Popham Rock Cutting Stabilisation

Client:
Network Rail

Location:
Popham Cutting - Overton, Basingstoke and Deane

Summary

Known locally as Popham Rock Slopes, this 40m deep chalk cutting is sandwiched in between two tunnel systems on the DC electrified Bournemouth Main Line (Waterloo to Northam Short Mile) on the Wessex Route. Our remit was to reduce the risk of weathered chalk blocks being eroded from the cutting slopes and potentially landing within the cess and four foot.

Project Overview

Emergency works targeting the heavily vegetated slopes was previously undertaken in late 2021 by Network Rail, also producing a detailed design for a permanent solution consisting of Active Netting/Anchor systems and Debris Catch Fences.

During the tender process, CML's engineers, working with our design partners Atkins, identified opportunities to value engineer the scheme, significantly reducing the cost and delivery programme whilst still achieving the clients desired outcomes. The initial re-design cut nearly £1M from the tender price to deliver the scheme.

A detailed design was produced consisting of a draped netting system, designed to cover the full slope for the eastern and western slopes and from the crest to just above the tunnel portal for the portal slopes.

Successes

The design and delivery team achieved tangible cost, programme and safety improvements through a value engineering exercise conducted at tender stage. One of the main efficiencies of the re-design was reducing the number of stabilisation anchors from over 1600nr down to 310nr, providing significant cost and programme savings, also reducing potential exposure to Hand Arm Vibration.

At the toe of the cutting, Road Rail Mounted Marini drilling rigs were utilised during possession / isolation working, both improving productivity and further reducing exposure to HAVS.

CML's site team were pro-active engaging with the local community and developed a good working relationship with our railway neighbours adjacent to the cutting. This resulted in zero complaints from our lineside neighbours and retained good working relationships for future access.

Project Overview Continued

The design was based on using a passive rock netting system using Geobrugg high tensile netting secured with anchors at the crest and the toe and contour anchors at the back of the slope bench on the eastern and western slopes. A second row of anchors were installed above the basal row with leashes on the portal slopes to prevent against catastrophic failure due to bulging.

Some of the upper slopes and the crest fall within a designated Site of Specific Scientific Interest (SSSI) known as the Micheldever Spoil Heaps. Our engineers liaised closely with Natural England during the design and planning phase to understand the site constraints and ensure a smooth assent process to progress the works to the satisfaction of Natural England as well as our client.

"Site visit with CML at Popham Cutting - The site and compound area is to a very high standard with good signage, tidy welfare facilities, first aid facilities, paperwork, white boards for daily briefs and close calls. The Site Manager gave a good clear brief and the communication on and off site was also good. Nice to see CML setting a standard that in my opinion is the best I've seen. Well done and keep up the good safety culture."

Extract from Network Rail Works Delivery Site Inspection carried out by NR HSEA

Challenges

Suitability anchors were installed to verify the design, which were all successful. However during construction it was identified that a number of working anchors began to fail. Investigations indicated that a failure was occurring at the interface between the bar and the grout, caused by a chemical reaction between the chalk and the grout. A review of the grout mix combined with deeper anchors and upgraded bar specification resolved the problem, with additional pull tests carried out to verify the revised design changes.

Prompt action and a pro-active approach from the team resulted in minimal delays to the programme and a suitable solution was swiftly identified and implemented. CML's engineers and our designers Atkins engaged with the local university who were keen to use the site as a case-study to both assist with the investigation into the failed anchors and to improve our understanding of the challenges associated with working in chalk cuttings.