optimal angle adjustment in this rather stiff anchoring system, the head structure included a ball joint.



Image 2

Schnitt B-B Ankeranschluss 4 1/2"- Anker (Pollerbereich)

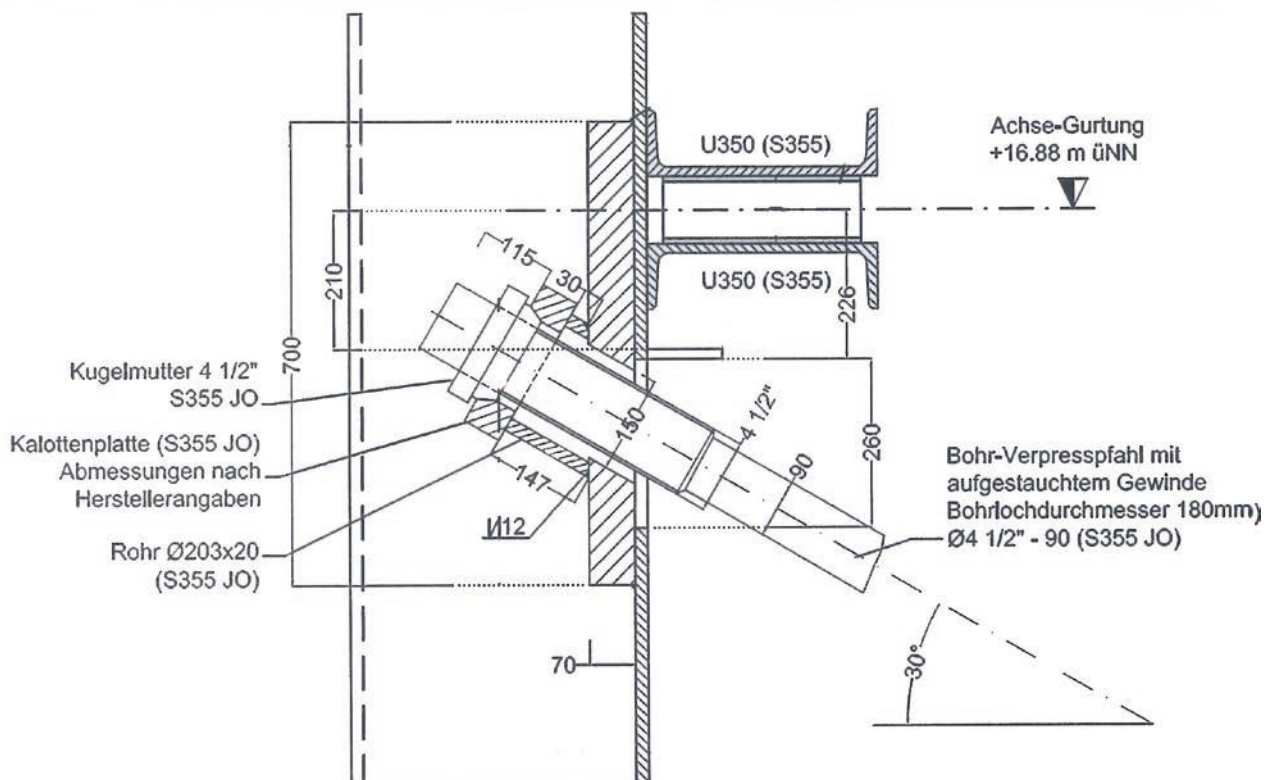


Image 3