



Excavations

Reference Details:

Owner DEBIS +++
General Contractor JV of Dyckerhoff & Widmann Berlin GmbH, Bauer Spezialtiefbau GmbH, Berliner Tief- und Verkehrsbau GmbH
DSI Services Supply of removable DYWIDAG Strand Anchors 0.6" St 1570/1770.



Berlin's Foundation Engineering Projects

Germany, Berlin: Excavation DEBIS

In the centre of Berlin at Potsdamer Platz structures for the future are being built. Directly alongside the huge civil engineering project for the central Berlin traffic association a complex structure, planned by an international team of architects, is being built for the Daimler-Benz subsidiary DEBIS. Next to the new Potsdam station 3 separate building pits are excavated over an area of 68,000m³.

The ground water reaching to approx. 1.50m under ground level together with the typical Berlin sands pose high requirements on the foundation engineers. Depending on the excavation depth different concepts were developed for the three building pits. The joint venture Dyckerhoff & Widmann Berlin GmbH, Bauer Spezialtiefbau GmbH and Berliner Tief- und Verkehrsbau GmbH received the order for the below proposal for pit A.

The excavation side consists of an approx. 29m deep, 60 cm broad diaphragm, into which to a depth of 6m below limit of excavation 20m deep sheet pile walls were integrated. A sealing dredge line created through injection of gel from the preexcavation level together with the diaphragm forms a trough. The depth is chosen such that at final excavation of the pit uplift security of the gel dredge line is secured. The sheet pile walls are secured with up to three anchorage layers. Approx. half of the anchors (443 pcs.) are introduced into neighbouring areas from where they have to be removed after use. Recoverable anchorages are still used seldom in Germany. Having chosen this type of anchor, vibration free recovering had to be considered as the possibility could not be completely excluded that bombs from the second World War were present.

The anchorage forces were so high that the proven recoverable DYWIDAG bar anchorages could not be considered as a general solution. Furthermore anchorage lengths up to 44 m were planned.

Now this was the opportunity for a first application of the recoverable DYWIDAG multiplane anchorage. It is a strand anchorage dimensioned for a nominal yield point of 220kN of a strand 0.6" St 1570/1770 and is provided with the necessary amount of strands. Staggering of the bond length means that a maximum of 2 bare strands are situated in one longitudinal section of the grout body, so that these ends need only a short length (under 2 metres) which has to remain in the soil. The strand wires are separated and the bond length is enclosed within a spiral sheet metal tube. Through staggering a maximum of two strands have the same free steel length, thus they are sheathed individually. This sheathing is properly sealed at both ends as unimpeded elongation of the strands is also important for recoverability after use.

The predetermined breaking point is factory induced to the bottom of the free length strand. This is adjusted to a maximum load of 220 kN. The force difference to the failure load of the strand is used to produce

The advantage of the short strand ends which behind each other remain in the grouted body, achieved by the steps, requires somewhat more effort during stressing. The strands receive different prestress with the monojack before the acceptance test is carried out with the anchorage jack and the anchor is fixed. The values for this are calculated with PC-support.

Water pressure at the mouth of the bare hole, together with flowable sands, was a particular challenge during installation of the anchorages in the second layer. A rubber packer sealing the individual strands against the tube was placed within a steel tube nozzle welded onto the sheet wall with an inclination according to the anchor.

To be able to carry out the work for manufacture of the wall, gel dredge line, installation of the anchorage and removal of the waste material by truck, the site was divided with a watertight diaphragm so that in one section the excavation depth was reached earlier than in the second section. Despite this, up to 5 anchor drilling rigs were used.

Anchor installation work was carried out by the joint venture

strand failure at the predetermined place.

Schnurpfeil Tiefbau-Grundbau Nord und the company Bauer.

Here each strand has to be stressed over the predetermined failure load. At fracture the strand shooting out of the hole is harnessed by a plastic deflector tube.

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