



■ Commercial Buildings

Reference Details:

Owner Federal Republic of Germany; State Berlin; German Rail AG +++ **Project Management** DB Project GmbH Knoten Berlin +++ **General Contractor (lot 1.1.)** JV Arge Baugruben Lehrter Bahnhof of: Brückner Grundbau GmbH; BallastNedam Beton en Waterbouw B.V. +++ **Jobsite Engineering** Ingenieurgemeinschaft Spiekermann GmbH & Co.; Emch + Berger GmbH +++ **Installation of the uplift piles** Arge ARGEWI

DSI Services Supply of 6564 GEWI® Piles 63,5mm dia. with lengths of 17,5m to 26,4m.



GEWI® piles secure Berlin's largest underground project against uplift

Berlin, Germany: Lehrte Transit Station

The federal government of the united Germany has decided to invest into the transportation system of it's new capital, Berlin, in order to meet the metropolitan demands of the 21st century in the heart of Europe. Both intercity and commuter rail systems will be upgraded and expanded as will key railway stations. The Lehrte transit station is one of three newly constructed railports on the north-south axis with construction focused on a 4-track 3.4 km long tunnel project. The future railway station will offer connections between the international, regional and east-west city trains.

The ground level of the station is designed as a light and transparent complex of two parallel north-south frames with the elevated and curved east-west city transit station in the middle. The space between the two buildings is covered with steel and glass. Nothing of this can be seen so far. Enormous lower level work is presently under way to make room for the four tracks and passenger gates of the north-south direction as well as additional tunnels and the subway connection. West of the terminal building is the entry section of the B96 highway tunnel.

Various sized excavations were separated by 35 m deep slurry walls and underwater concrete foundations. Berlin's very high ground water table (3 m below surface), a difficult geology as well as the shear size of these excavations were very challenging for all construction parties.

GEWI® piles were installed in two of the largest excavations and the inner bulkhead to counter hydraulic uplift. First, excavations to a depth of 18 m below water table resulted in artificial lakes. Then, 6,500 GEWI® piles 63.5 mm Ø were driven 17.5 m to 26.4 m deep into the ground from floating platforms. Finally each excavation was made watertight by a 1.5 m thick heavy underwater concrete slab. After pumping all the water out, GEWI® piles at 2.7 m centres resisted the uplift forces. Sixty to seventy percent of the piles were permanent with double corrosion protection and pregrouted in the factory inside a corrugated sheath. The pile head incorporated a specially designed 350 mm Ø anchor head to transfer the pile force to the basement slab.

The installation and tightening of the anchor head was conducted under water with a satellite controlled robot specifically developed for this project. Technical innovation eliminated most of the construction diving.

The basement slab was connected to the GEWI® piles and built directly on top of the underwater concrete foundation slab.

The German company, DSI - ALLSPANN GmbH, established a new plant in Berlin Spandau especially for this gigantic project to mass-produce the double corrosion protected GEWI® piles. At the core of this facility was an automated assembly line where the bars could be efficiently installed into the corrugated sheathing.