Dynamic Barriers - Long Term Study

Knockan Crag, Scotland



TYPE OF PROJECT	YEAR OF CONSTRUCTION	CLIENT	CONTRACTOR	DESIGNER
Dynamic Rockfall Barriers	**2009**	**Scottish National Heritage**	**Skye Rope Access**	**URS**

PROD. RELATED
Rockfall Barriers ()

Challenge

Knockan Crag in northwest Scotland is internationally recognised as a landmark site for thrust tectonics and holds designation as a Site of Special Scientific Interest (SSSI). Located approximately 13 miles north of Ullapool, this remote and exposed location is subject to some of the most severe weather conditions in the UK, creating significant challenges for slope stability and infrastructure protection.

At the site of the “Rock Room” geology visitor centre, the terrain is dominated by a steep rock slope rising 20 to 30 metres with an inclination of 75 to 85 degrees. In 2008, a major rockfall incident occurred when several large boulders, measuring up to 2 x 1.5 x 1 metre, detached from the slope and fell towards the visitor centre. The rocks narrowly missed the structure, highlighting a critical safety risk to visitors and staff.

Given the increasing risk of rockfall hazards in this high-exposure environment, Scottish Natural Heritage (SNH) required a robust and reliable rockfall protection solution to safeguard the visitor centre while preserving access to this important geological attraction.



Dynamic Barrier completed at Knockan Crag in Jan 2009



Dynamic barrier condition in 2014 (view N) after 5 years on

Solution

Following a detailed geotechnical assessment and advanced rockfall trajectory analysis, URS's Derby office designed a tailored rockfall mitigation solution. The analysis identified potential rockfall paths, impact energies, and risk zones, enabling the specification of an effective protection system.

The Maccaferri CTR 10-04-B dynamic rockfall barrier system, with a maximum energy level (MEL) of 1000 kJ, was selected to protect the Rock Room. This high-performance rockfall barrier is engineered to intercept and absorb the energy of falling rocks, preventing them from reaching critical infrastructure.

Installation was completed in January 2009 using prefabricated system kits, which allowed for efficient deployment in the remote and weather-challenged location. The system included hot-dip galvanised steel posts, base plates, steel cables with integrated energy dissipaters, and high-strength interception mesh panels.

To ensure long-term durability in the aggressive coastal environment, all components were supplied with Class A corrosion protection, the highest standard available at the time.

A comprehensive inspection conducted after five years of service confirmed the effectiveness and resilience of the rockfall protection system. Despite continuous exposure to harsh weather conditions in the Coigach region, the barrier remained in excellent condition.

All primary structural components, including posts, base plates, steel ropes, interception mesh, and energy dissipaters, showed no signs of corrosion or degradation. Minor superficial corrosion was observed on a small number of accessory components, such as shackles, rope grips, and panel clips; however, this did not impact system performance or safety.

This case study demonstrates the long-term reliability of Maccaferri rockfall barriers in extreme environments. Modern systems now offer enhanced corrosion protection, incorporating advanced galvanisation techniques such as zinc and zinc/aluminium alloy coatings to further extend service life and performance.



Dynamic barrier condition in 2014 (view S) after 5 years on



Patented aluminium dissipaters unaffected by corrosion



Galvanised rope grips showing very slight surficial corrosion (2014).

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