

# Linde Helps Transport Gothenburg into the Future

## Ground Freezing with Linde Gets Construction Work Back on Track

### Highlights

- NCC could resume operations in just two weeks
- One-stop partner for water treatment and ground-freezing needs
- Instant access to Linde's application expertise from countless reference projects
- Security of supply for high-volume gas needs thanks to Linde's extensive distribution network

#### New transit tunnel for Gothenburg

The Swedish transport authorities are committed to supporting regional growth through sustainable urban and regional development planning. They decided the time had come to expand Gothenburg's rail infrastructure, kicking off the West Link (Västlänken) project. Scheduled for completion in 2026, this involves building a railway tunnel that will run under central Gothenburg, creating three new stations and connecting commuter traffic with transit traffic. The new stations will greatly improve quality of service and reduce road traffic by enabling many commuters to get off directly at their stop rather than having to change to a bus or tram. A connecting tunnel of this scale underneath a vibrant city presents a number of construction challenges, however. The first step entailed selecting the right contractors for the job.

#### About NCC

The NCC Group is one of the leading construction companies in the Nordics. Drawing on a host of successful reference projects, NCC contributes to the positive impact of construction work for its customers and society. Core competencies include commercial property development, building and infrastructure project contracting, and asphalt and stone materials production. Drawing on its long-standing experience and vast expertise, the company is valued above all for its ability to overcome complex construction challenges. This made NCC one of the contractors of choice for the Swedish transport authorities.



Tank and supply lines for freezing project

## Challenge

During work under the central Gothenburg station, NCC needed to connect a service shaft (lifts, stairs and evacuation options) with the tunnel running under Gothenburg Central.

While the tunnel “floats” in the mud, the service shaft is anchored by piling. This means that the two structures do not necessarily move in sync. Filling the gap between the shaft and the tunnel with concrete was not an option as the concrete would crack in response to movements and settlement. NCC decided that an omega seal was the best option. This unusual seal is ideal for joints subject to pressure and movements in all directions. It is an extremely elastic solution, enabling the tunnel to move about 15 cm up or down in relation to the fixed service shaft.

However, when NCC tried to install the omega seal, they ran into problems with water leakage. A clean, water-free surface was essential to ensure a secure fit. The company tried pumping the excess water away, but the pumps were not effective enough to stop the ingress. As NCC was running behind schedule, they decided to look for an alternative, more effective solution.

## Solution

NCC turned to Linde for advice and assistance. Linde was quick to the rescue as the company had already installed carbon dioxide tanks at the Gothenburg Central site to help regulate the pH of wastewater from cement operations and bring it under the regulatory limits. In addition, Linde was a trusted partner as it had supported NCC Gothenburg with various construction projects over the past eight years.

Linde recommended using liquid nitrogen (LIN) to freeze the soil and prevent water from running down to where the omega joint was to be installed. The cryogenic power of LIN (at minus 196 degrees) was sufficient to quickly stop the flow of water into the area of interest and create a good fastening surface for the joint. The customer was able to install the joint and get back on schedule. “The ground freezing experts at Linde had our back from the get-go. We reached out to them because we were one month behind schedule, and one week later, the Eco lances were in place. And one week later again, we were able to resume operations. That’s the kind of service spirit we value here at NCC,” says Magnus Silfversten Frizell, Procurement Director at NCC.

## Ground freezing with Eco lances from Linde

With its extended “fade-out” zone, the Eco lance is designed to maximize efficiency by reducing the volume of coolant required. Eco lances are provided as part of a full-service, turnkey package spanning gas supplies and installation, expert advice on optimum deployment and positioning, and support with LIN handling and safety instructions. Having already delivered over 130 ground freezing projects around the world – many of which were extremely complex – Linde’s experts can draw on a wealth of experience to ensure the success of time-critical ground stabilization projects such as Gothenburg Central.



Freezing lance in action

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