Low Energy Rockfall Barrier Protects Shetland HVDC Substation Construction Site

Shetlands



TYPE OF PROJECT	YEAR OF CONSTRUCTION	CLIENT	CONTRACTOR	DESIGNER
Dynamic Rockfall Barriers	**2025**	**SSEN**	**Breeze Landscaping And Plant Hire Ltd On Behalf Of BAM Nuttal**	**NA**

PROD. RELATED
Rockfall Barriers (340m)

Challenge

The Shetland HVDC link, approved in 2020 after more than a decade of development, is a landmark project that connects Shetland to the Great Britain transmission network for the first time. This critical energy infrastructure unlocks the island's renewable energy potential, supports the 443MW Viking Wind Farm, and contributes to the UK's net-zero carbon targets.

As part of the project, a 320/132kV substation and HVDC converter station were constructed at Kergord. The works required significant bedrock excavation, resulting in a 6-metre-high exposed rockface formed within the Weisdale Limestone Member. Following excavation, sections of the rockface showed signs of instability, including ravelling and loose material.

This created a high rockfall risk to workers operating in the adjacent storage yard at the base of the slope. Without mitigation, falling debris posed a serious safety hazard, making effective rockfall protection essential to maintain safe construction operations.



Energy dissipating device connected to lateral anchor



Energy dissipating device connected to lateral anchor

Solution

Maccaferri was engaged by BAM Nuttall, via local contractor Dave Breeze, to design and supply a rockfall protection system tailored to the site conditions. The requirement was for a low-height, high-performance solution capable of intercepting falling debris while integrating efficiently within the construction environment.

A detailed engineering assessment was carried out, including site inspections, rockface analysis, and rockfall trajectory simulations using Rocscience Rocfall 2. These simulations evaluated potential impact energies, bounce heights, and runout distances to determine the most effective mitigation strategy.

Based on this analysis, the RB35 low-energy barrier (LEB) system was selected. Installed at a height of 1.35 metres and designed to withstand impact energies of up to 35kJ, the barrier provided an optimal balance between performance, footprint, and cost-effectiveness for the identified hazard.

To ensure long-term durability in a moderate corrosivity environment, Maccaferri specified its Galmac C3 coating, delivering a design life exceeding 50 years. This ensures minimal maintenance and reliable performance throughout the lifespan of the infrastructure.

A total of 340 metres of RB35 rockfall barrier was installed around the storage yard in the northwest section of the site, creating a continuous protective system between the rockface and working area.

The RB35 system is part of Maccaferri's range of certified low-energy rockfall barriers, available in heights of 1.35m and 1.85m, with flexible foundation solutions suitable for soil, rock, or concrete installations.

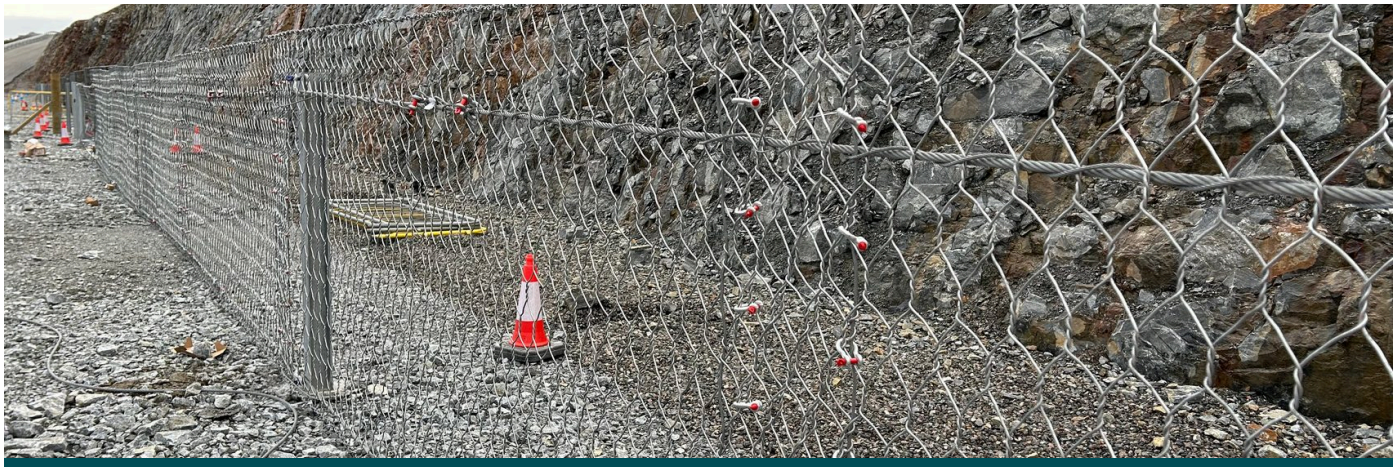
Performance is validated through full-scale dynamic impact testing in accordance with EAD 340089-00-0106 standards. Testing confirmed the barrier's ability to withstand 38kJ impact energy, retain 83.8% of its height after impact, and limit maximum elongation to 1.57 metres—demonstrating its reliability in real-world rockfall protection applications.



RB35 NP (no plate) 1.35m high posts set into concrete



Double twist interceptor mesh connected with shackles



Fully constructed RB35 NP 1.35m high rockfall barrier

Officine Maccaferri S.p.A. Via del Faggiolo, 1/12 40132 Bologna – Italy
Tel:+39 051 6436 000 E-mail: info.hq@maccaferri.com

OPEN GOOGLE MAPS

OPEN GOOGLE EARTH

Officine Maccaferri S.p.A. Via del Faggiolo, 1/12 40132 Bologna – Italy
Tel:+39 051 6436 000 E-mail: info.hq@maccaferri.com