Magnavale, Chesterfield

Delivering operational excellence in multidiscipline retaining solutions through efficient design and effective operations

In preparation for a new cold storage warehouse south-east of Chesterfield, Aarsleff were contracted by IBO Construction Ltd to design and install a 200 linear metre soil nailed slope with a sprayed concrete 'rigid' facing and 40 linear metres of a king post retaining wall. Challenging design and complex logistics have made this a keystone project, with it being one of the largest soil nailing projects delivered by Aarsleff in recent years. Our design engineers were faced with many complex design elements including assessment of rock stability, soil nail design, groundwater control, and producing high quality construction drawings. The scheme, from tender, to design, to installation, is a prime example of Aarsleff's ability to add value for our clients at every stage, delivering trusted solutions to even the most complex of projects.

One of the key parts of the logistics of this project was that the level of the development platform was considerably lower than the existing ground level on site, and therefore, the soil nails were installed on slopes excavated at 80 degrees up to 7m high, which is higher than the average two storey house. To ensure stability of the slope as it was excavated, Aarsleff had to work closely with our client to install 5 rows of soil nails in a top-down sequence as the excavation progressed. Soil nails of up to 7m long were installed in a grid-pattern at 1.5m centres before the face was reinforced with a structural steel mesh and sprayed concrete facing.

Groundwater was identified as a possible long-term issue and therefore, Aarsleff designed in sub-horizontal drilled drains passing back into the slope to ensure both operational continuity and long-term control. Alongside this, our experienced drillers were contending with variable rock strength as the nails were installed into weathered and un-weathered Pennine Coal Measures rocks. Their dedication to finding the right solution and overcoming challenges to install operational excellence ensured the works were completed in full to a high standard, with input and consul from our design engineers.

To meet a lower retained height specification and combat land constraints, we also installed a 40 linear metre king post wall where it was identified a vertical retaining structure would work best. The installation here was smooth and quick and worked alongside the soil nail installation to best control programme for our client.

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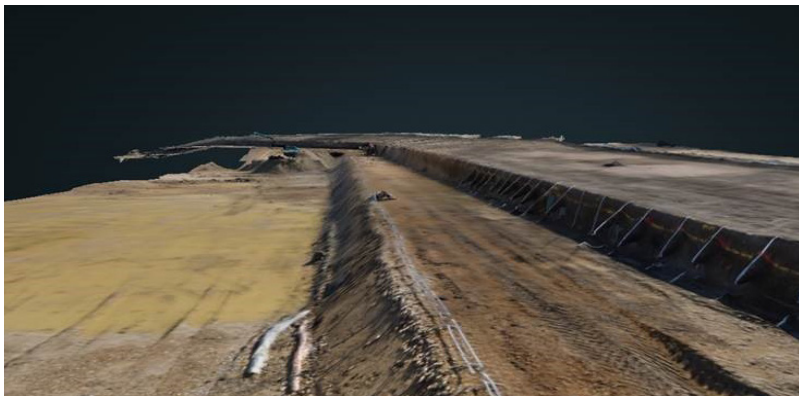
Throughout the installation of the solution, site conditions were monitored by regular visits from our design engineers to ensure ground conditions on site matched those considered in design and make variations accordingly to improve site production rates. This was done partly through traditional monitoring and a trial of digital imaging software, utilising a drone to take aerial photography. Our designers were then able to match the imaging software points to both the ground investigation and our design to work alongside incoming site information to gain a full picture of the project. The hope is to take this forward to gain a more accurate picture of our projects as a whole, reduce processing time, and present more detailed as-built information to our clients.

The project at Chesterfield has been a challenging yet rewarding scheme for Aarsleff, involving detailed and complex design and allowing us to push forward on digital innovation. By focusing in on added value from tender, all the way through to demobilisation, Aarsleff have been able to exceed our client's needs and deliver operational excellence across this multidiscipline scheme.



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Data

- 200 linear metre soil nailed slope up to 7m
- Sprayed with rigid concrete facing
- 40 linear metre king post wall

Client

IBO Construction Ltd

Type of contract

Design and build contract

Construction period

April - June 2023

Contact

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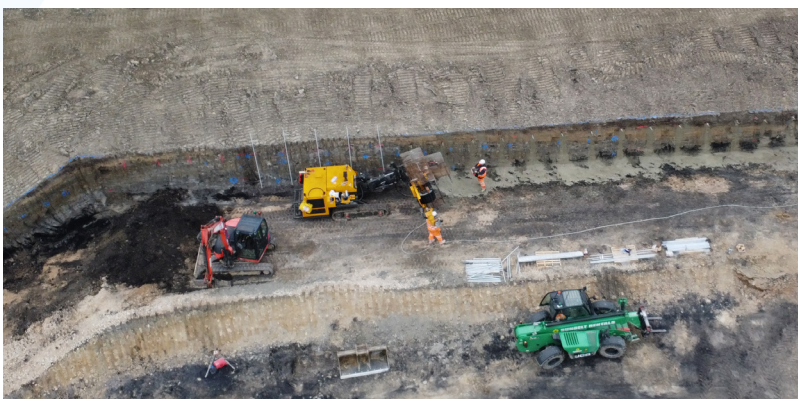

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