



HS2 C1 – Pynesfield Quarry Project Case Study

Location:

Hertfordshire, UK

Client:

SOCOTEC UK

Application Summary:

Monitoring settlement beneath, and consolidation of chalk backfill

Tags:

ipx; settlement; consolidation; extended-through-fill;

Description:

HS2's 16km twin TBM tunnels running beneath the Chilterns to the North-West of London will produce some 2.5 million tonnes of spoil. This spoil, comprising primarily chalk and some flint, is mixed into a slurry at the TBM site, pipelined out of the tunnels to desiccation plants where the water is removed and recycled, and the excavated chalk is used as backfill to create a 127-hectare wildlife haven featuring new grassland, woodland, wood pasture and wetlands habitats. This landscape will rise to up to 20m above the original ground level where a drainage layer has been placed.

The In-Place Extensometer was used, in conjunction with In-Place Inclinoimeters and Piezometers to monitor both the original ground, and the stability of the backfill material. Extensometers were installed in 26 boreholes across the site ranging from 8 to





12m deep, each with 3-4 sensors installed within the borehole. As filling progressed, additional sensors were added to monitor plate magnets placed within the backfill, allowing near real-time monitoring of ongoing consolidation of the treated chalk.

Key Benefits:

- Large Measurement Range
- Post-Installation Adaptability

Large settlements (up to 500mm) were expected within the original ground, and further consolidation within the fill material. The Osprey IPX offered a high precision settlement monitoring system with a large measurement range, easily adapted to accommodate larger movement, and, uniquely, the ability to extend the system and place additional monitoring points through the fill.

Related Articles:

First Million Cubic Metres Laid, as Part of the Chiltern Grassland Transformation

"Going forward SOCOTEC UK will continue to monitor the quarry as it is transformed with further chalk from the tunnels to form the new grassland. The project is ongoing for SOCOTEC UK, with the monitoring systems we have put in place we can ensure the quarry transforms as planned"

<https://www.socotec.co.uk/media/news/socotec-uk-delighted-first-million-cubic-metres-chalk-has-been-laid-part-chiltern>

A Bridge so Far: HS2's Colne Valley Viaduct

"It's like building a mountain out of toothpaste, and it was challenging in the first winter to do earthworks."

<https://www.constructionnews.co.uk/project-reports/a-bridge-so-far-hs2s-colne-valley-viaduct-28-02-2023/>

HS2 Recycles Tunnel Chalk to Form 127 Hectare Wildlife Haven

"The south portal project is one of the most important parts of our Green Corridor programme to establish better connected, sustainable and biodiverse landscapes along the route of the new railway and will contribute substantially to HS2's carbon reduction target. It's great to see how much chalk has already been laid on site and I look forward to seeing the site completely transform over the coming years."

<https://thebusinessmagazine.co.uk/esg/hs2-recycles-tunnel-chalk-to-form-127-hectare-wildlife-haven/>

In Her Majesty's (Express) Service

"Some 2.5 million tons of excavated earth will be used to create a chalk grassland ... eventually, this area will be landscaped in a new nature reserve consisting of calcareous grasslands, which will be beneficial to biodiversity, wildlife, and nearby communities."

<https://www.bouygues.com/en/publications-at-a-glance/magazine/in-her-majestys-express-service/>

