

U5 Europaviertel, Frankfurt am Main

Data and facts

Company	PORR Spezialtiefbau GmbH
Type	Turnkey construction pits
Runtime	01.2018 - 12.2021
Principal	PORR GmbH & Co. KGaA, München

[Project report online](#)

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Soil freezing works in the connection area of an existing tunnel

brine-based freezer unit with a refrigeration capacity of 140kW for this project. Freezing boreholes were drilled to enable the cold to be transmitted into the soil. This was the most difficult part of the process, as very high precision was required in calculating borehole variations and ensuring the impermeability of the inserted drill strings. Preventers and previously mounted standpipes were used to enable drilling against the pressure of the groundwater. Extreme precision was essential, with multiple work processes and extremely limited room to work adding to the difficulty of the process.

An innovative special solution: active cooling reduces freezing time

On the U5 construction scheme in Frankfurt, the tunnel boring machine was virtually drilling into a funnel composed of the previously frozen body of earth. This effect was achieved via a specially shaped flange on the freezing tube. Active cooling, which recycles the already "used" and warmed brine from the freezing pipe return flow, was applied to the surface of the striking wall to assist the freezing process. It took around 50 days before the required temperature was achieved throughout the affected soil and a frozen body of sufficient diameter was created. Once the soil was successfully frozen, our experts were able to seal and compact the soil so that the tunnel boring process could be safely executed. An uninterrupted freezing process was ensured at all times with two redundant cooling cycles and an emergency backup power supply on hand throughout the process.

Impressions

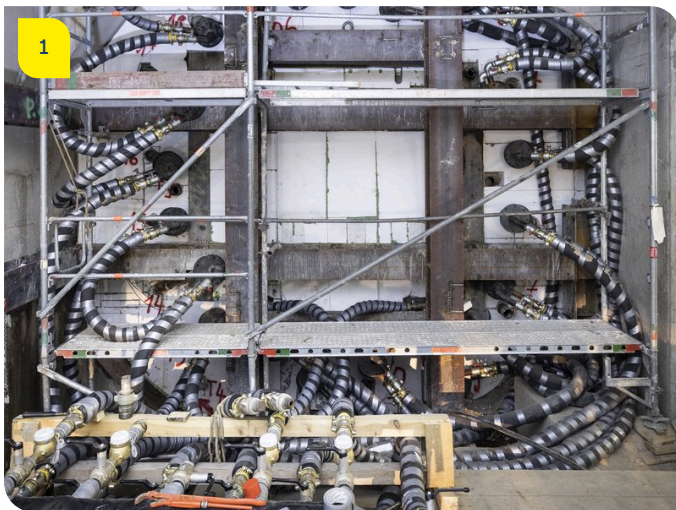


Image notes

1

U5 Europaviertel, Frankfurt a.M.

Ground freezing can be used to create closed, watertight systems with an extensive static effect.

2

U5 Europaviertel, Frankfurt a.M.

During the U5 underground railway construction project in Frankfurt, the tunnel boring machine virtually "drove into" a funnel created by previously frozen soil bodies

Do you have questions about the project or would you like to learn more? Feel free to contact us for further information.

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