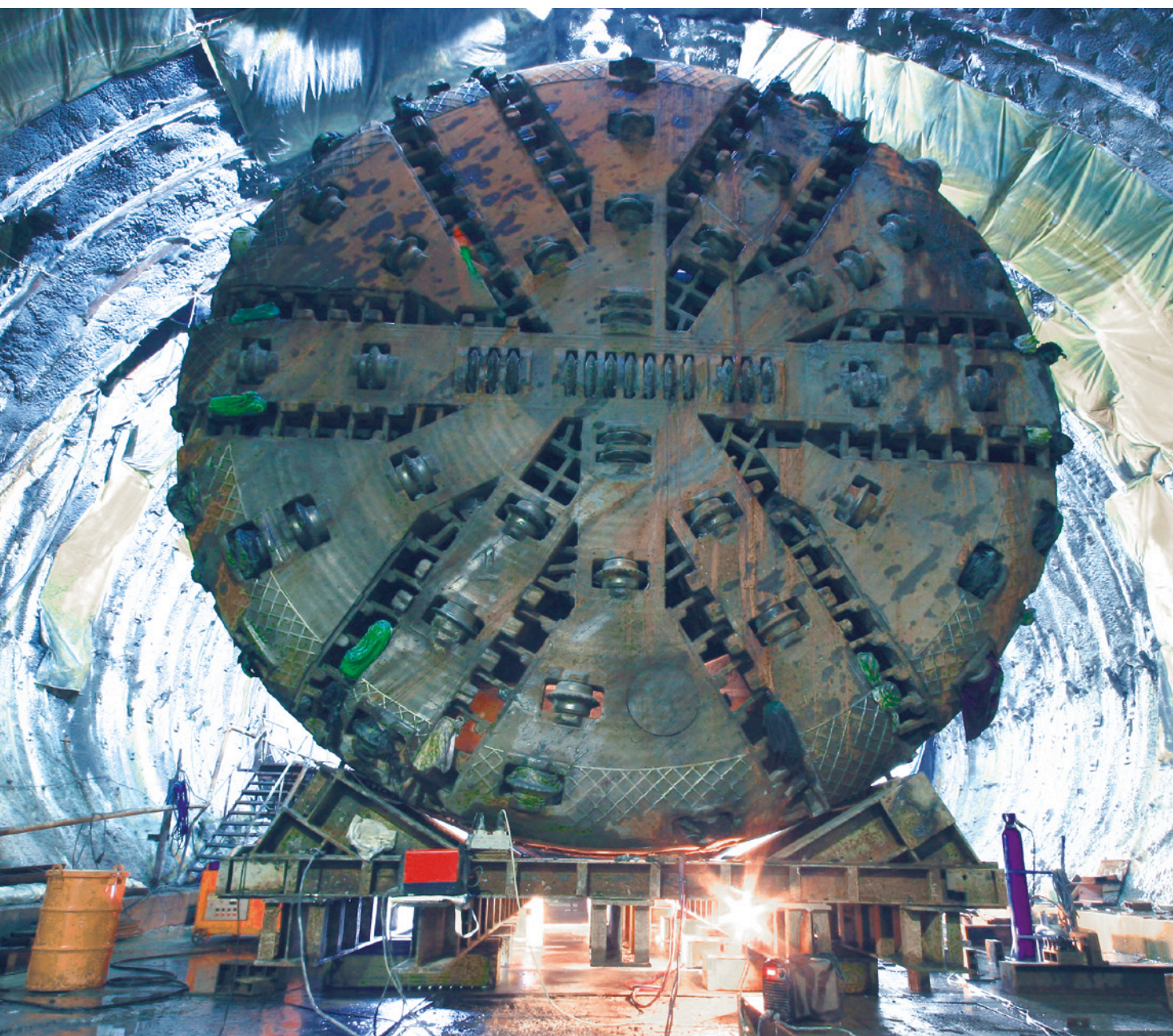
FOCUS

LR Kältetechnik

More than cold. | Refrigeration



Refrigeration units for ground freezing under the Suez canal

Icy tunnel work in the desert

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Refrigeration units for ground freezing under the Suez canal

Deilmann-Haniel GmbH, a globally active specialist company for tunnelling and shaft sinking, has been chosen to build a tunnel below the Suez Canal using ground freezing as a tried and tested as well as an efficient process. The frozen soil layer makes it possible to insert cross passages between the tunnel tubes without the risk of water ingress.
The robust refrigeration systems were supplied by L&R Kältetechnik. The container design allows the later use of the units in other tunnel projects.

For international shipping, the new, widened Suez Canal is a major step forward. It doubles the number of ships that can pass through the canal and reduces waiting times from around nine to around three hours. What the shipowners and ocean freight forwarders are pleased about, however, is that it will entail additional construction measures for road traffic. The new canal section, about 37 kilometers long, will have to be tunnelled in order to ensure that east-west traffic at the interface between Africa and Asia continues.

Deilmann-Haniel GmbH in Dortmund (Germany) is involved in this project. Its task is to carry out the ground freezing for the construction of the so-called cross passages in the tunnel. These are connections between the two tunnel tubes, which are primarily necessary for safety reasons, but can also facilitate maintenance and repair work and serve as a technical room. While the tunnelling of the tunnel tubes are done by powerful tunnel drilling machines highly automated and largely autonomous, the crosscuts must be made mostly by hand.

For their safe operation, groundwater infiltrations must be prevented - lastly, the work takes place at some depth below the sewer bed. As a specialist for worldwide tunnel drilling and shaft sinking, Deilmann-Haniel is familiar with such tasks and often uses a method that has proven to be as efficient as it is safe and reliable: ground freezing.

Prior to the actual excavation, pipes are installed in the surrounding soil through which brine flows as coolant. This causes the soil to cool to temperatures below freezing. Now the desired borehole can be drilled „dry“ and there is no need to fear water ingress. In addition, the impairment of underground construction work by sludge and dust is reduced.

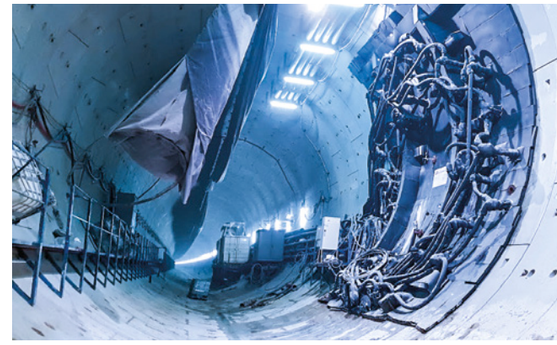
The brine flows with a temperature of -35 °C through the pipes. The cold is generated by ground freezing machines designed and built by L&R Kältetechnik. Since several cross passages are planned and built in parallel, Deilmann-Haniel ordered four identical refrigeration systems from L&R, which were designed for use under adverse conditions (heat, limited ventilation possibilities, salty ambient air). Stowage in rugged 20-foot containers also ensures high mobility.

Each of the four L&R ground freezers has a cooling capacity of 100 kW, divided into two cooling circuits. All components in the circuit are designed for low temperature applications.
One PLC control with touch panel takes over the entire regulation of the unit. The programming of the unit is generally carried out by L&R in its own home.

Tunnel Entry

This is an important prerequisite for the fact that the system works in every operating state optimally. In addition, the existing potential for energy savings and capacity boost - resulting, for example, from the gliding Vari-Kon condensation temperature control - is used in the best possible way. Even more important is the possibility of a significant increase in cooling capacity through the temporary use of a chiller. Water-cooled, the ground freezing unit can provide more than twice the capacity, which is particularly important during the freezing phase.

Furthermore L&R experts can log into the control system via an integrated UMTS router and perform remote monitoring if required. The ground freezing machine can also be monitored by the operator on site or remotely via a supervision computer available at the construction site.



Start of icing

The ground freezing systems are already in use under the Suez Canal. Once the cross passages between the two tunnel tubes have been completed, the L&R systems can make their contribution to efficient and safe tunnel construction in other projects carried out by Deilmann-Haniel worldwide.

Übersicht Querschlag

Industrial refrigerations systems
Ultra low temperature units
Control technology

L&R Kältetechnik

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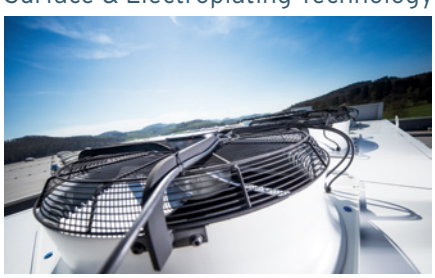

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Food Industry

Special Engineering

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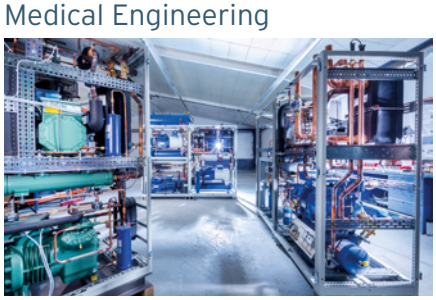

Metal Processing

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