

Monitoring Assets Affected by London Power Grid Tunneling

CLIENT: COSTAIN/BT TUNNELS

How wireless remote monitoring helped to safeguard critical assets affected by tunnelling activity and supported efficient progress of tunnel boring machines

Challenge

In February 2011 National Grid embarked on a seven-year project to upgrade London's electricity grid. This involved construction of a series of tunnels to house 400kV power cables, boosting capacity and access to renewable energy. Main contractor Costain was responsible for the civil engineering work.

Tunnel routes connected Willesden in the west to Kensal Green and Hackney in the east. A north-south route extended from Kensal Green to Wimbledon. Two tunnel boring machines (TBMs) were used to build the 32 km of tunnels. Costain was also responsible for monitoring assets along the route that may have been affected by the tunnelling.

They used Senceive technology at several sites where there was concern about the risk of settlement affecting critical assets, including British Telecom (BT) communications tunnels, the River Thames embankment wall and London Underground railway tunnels.

Solution

Costain engineers worked closely with Senceive experts to devise appropriate and cost-effective solutions.

In Camden, for example, a series of interconnected aluminum beams, each with a high-precision dual axis tilt sensor measured longitudinal settlement along a 100 m section of BT tunnel. With no wires, the installation was quick and easy. The movement sensors were connected via a gateway and BT's own lines. Stakeholders could see and interact with the feed of monitoring data which was updated four times an hour.

At the Thames embankment site, tilt nodes were installed on beams on the river side of the wall. Data was relayed wirelessly to the WebMonitor cloud server via solar-powered GPRS gateway.



Outcome

Each of these projects lasted several months and was effective in reassuring owners of third-party assets that movement levels were generally well within acceptable tolerances. As a result, a number of other sites affected by the London Power Tunnels project chose to use Senceive technology to safeguard at-risk infrastructure.

KEY POINTS

- **Complex tunnelling operations took place in close proximity to other critical infrastructure.**
- **Wireless monitoring solutions were quick to deploy and were adapted to work in varying conditions above and below ground.**
- **Monitoring data reassured asset owners and allowed tunnelling to go ahead with confidence.**