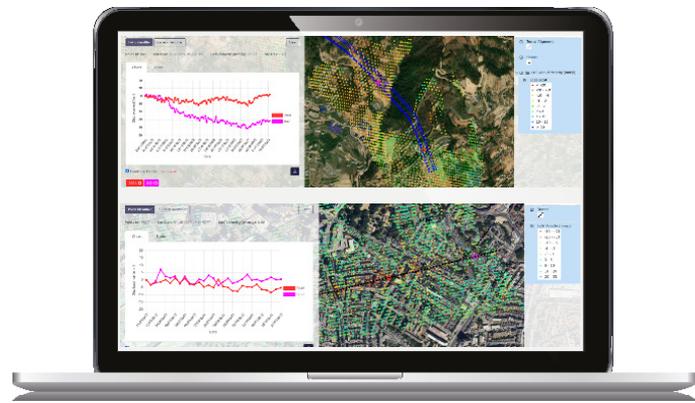


CASE STUDY

Tunnel Stability

Monitoring ground movement above tunneling operations is crucial for ensuring the safety and stability of surrounding infrastructure and environments. As tunnels are excavated beneath the Earth's surface, they can induce ground settlement or displacement, potentially leading to structural damage, land subsidence, or even surface collapses.



THE CHALLENGE

Tunnelling-induced ground movements can occur across a corridor tens of metres wide from the tunnel centreline, creating a very large area to be monitored. This makes in situ methods of ground surface and building displacement monitoring expensive and time-consuming to both set up and operate. The precision of in situ techniques, particularly in changing weather conditions, can be poor, making it difficult to detect the first signs of displacement early. Furthermore, since displacements can occur over a wide area, it can be difficult to reference them back to a known datum.

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QR CODE**
to find out
more.



CHANDRAGIRI TUNNEL, NEPAL

Tunneling operations in Nepal present unique challenges due to the region's rugged terrain, seismic activity, and the presence of soft, unstable soils in some areas. In such a dynamic environment, monitoring ground movement becomes particularly crucial. As tunneling operations in this area of Nepal were underway, stakeholders needed a way to monitor the stability of the surrounding ground with a higher level of accuracy than visual inspections allow. Using InSAR technology, Geofem monitored ground deformations along tunneling alignments with millimetric accuracy. From these insights, stakeholders could detect areas of displacement requiring further remedial attention before critical failures occurred.

BATTERSEA, LONDON

This project in London faced similar challenges. In a densely populated urban environment with extensive infrastructure networks, historical buildings, and variable geology. Many of London's structures are historic or heritage buildings, which may be more vulnerable to ground movement than modern constructions. Moreover, London's extensive infrastructure, sewers, water mains, and underground transportation networks like the Tube, poses a risk of interference and damage during tunneling.

Monitoring ground behaviour, therefore, is essential to the preservation of cultural assets and useful in preventing accidental damage to utilities, minimising service disruptions and costly repairs. Project managers could assess areas of accelerated displacement requiring further attention without needing to disrupt vehicular and pedestrian traffic in the busy city centre.