

CASE STUDY

Stable, Wireless Monitoring of an Excavation Pit in Central Oslo

PROJECT TYPE: Excavation pit monitoring

COUNTRY: Norway

INDUSTRY: Construction



MAIN PRODUCTS:

- 1 Ackcio Gateway (BEAM-GW)
- 2 Ackcio Digital Nodes (BEAM-DG)

CHALLENGE



A new family-friendly housing development with 240 residential units is being built close to Bispevika, a historic bay in the centre of Oslo, Norway.

Cautus Geo, a Norwegian company specialising in survey systems and geo-monitoring solutions, has the monitoring contract for excavation of the site, which is approximately 1,000 square metres.

This is a critical stage in the project, where the pit is being excavated and struts applied successively. Monitoring will be used to verify the geotechnical design that was used to estimate the length of the sheet pile as well as the number of struts and bracing levels needed. The design should provide appropriate excavation pit safety as well as acceptable deformation of the highway.

The site is also culturally significant. Bispevika Bay was a major port in the Middle Ages, and The Norwegian Institute for Cultural Heritage Research has discovered numerous shipwrecks and other objects dating to before 1624 A.D in the bay.

To protect this cultural heritage and ensure the preservation of any archaeological discoveries, the site is being excavated two centimetres at a time with an excavator before archaeologists analyse the surface.

Cautus Geo needed a monitoring system to provide stable, remote readings to help manage the potential risks to infrastructure, cultural artefacts and people. The client claims that the monitoring so far has worked very well and given results that harmonizes well with the geotechnical design.



SOLUTION



Cautus Geo's client wanted a reliable and efficient remote monitoring system. It chose Ackcio's wireless solution to eliminate the need to mount cables along the sheet pile to connect data loggers.






In September 2022, Cautus Geo installed four 16-metre Measurand SAAV automatic inclinometers along the sheet pile wall. Each inclinometer has an Ackcio Node (BEAM-DG) mounted to the top of its casing, approximately one meter above the sheet pile. The distance between the nodes is around 15 to 20 metres. The Ackcio Gateway (BEAM-GW) is located outside of the site, inside a fibreglass cabinet on the wall of a barracks rig where it has power supply.

The alternative was a cabled monitoring solution that would require the datalogger to be located on the outside of the excavation area as the sheet pile wall monitored will not be easy to access for most of the construction time.

This system would have required more time in the field to install, as well as a lot more cabling and cable protection, than Ackcio's easy-to-deploy wireless solution. There was also the risk of a sensor breaking from work on the site, a challenge Cautus Geo has encountered in previous projects. A break stops monitoring and requires immediate maintenance to repair the cable or sensor and resume the monitoring. Another risk of a cabled solution is that all sensors are connected to a single data logger; if it fails, monitoring from all sensors fails.



Benefits

-  Reliable, remote communication
-  Quicker deployment
-  Lower installation, maintenance costs
-  Eliminated risk of cable breakage
-  Reduced sensor cable costs

RESULTS

✓	Remote, real-time data access
✓	Reliable, stable readings
✓	Increased infrastructure, worker safety
✓	Improved risk management

The Ackcio solution is providing incredibly stable, reliable data streams from the site. Along with eliminating data collection failure risks associated with a cabled solution, the Ackcio Nodes and Gateway are more cost-effective.

Cautus Geo estimates a 25% reduction in installation and maintenance hours compared to a cabled solution, as well as savings from sensor cables.

Cautus Geo plans to deploy more Ackcio solutions on this project if further monitoring needs arise.



TESTIMONIAL

The Ackcio monitoring system reduced the time it took our personnel to install the instruments and monitoring system in the field, which benefited both us and our client due to cost savings. The monitoring has shown to be incredibly stable. We are very happy with Ackcio's wireless system, knowing that the risk of sensor cables breaking is eliminated.

— Alexandra Emhjellen
Geologist, Cautus Geo AS



ABOUT CAUTUS GEO [Cautus Geo AS](#) is an independent Norwegian company specialising in solutions for geo-monitoring, automatic monitoring of stability, deformation, water, snow and the environment. It is a leading and innovative provider of effective and secure solutions for geo-monitoring and automated measurement systems for land, water and vulnerable structures.



ABOUT ACKCIO Ackcio builds reliable wireless data acquisition systems for industrial monitoring applications. The company automates monitoring processes and provides remote, intelligent data to enable increased safety and efficient risk management in mission-critical industries, including construction, infrastructure, mining, and rail. Ackcio's flagship solution, Ackcio Beam, is an industrial data acquisition platform that uses a patented long-range wireless mesh network to monitor sensors accurately and reliably in both above-ground and underground environments. Ackcio is headquartered in Singapore and supports clients across the world. In 2021, the company was included in Forbes Asia's inaugural '100 to Watch', a list comprising small companies and startups on the rise across Asia Pacific.

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