Continuous Monitoring of Railway Tracks in Denmark

Country

Denmark

Project type

Geotechnical
Environmental
Rail - UTX

Sector

Transport

Main product

Monitoring solution

Context

The client is facing challenges related to the monitoring of two railway tracks at Hammersholt, Hillerød, (Denmark) due to the installation of district heating pipes beneath the S-train line 820 that connects Copenhagen H to Hillerød. The authorities have requested that settlement and cant be monitored during the work under the railway.

The monitoring needs include providing data every 30 seconds, which requires the use of sensors that can transmit data simultaneously. This excludes the use of total stations and prisms, which transfer data sequentially at longer intervals. Instead, tiltmeters are installed to monitor the tracks.

Solution

To meet the monitoring needs, a total of 54 Worldsensing wireless tiltmeters were installed, together with a cloud gateway.

The tiltmeters were installed on aluminum profiles (tiltbeams) between every third sleeper, spaced 15 meters apart on either side of the pipeline excavation area, within the zone of influence. Additional tiltmeters were positioned in the middle of every third sleeper, 7.5 meters on both sides of the pipeline to monitor changes in cant.

For data visualization purposes, the data collected by the tiltmeters is used to create a profile of the track and approximate the maximum settlements along with cant information. The system is set up to trigger an alarm if movements exceed the predefined threshold values.

> “The immediate results for the client include accurate and reliable monitoring of the track's condition, with data being transmitted every 30 seconds. This allows for timely detection of any changes in the track's structure, reducing the risk of errors and ensuring robust monitoring.”

Jakob Larsen
Partner and Land Inspector
Lifa

Benefits

The benefits for the client include enhanced monitoring capabilities, leading to improved safety and reliability of the railway tracks. For the local community, the project ensures the safe installation of district heating pipes without compromising the integrity of the railway tracks. This contributes to overall public safety and the reliability of the infrastructure. The enhanced monitoring system ensures that any potential issues are identified and addressed promptly, thereby maintaining the continuous safe operation of the railway and supporting community confidence in public transportation and infrastructure projects.

Advantages

- Enhanced Monitoring Capabilities: The use of wireless tiltmeters provides continuous, real-time data every 30 seconds, allowing for accurate and reliable monitoring of the track's condition and timely detection of structural changes.
- Improved Safety and Reliability: By offering precise monitoring, wireless technology contributes to the safe installation of district heating pipes without compromising the integrity of the railway tracks.
- Effective Data Visualization and Alarm System: The data collected by the wireless sensors is effectively used to create track profiles and calculate settlements. The system is set up to trigger alarms if any predefined threshold values are exceeded, enabling prompt response to potential issues.

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