Case study

Fugro LOADTEST have performed shaft profiling using the patented SONICaliper system to a European record depth of 292.6 m

Project

Sirius Minerals Polyhalite Mine

Mineral Transport Systems
Lockwood Beck

Contractor:

Shaft Drillers UK Limited

Location

Lockwood Beck Site in Lingdale, UK

Period

2021

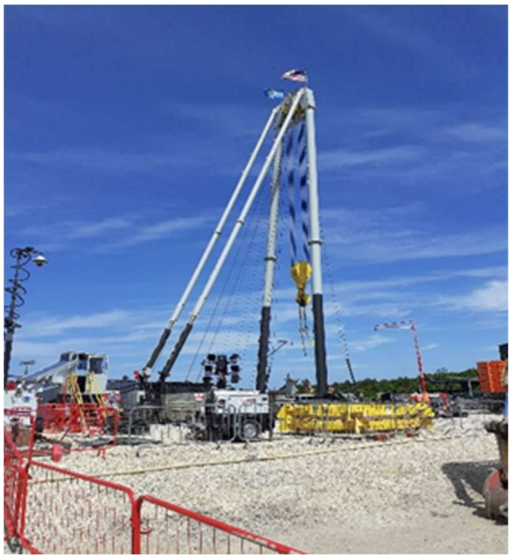
Services

SONICALIPER®

Record breaking 3D calipering depth performed in Europe using a system developed for assessing foundations

The profiled shaft is part of a critical ventilation to the Mineral Transport Systems (MTS), comprising a series of conveyors within a 37 km tunnel.

Challenge



Onsite drilling rig

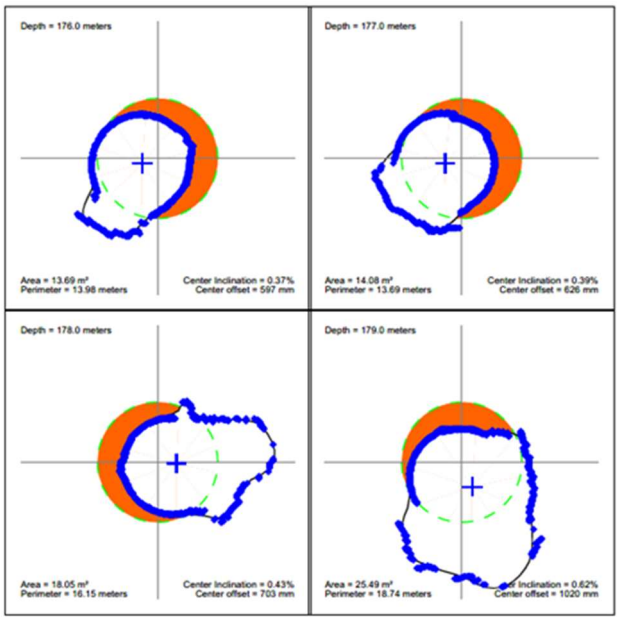
The Lockwood Beck Site located in Lingdale, UK is a critical ventilation shaft drilled for the MTS project presently being constructed beneath the North Yorkshire Moors. Delay in completion of the shaft would result in significant financial consequences for the MTS project. Pennsylvania (US) based Shaft Drillers observed unexpected additional weight on the drill head associated with potential falling material while drilling at a depth of approximately 290 m. Drilling of the 3.5 m diameter shaft was halted immediately and Fugro requested to mobilise to investigate.

Difficulties with the vertical boring of one of the ventilation shafts required a system of assessment of what the issue might be and the potential solution.

loadtest@fugro.com

Solution

A task specific 300 m cable was prepared and mobilised from the Fugro Loadtest office in Gainesville, Florida USA on board a private aircraft chartered by Shaft Drillers enabling Fugro to perform a reconnaissance profile to a depth of 280 m within 24 hours of initial client request. The results of this profile indicated cavities within the bore wall between depths of 170 – 180 m. Preliminary site reports issued immediately after completion of the profiling allowed the client to swiftly implement remedial action to stabilise the shaft and later redrill. Fugro returned to re-profile the bore on completion providing quality assurance that remediation works had been effective.

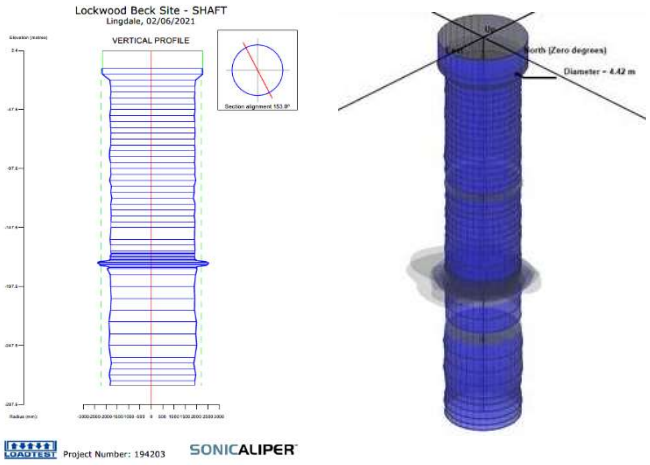


2-D Data Rings with polynomial assessment Indicated shaft wall collapse at 176 – 179 m Depth.

Conclusion

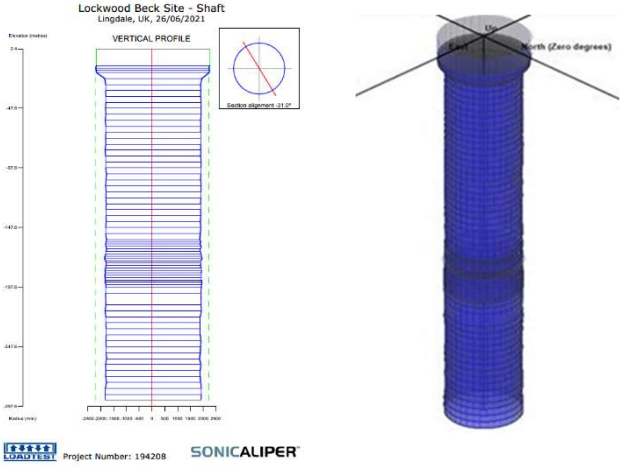
The SONICALIPER successfully imaged the area of shaft wall collapse and provided estimates for actual shaft volume. Rapid mobilisation of equipment combined with immediate site reports enabled pro active management of conditions, and swift implementation of remediation plans using the information provided.

Quality assurance that remediation works were effective provided the client with greater confidence to proceed with the final installation of casing, minimising delay and disruption to the progress of the MTS.



Initial Profile Results Indicating Shaft Wall Collapse

Shaft casings ready for installation



Post remediation results.