

PROJECT

CITY METRO TUNNEL KARLSRUHE MANCHETTE PIPE GROUTING



PROJECT NAME

Karl-Friedrich-Strasse Tunnel
Grouting with tubes à Manchettes (TAM)

CLIENT

KASIG GmbH

ENGINEER

Smolczyk & Partner GmbH

MAIN CONTRACTOR

BEMO Tunnelling GmbH

SPECIALIST CONTRACTOR

RODIO GmbH Spezialtiefbau

CONTRACT VALUE

EURO 5.5 Mio. CHF 6.8 Mio.

BEGINNING OF WORKS

OCTOBER 2014

END OF WORKS

SEPTEMBER 2015 (foreseen)

■ JOB DESCRIPTION

The 210 m long Karl-Friedrich Tunnel is part of the new underground metro project of Karlsruhe. The low pressure permeation grouting treatment by means of tubes à manchettes, has been envisaged in order to reduce losses in the quaternary gravel and sands, during the full face excavation of the tunnel under compressed air. The soil grouting occurs as low-pressure injection with cement and soft gel based grouts. The manchette pipes (TAM) are installed into holes drilled vertically and inclined from the Kaiser Friedrich Street. The PVC TAM pipes have one valve every 33 cm. The soil to be treated by grouting is a very inhomogeneous quaternary alluvium with alternate layers of silty fine sand to coarse gravels. The aim of the injection is the reduction of the permeability to values of less than 10⁻⁷ m / sec. The injection is performed in each single valve of the TAM, by means of double inflatable packers. In the first grouting stage, a cement based stable suspension is injected over the whole volume formed by the tunnel and a 2 m thick border around it. In the second grouting stage, soft gel grout is injected over the 2 m thick border only.

■ WORK QUANTITIES

2.120 grouting pipes, total drill length 36.000 m, 33.000 m³ of grouted soil
~ 5.000 m³ of cement based grout with ready product (cement / limestone)
~ 5.000 m³ of soft gel grout (sodium silica + reactive)

■ MAIN EQUIPMENT

1 Comacchio MC22 long mast drill rig
1 Comacchio MC1200 long mast drill rig
1 Metax JM30 full automatic mixing plant
1 Grouting container with 10 pumps type **RODIO** CIRO10
Recording of drilling parameters by means of LUTZ LT3 System
Recording of all grouting parameters SOFIA



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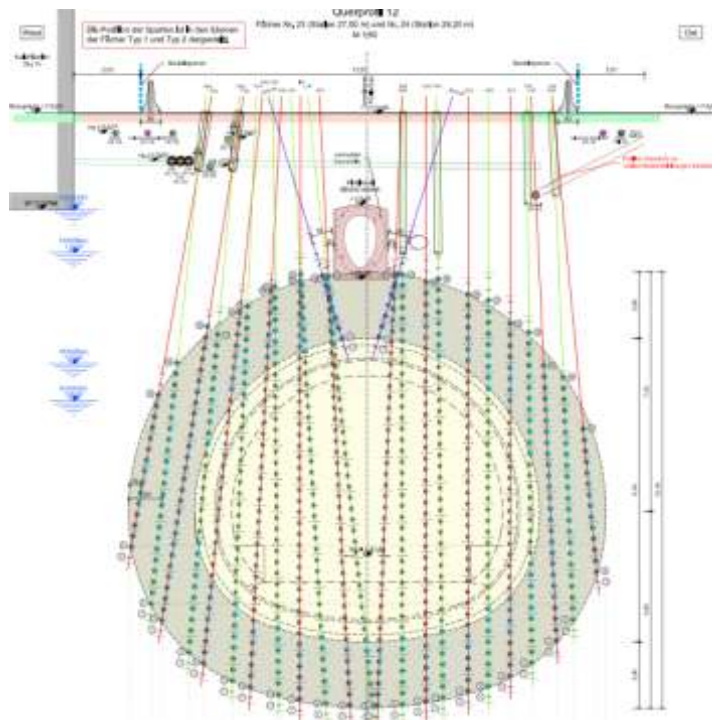


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Drilling and grouting works in the Karl-Friedrich-Street



Cross section with grouting pipes and valves



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