PROJECT CASE STUDY

Engineering Resilience: Innovating coastal stability at Dawlish

- Complex cliff stabilisation
- Exemplary collaboration
- Pioneering combination steel tendon system
- Major cost savings

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How we helped our customer

Summary

The Southwest Rail Resilience Programme (SWRRP) is a multi-phase initiative by Network Rail to secure a critical stretch of the UK's coastal railway line. In Phase 4 of the programme, the team faced the challenge of stabilising the cliffs between Dawlish and Holcombe—an area historically vulnerable to landslides and weather-related disruption.

This section of railway is vital for the Southwest of England, connecting Exeter, Plymouth, and beyond. Past storm events, including severe cliff collapses and track washouts, underscored the urgency of a durable, future-proof solution.

Working with Tony Gee Partners and BAM, DYWIDAG were engaged early in the process under a collaborative working agreement. Facing budget considerations and a stringent design life of 100 year, the team committed to an intensive, design-led partnership to approach geotechnical stabilisation in corrosive coastal conditions.

Location	Dawlish to Holcombe, South Devon,, UK
Client	Network Rail
Timeline	Phase 4 of SWRRP – 2023 to 2024
Consulting engineer	Tony Gee Ltd
Principal contractor	BAM
Geotechnical contractors	BAM Ritchies, and CAN
Products	Combination soil nails comprising marine grade 316 HCR Stainless Steel and Galvanized GEWI Plus Threadbars

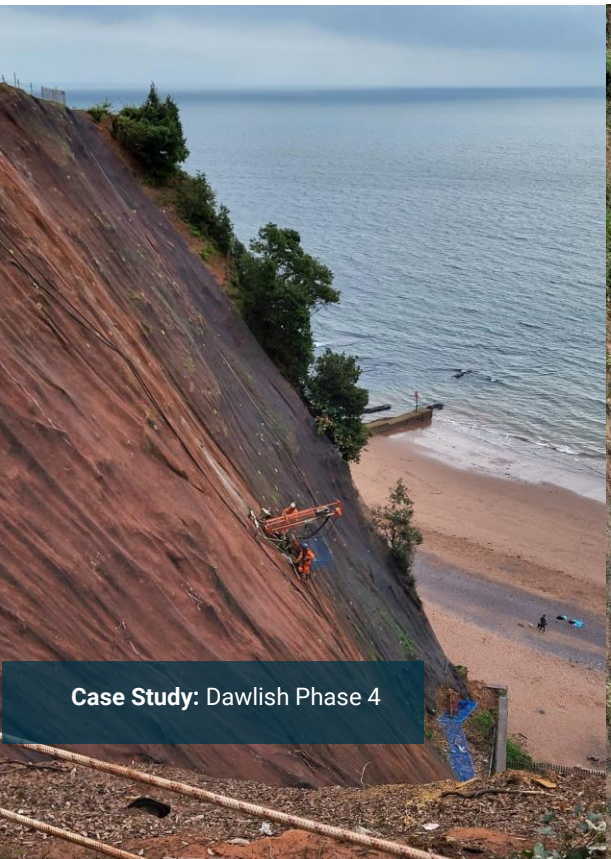
Project wins

Innovative engineering: Developed a UK-first hybrid soil nail system combining materials for optimal performance in coastal environments.

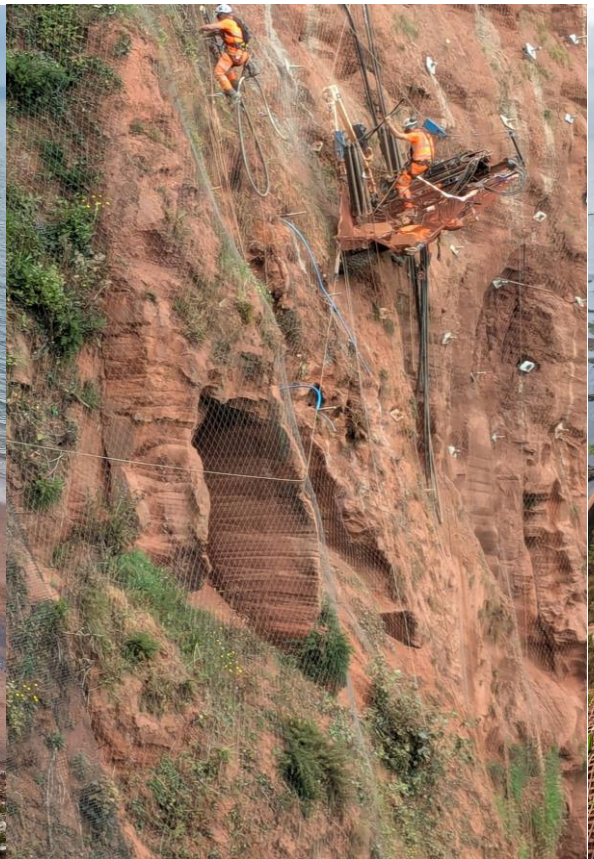
Risk management: Factory-assembled couplers ensured long-term integrity.

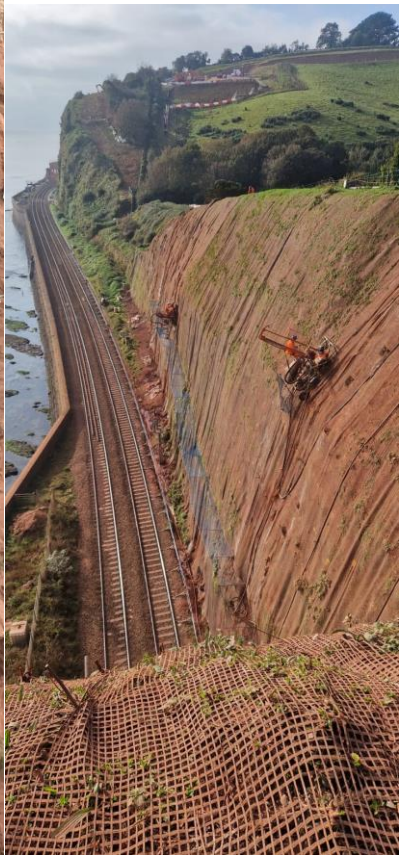
Cost optimisation: £7m saved versus traditional stainless-steel approach, while retaining a 100-year design life.

Exemplary collaboration: A tightly integrated partnership between BAM, Tony Gee and CAN, working in step with Network Rail.



Case Study: Dawlish Phase 4





The Problem

As part of the Southwest Rail Resilience Programme, a 1.2 km stretch of coastal cliffs between Dawlish and Holcombe required urgent stabilisation to safeguard a critical section of the rail network connecting the Southwest of England. This exposed section is subject to continual geological movement and extreme marine conditions — demanding a solution that could deliver long-term performance with a 100-year design life.

While the original design called for full-length stainless steel soil nails to meet durability standards, the associated costs proved financially unfeasible within the constraints of Network Rail's budget. The project team was tasked with identifying an alternative solution that could deliver equivalent technical performance, minimise long-term maintenance requirements, and remain cost-effective. Balancing these demands presented a significant design and engineering challenge, requiring innovation in both material selection and system integration.

The Solution

A collaborative value engineering approach led to the development of an innovative, UK-first combination tendon system—delivering the required durability at a fraction of the cost of full-length stainless-steel soil nails.

The solution integrated a 1.5-metre section of marine-grade 316 HCR stainless steel bar at the exposed nail head—where corrosion risk is highest—paired with a 9.5-metre GEWI® Plus galvanised bar for the embedded section. These components were connected using a bespoke transition coupler, specifically designed to accommodate the different thread forms and ensure a secure mechanical connection.

To mitigate the risk of galvanic corrosion between dissimilar metals, the coupler assembly was protected with a heat-shrink sleeve that created a sealed barrier against moisture ingress. This hybrid design not only reduced material costs but also met all technical requirements for longevity and performance in a harsh coastal environment.

The Result

The Dawlish cliff stabilisation project delivered a robust and forward-thinking solution that successfully addressed both the technical and financial challenges of working in an aggressive coastal environment.

Over 6,200 soil nails, totalling 60 kilometres in length, were installed to secure the 1.2 km stretch of cliff face, achieving the required 100-year design life. By developing and implementing the combination soil nail system, the project team reduced overall costs by £7 million compared to a full stainless-steel solution — a saving that made the full scope of the project financially viable.

This approach has since set a new standard for coastal ground engineering, showing how strategic material selection and smart system integration can unlock long-term value. It now serves as a model for future infrastructure resilience projects in similarly challenging conditions.

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