Ground Freezing

PROJECT

SLOVACKI TUNNEL DANZIG POLAND

PROJECT NAME
Road Tunnel 1,1 km long and 11 m internal diameter crossing under the so called Dead Vistula river in the vicinity of Danzig (Poland)

CLIENT
Gdanskie Inwestycje Komunalne (GIK)

ENGINEER
PSP Consulting Engineers GmbH

GENERAL CONTRACTOR
Obrascon Huarte Lain SA (OHL)

SPECIALIST CONTRACTOR
RODIO GmbH Spezialtiefbau

CONTRACT VALUE
EURO 4,7 Mio. CHF 7,3 Mio.

BEGINNING OF WORKS
APRIL 2014

END OF WORKS
MARCH 2015

JOB DESCRIPTION

The Slovaki road tunnel links the new airport of Gdansk, the stadium and many of the road connections to west Poland, with he old portual city on the eastern side of the Vistula river. The freezing of the soil with the so-called indirect method (brine freezing) was chose to permit the construction of the 7 cross passages located into lose ground and below the water table. The main tunnels were excavated using a Herrenknecht Hydroshild type TBM. The TBM has a cutting diameter of about 12,5 m. The cross passages are located in very heterogeneous alluvial deposits with peat to roll gravel layers and some with large boulders. The water head above the sole of the cross passages ranges between 15 and 25 m. The planned frozen wall thickness of 1.80 m was achieved using only one row of freezing pipes. The initial freezing phase required 60 to 70 days. The holes for the installation of the pipes freezing and thermometer were drilled from the south tube against water pressure, using special preventers (BOP). The freezing, thermometer and drainage pipes were installed as lost drill pipes by rotary drilling. A drill mast type EGT VD 400 mounted on a hydraulic lifting platform was used. Due to the huge dimensions of the main tunnels, the construction and implementation of an intermediate working platform was required for the achievement of the upper drilling positions.

WORK QUANTITIES

340 Drillings, average drill length 12 to 19 m. total length 4.500 m
Total volume of frozen soil: approx. 5.600 m3
300 freezing pipes, 30 Thermometer pipes, 450 temp. measuring points.

MAIN EQUIPMENT

1 drill mast EGT VD 400 installed on an hydraulic lifting paltform
1 mixing and grouting plant
1 Freezing plant with a cooling capacity of 380 KW at -35 °C
4 Freezing plants with a cooling capacity of 130 kW each at -35 °C
Recording of drilling parameters by means of LUTZ LT3 System

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One cross passage in freezing stage

Two freezing units inside the main tunnel

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