

# Specialist Press Release

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## **Red Dog Mine Alaska: Ground improvement in permafrost**

**Alaska, USA** – Red Dog Mine, one of the world’s largest zinc mines, is located in the north-west of Alaska, around 170 km north of the Arctic Circle and nearly 1,000 km to the north-west of Anchorage. The mine has been operating since the late 1980s with around 10% of the world's zinc extracted here in open-cast mining.

Its location in the Arctic Circle region means that the entire mine is in a geological permafrost area that keeps the ground permanently and completely frozen below a certain depth. There is an active zone near the surface that thaws during the summer and refreezes during winter. Based on an evaluation of the permafrost and soil on the site, ground improvements were identified as a prudent measure to counteract the effects of potential melting permafrost. To this end, BAUER Foundation Corp. was tasked by Teck with carrying out field tests using the jet grouting and Cutter Soil Mixing (CSM) methods.

"The trials included detailed data capture and strict quality controls in close collaboration with Teck, the project owner, and other geotechnical consulting engineers," explains Alejandro de la Rosa Knecht, Project mNager with Bauer Foundation. "Trials were carried out from August to December of 2019, which ultimately identified the CSM method as the most suitable choice for the main scope of this project." The CSM method combines features of the diaphragm wall technique and the mixed-in-place ground improvement method (MIP). The soil is broken up using a cutter, then rearranged and mixed with an aggregate. The trials for the Red Dog Mine also determined the extent to which existing subsoil were to be replaced with suitable filler material to facilitate later mixing.

In 2020, during the period from July to November, 50% of the pre-drilling was completed as well as 30% of the CSM. In addition, BAUER Foundation Corp. was tasked with the construction of a secant pile wall as an extension to an existing slurry wall. To achieve this, the required pile wall was integrated into the existing slurry wall and the underlying rock using primary and secondary piles. In all, 93 secant piles were constructed. A multi-purpose BAUER BG 30 drilling rig with special Arctic equipment along with various drilling tool and mixer sets were used for the execution of all the works.

One of the main challenges was the mobilization of equipment in the limited time provided by the schedule. However, the required special equipment was mobilized in record time. Some equipment was transported by plane and then by ship from Seattle Harbor across the Bering Sea to a dock just over 80 km from the mine. Other equipment was transported via Hercules aircraft from Anchorage airport to the airport on the mine site. This logistical success was made possible by close collaboration with various Bauer subsidiaries and Teck. "The remote and isolated location, the long deployment times and accommodation in camps pose additional challenges, as do the extreme Arctic climate conditions,

precautionary measures associated with the corona pandemic and the specific safety requirements of the mining industry,” says Alejandro de la Rosa Knecht.

Despite all these challenges, the Bauer and client teams were able to successfully conclude trial work between August and December 2019 and the first phase of production activities between July and November 2020. The final production phase which includes CSM and demobilization is due to be completed by June 2021.

#### Images: 2021-06\_BAUER\_Red Dog Mine ...



(1) Around 170 km north of the Arctic Circle, BAUER Foundation Corp. carried out field tests using the jet grouting and Cutter Soil Mixing methods.



(2) Amongst others, a multi-purpose BAUER BG 30 drilling rig with special Arctic equipment was used.

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### **About BAUER Spezialtiefbau Group**

BAUER Spezialtiefbau GmbH, the original parent company of the BAUER Group, has been a major driving force in the development of specialist foundation engineering. It carries out all of the customary processes of foundation engineering, primarily for excavation pits, foundations, cut-off walls and ground improvements on a worldwide basis. In doing so, BAUER Spezialtiefbau GmbH works closely together with their over 50 subsidiaries and branches across the globe. Regional networks around the world allow for the quick and flexible application of machines, teams and expertise. Bauer Spezialtiefbau offers their customers individual, creative and economical specialist foundation engineering solutions for demanding construction projects, from planning through to execution. More at [bst.bauer.de](http://bst.bauer.de)

### **About Bauer**

The BAUER Group is a leading provider of services, equipment and products dealing with ground and groundwater. With over 110 subsidiaries, Bauer can rely on a worldwide network on all continents. The Group's operations are divided into three forward-looking segments with high synergy potential: Construction, Equipment and Resources. Bauer profits enormously from the collaboration of its three business segments, enabling the Group to position itself as an innovative, highly specialized provider of products and services for demanding projects in specialist foundation engineering and related markets. Bauer therefore offers suitable solutions to the world's greatest challenges, such as urbanization, the growing infrastructure needs, the environment, as well as water, oil and gas. The BAUER Group was founded in 1790 and is based in Schrobenhausen, Bavaria. In 2020, it employed about 11,000 people in around 70 countries and achieved total Group revenues of EUR 1.5 billion. BAUER Aktiengesellschaft is listed in the Prime Standard of the German Stock Exchange. More information can be found at [www.bauer.de](http://www.bauer.de). Follow us on [Facebook](#), [LinkedIn](#) and [YouTube](#)!