



PROJECT CASE STUDY

Rapid vibration monitoring supports ground stabilisation works above a historic railway tunnel.

- ▶ Monitoring plan developed within one week.
- ▶ Five vibration sensors installed inside the tunnel with automated alerts and daily reporting throughout the works.
- ▶ Site delays avoided.

How we helped our customer

Summary

Pill Tunnel is a 608-metre-long railway tunnel on the Portishead line near Bristol. Originally used to transport goods between the Port of Bristol and Temple Meads, the route is currently out of operational use and forms part of the wider programme to restore passenger services to Portishead.

As part of the regeneration works, QTS Group was appointed by Network Rail to undertake stabilisation of the mixed cutting slopes above the tunnel's western portal. The permanent works comprised ground anchors and active netting installed into the embankment.

Before drilling could proceed, monitoring was required to assess whether vibrations generated by the works could affect the tunnel lining. With the construction programme already under way, DYWIDAG was engaged to provide a fast, robust monitoring solution that could be agreed quickly and implemented without holding up site progress.

Working with QTS Group, Network Rail, JNP Group and Jameson Acoustics, DYWIDAG prepared the structural monitoring plan, installed five vibration sensors inside the tunnel and provided automated alerts and daily reporting throughout the remaining works.

► Location	Pill, near Portishead, Bristol
► Client	Network Rail
► Timeline	April to May 2026
► Partners	Principle contractor – QTS Group Specialist sub contractors – JNP Group, Jameson Acoustics
► Products & Services	Worldsensing vibration sensors, Infrastructure Intelligence, monitoring design, installation.

Project wins

Rapid monitoring design: A complete structural monitoring plan was developed and agreed within one week, avoiding further disruption to the construction programme.

Targeted vibration monitoring: Five sensors were positioned inside the tunnel to monitor the section directly beneath the ground stabilisation works.

Clear reporting and alerts: Infrastructure Intelligence provided remote access to monitoring data, supported by automated threshold alerts and daily reports.

Works completed without a trigger breach: No vibration levels exceeded the agreed thresholds during the monitored works.



The Challenge

QTS Group was undertaking ground stabilisation above the western entrance to Pill Tunnel, using ground anchors and active netting to provide a permanent remedial solution to the cutting slopes.

A suspected gap between the tunnel lining and the internal bore raised concerns that vibration from drilling could disturb material behind the lining or cause damage within the tunnel. Monitoring was therefore required before the anchor installation could continue.

The monitoring strategy needed to define suitable vibration limits, establish natural baseline conditions and provide timely notification if activity approached the agreed thresholds.

Time presented an additional challenge. The site works were already in progress and an extended ground investigation would have delayed the programme. DYWIDAG needed to develop a technically sound monitoring approach quickly, coordinating input from the designer, vibration specialist, principal contractor and Network Rail asset engineers.

The Solution

DYWIDAG was appointed to design and deliver the structural monitoring system for the tunnel.

Working with JNP Group and vibration specialists Jameson Acoustics, the UK Structural Health Monitoring team developed a monitoring plan covering the remaining ground stabilisation works. The plan defined two response levels: a transmission threshold and an alert threshold.

Five wireless vibration sensors were installed inside the tunnel using a PASMA scaffold tower. The sensors were positioned at five-metre intervals, extending from approximately 0.5 metres inside the tunnel entrance to 20.5 metres. This arrangement covered the area beneath the ground anchor installation works.

The equipment initially recorded five days of baseline data to identify natural variations within the tunnel. Suggested trigger levels were then established with reference to BS 5228-2:2009 and agreed with the project stakeholders before drilling commenced.

Data from the sensors was transmitted remotely to DYWIDAG's Infrastructure Intelligence platform. Automated alerts were configured against the agreed thresholds, while daily reports gave QTS Group a clear record of vibration activity throughout the works.

The monitoring plan initially considered rotational sensors on beams within the tunnel crown. Following further review, these were deemed unnecessary. Instead, pre- and post-works laser scans were used to provide a comparative record of the tunnel and identify any movement associated with the works.



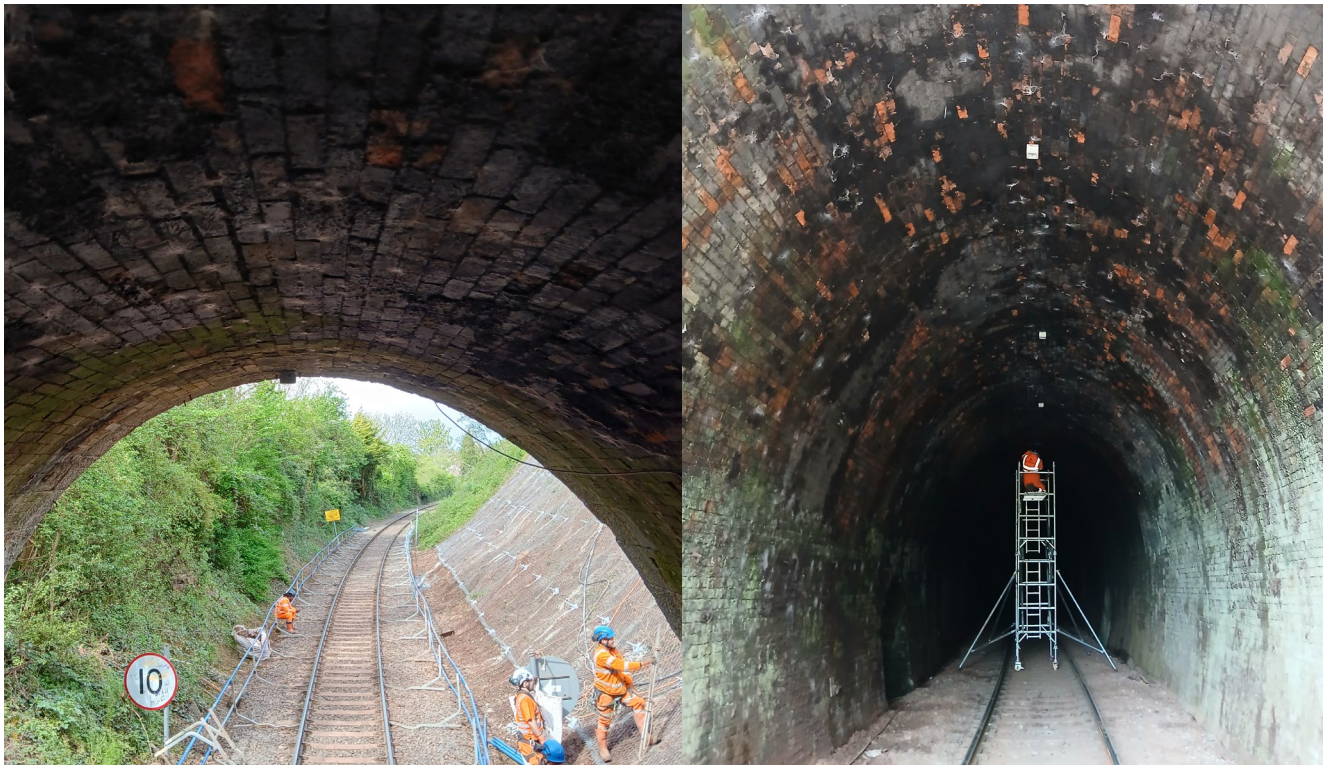
The Result

The monitoring system was developed, agreed and installed within the required timeframe, allowing the ground stabilisation programme to continue without further delay.

No vibration trigger levels were breached during the works. A small increase in activity was recorded while anchors were installed close to two of the sensors, but the readings remained within the agreed limits.

The combination of baseline monitoring, automated alerts, daily reporting and comparative laser scanning gave the project team clear evidence of the tunnel's response during construction.

By coordinating the monitoring design across QTS Group, Network Rail, JNP Group and Jameson Acoustics, DYWIDAG delivered a practical monitoring system that supported the safe completion of the stabilisation works without incurring additional stand-down time.



“It was a pleasure to be involved with an interesting project working with Dywidag to produce the structural monitoring plan and to play a small part in the reopening the Portishead line.”

- Jonathan Hartley, Senior Structural/Rail Engineer, JNP Group

“DYWIDAG delivered a practical and responsive monitoring solution, working collaboratively with the wider project team to provide confidence that the works could proceed safely while protecting this important railway asset.”

- Andrew Jameson, Jameson Acoustics



Creating safer, stronger, and smarter structures

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