



INNOVATIONS IN ROCKFALL BARRIER TECHNOLOGY: OPTIMIZING PERFORMANCE FOR LOW ENERGY IMPACTS.

Date 18 April, 2023

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Webinar Agenda



5' *Introduction*

20' *Effective rockfall barriers for Low Energy Impacts*

10' Live Q&A Session

Speaker:

Luca Gobbin – *Corporate Technical Specialist*



FUTURE AND ROCKFALL EVENTS

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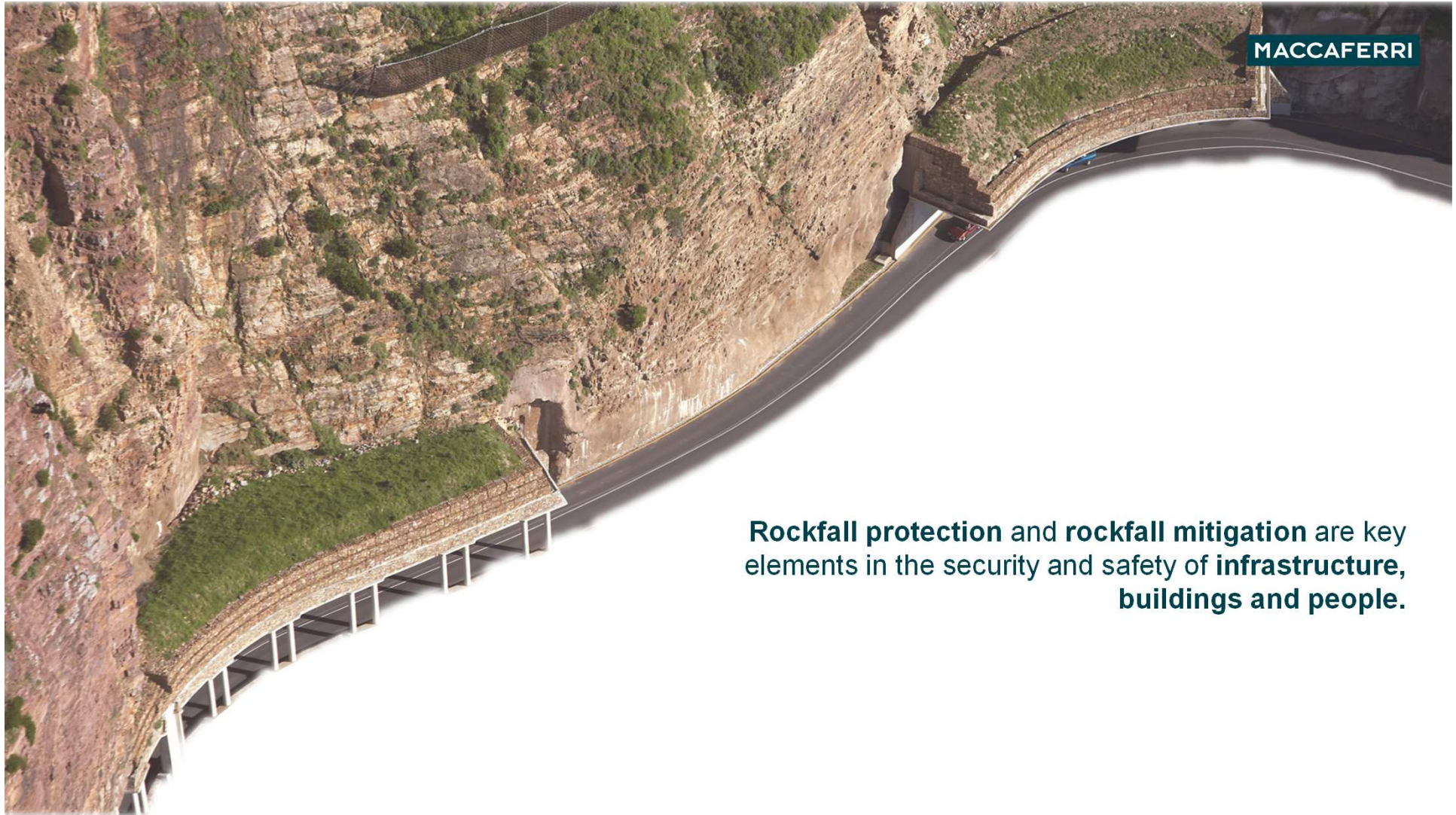
“

People and assets around the world are being exposed to a growing mixture of hazards and risks, in places and to an extent previously unrecorded.”

2019, Global Assessment Report on Disaster Risk Reduction (GAR)







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Rockfall protection and rockfall mitigation are key elements in the security and safety of **infrastructure, buildings and people.**



OUR COMMITMENT TO A CONTINUOUS IMPROVEMENT

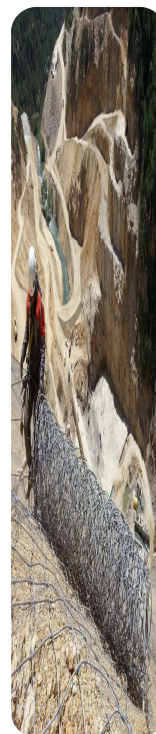
We have developed a **140 years' experience** in **geohazards mitigation systems**. Every day we work to apply the most appropriate solution to the specific hazard.



OUR PORTFOLIO

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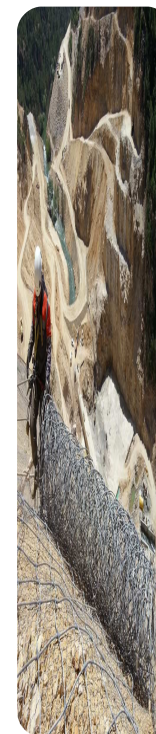
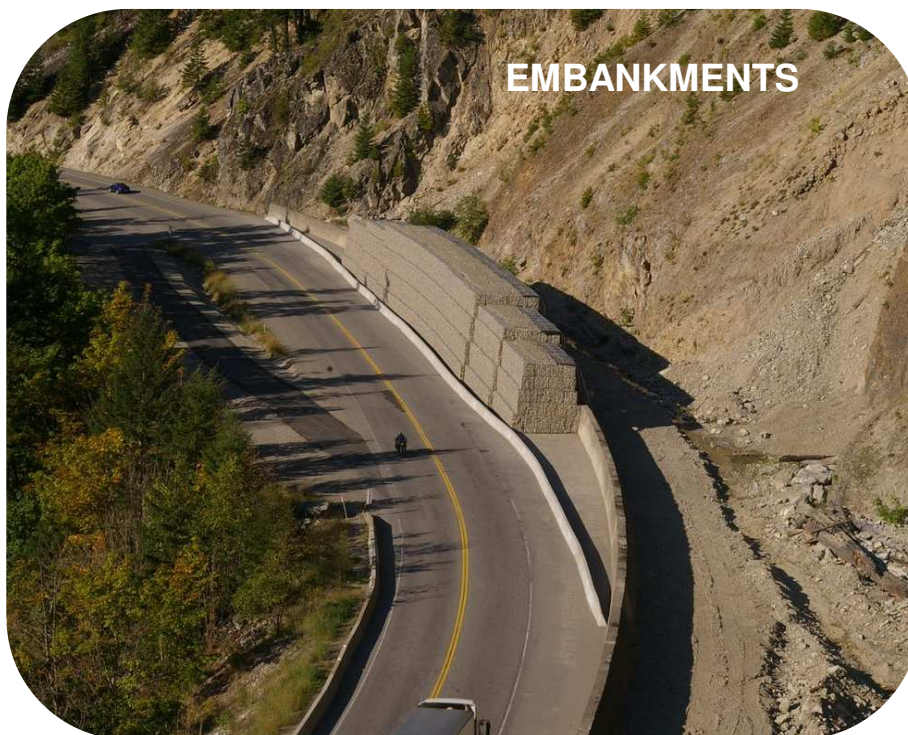
WIDE RANGE OF ROBUST AND EFFECTIVE SOLUTIONS



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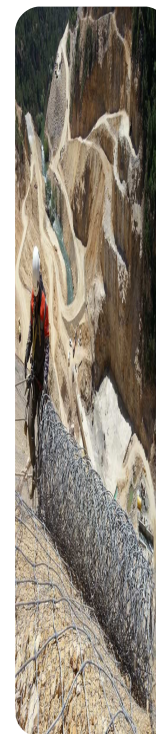
WIDE RANGE OF ROBUST AND EFFECTIVE SOLUTIONS



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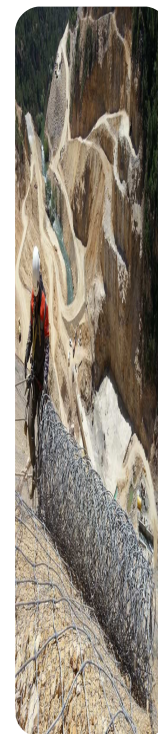
WIDE RANGE OF ROBUST AND EFFECTIVE SOLUTIONS



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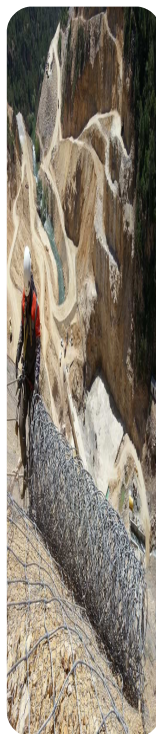
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ETA CERTIFIED ROCKFALL BARRIERS

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EAD

harmonised technical
specification developed by
EOTA

- Methodology to carry out the Full-Scale Crash Tests
- Definition of the controls on the production procedure and materials



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OUR NEW RANGE OF ROCKFALL BARRIERS

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With the aim of maximizing value for clients, we added a new range of rockfall barriers to our portfolio to mitigate hazards coming from low energy impacts.



WHY RISK AND UNCERTAINTY ANALYSIS IN THE ROCKFALL SECTOR?

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When facing a geohazard problem, we deal with risk.
Loss and damage are a function of hazard, exposure and vulnerability.

RISK

=

HAZARD

×

EXPOSURE

×

VULNERABILITY





HAZARD

it's the probability that a natural phenomenon such as a rockfall with a certain intensity occurs in a defined period of time and in a determined area.





EXPOSURE

it's the number of units (or "value") for each risk element presents in a certain area, such as human lives or settlements.



VULNERABILITY

of an element (people, buildings, infrastructures, economic activities) is the propensity to suffer damages as a result of actions induced by an event of a certain intensity. Our commitment is developing new solutions for minimizing the risk, in this case related to rockfalling.

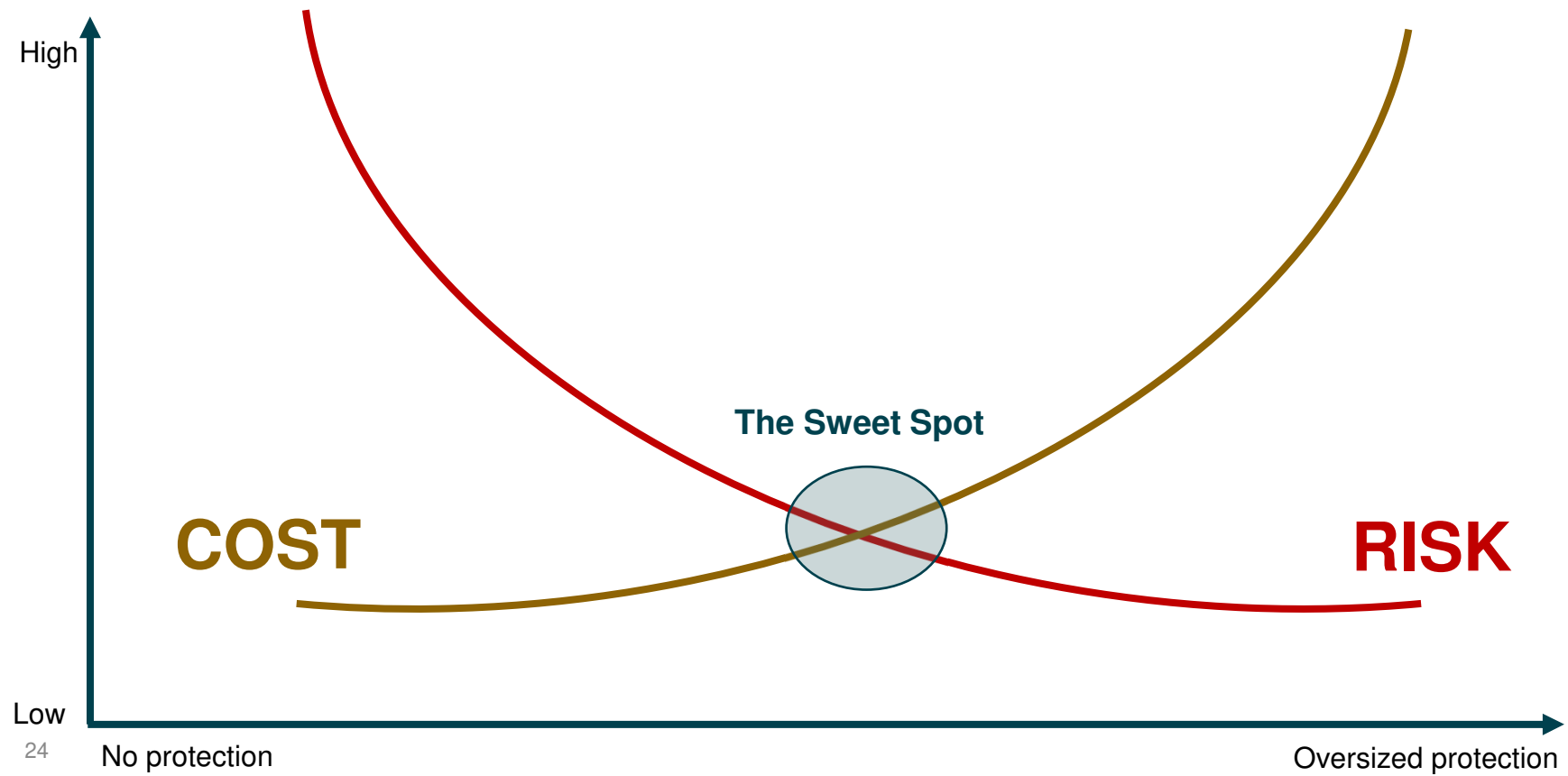
COST-EFFECTIVENESS IN ROCKFALL

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COST-EFFECTIVENESS IN ROCKFALL

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LOW ENERGY IMPACTS

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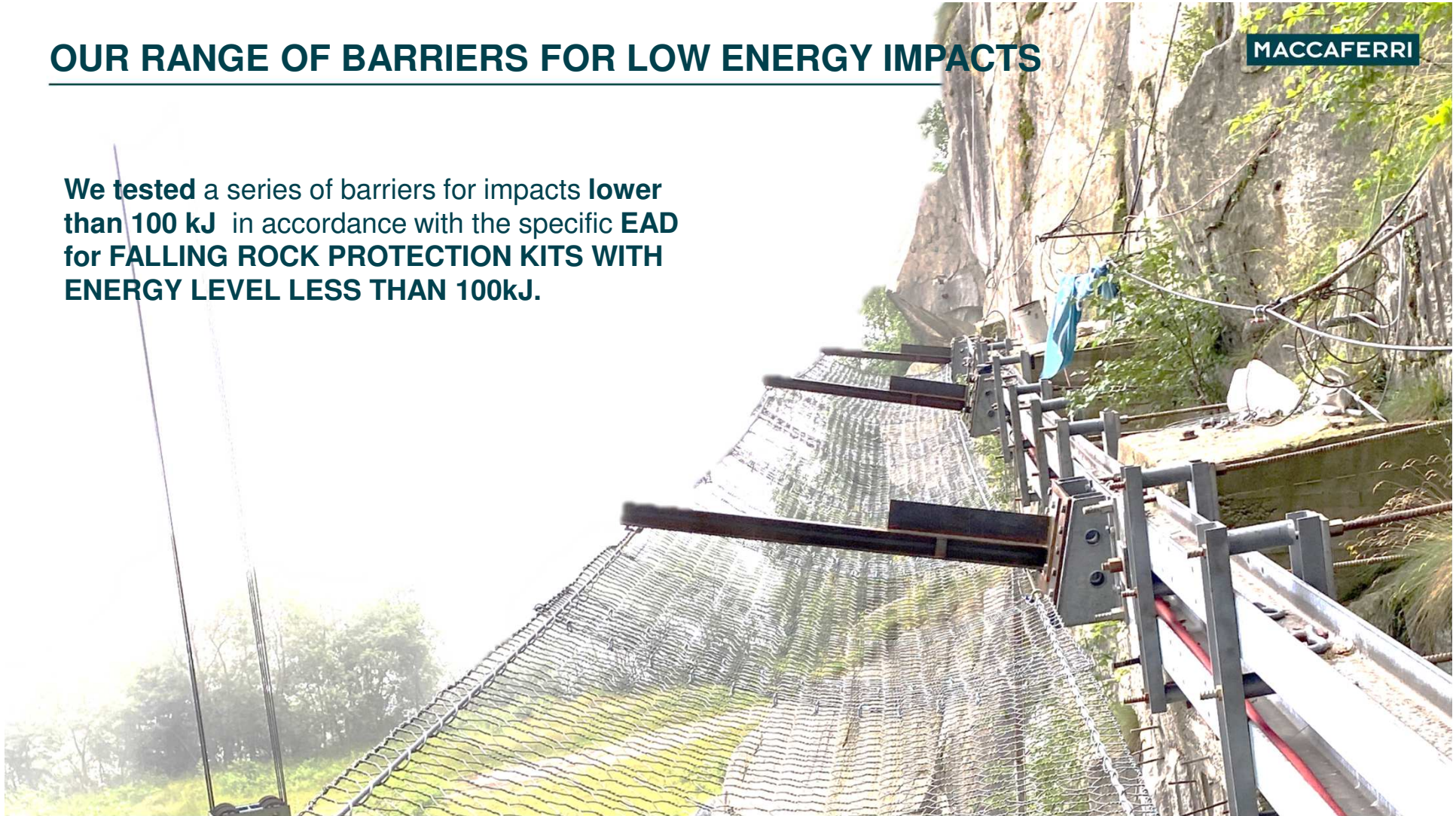
Even small debris can have a high disruption potential



OUR RANGE OF BARRIERS FOR LOW ENERGY IMPACTS

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We tested a series of barriers for impacts **lower than 100 kJ** in accordance with the specific **EAD** for **FALLING ROCK PROTECTION KITS WITH ENERGY LEVEL LESS THAN 100kJ.**



TESTING PROCEDURE

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EAD 340089-00-0106 GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL OF FALLING ROCK PROTECTION KITS WITH ENERGY LEVEL LESS THAN 100kJ – 2019



1. Defines the methodology to carry out the **Full-Scale Crash Tests**
2. Defines the **controls on the production and materials**



ETA (European Technical Approval)

European Organisation
for Technical Assessment

EAD 340089-00-0106

The Energy Level (EL) is defined as the highest level of energy to which the barrier can withstand. Actually, it is the **minimum value for the domain of resistance** of the barrier.

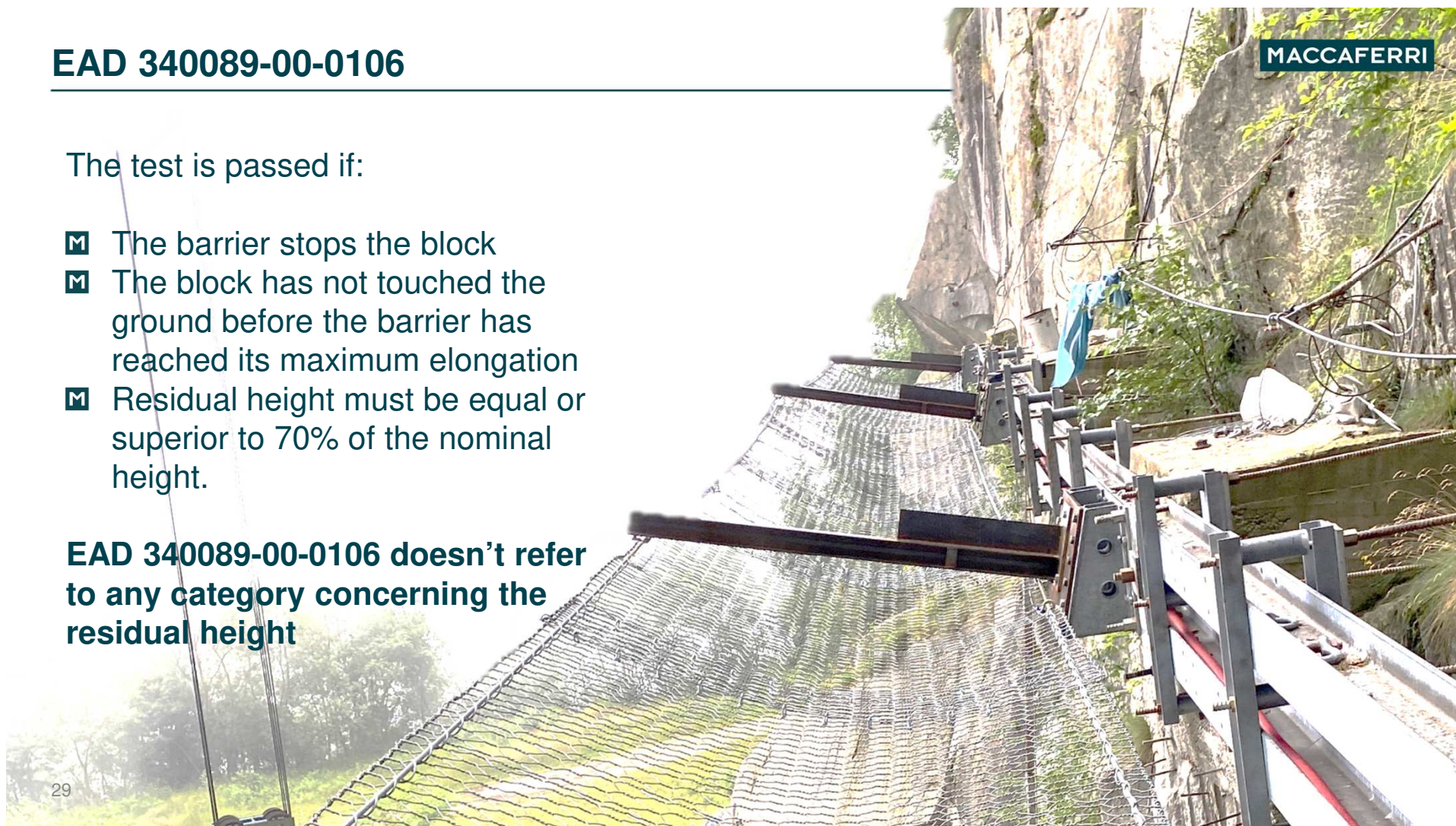


EAD 340089-00-0106

The test is passed if:

- The barrier stops the block
- The block has not touched the ground before the barrier has reached its maximum elongation
- Residual height must be equal or superior to 70% of the nominal height.

EAD 340089-00-0106 doesn't refer to any category concerning the residual height



EAD < 100kJ vs EAD ≥ 100 kJ

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What changes?

EAD 340089-00-0106

- ENERGY LEVEL (EL)
- NOT SEL 1
- NOT SEL 2
- NOT CATEGORIES FOR RESIDUAL HEIGHT



EAD 340059-00-0106 (EX ETAG 027)

- MEL
- SEL 1
- SEL 2
- RESIDUAL HEIGHT CATEGORY (MEL)

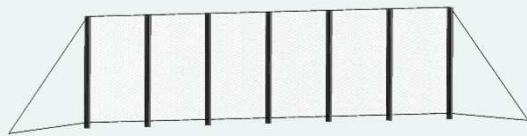
MACCAFERRI ROCKFALL BARRIER PORTFOLIO

Portfolio integration and enhancements

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NEW BARRIERS

LOW ENERGY BARRIERS EAD 340089-00-0106

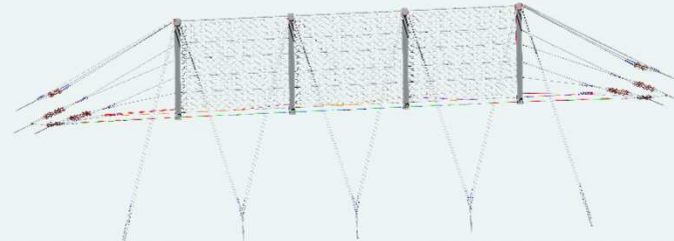


RB 35

RB 70

RB 35 H2

HIGH ENERGY BARRIERS EAD 340059-00-0106



100 kJ

RB 100-UAF

RB1000

RB 2000

RB 2000 H4

RB 9000

RB 750

RB 1500

RB 2000 H6

RB 3000

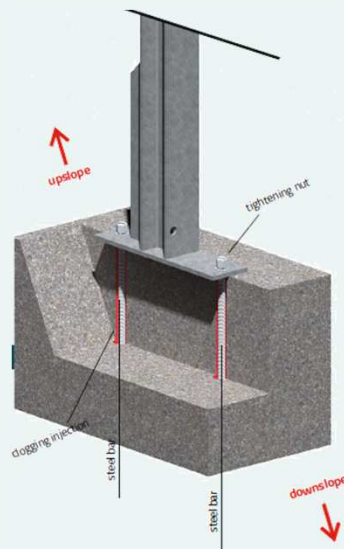
EPFM 5000

MACCAFERRI LOW ENERGY BARRIERS - PORTFOLIO

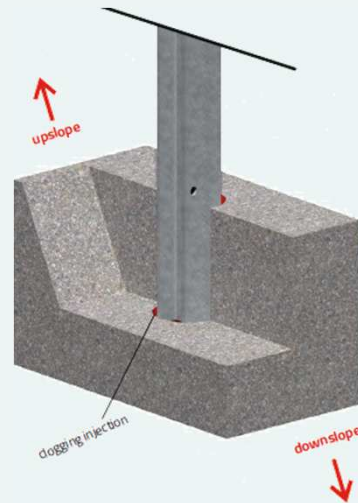
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RB 35, RB 35 H2 and RB 70 are available in 3 configurations:

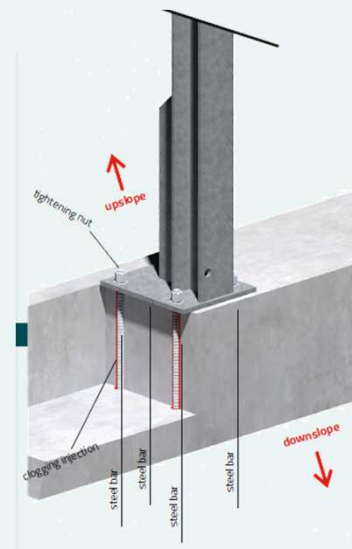
Standard configuration:
with 2 anchors
(for soil or rock)



NP configuration:
no plate at the base of the post
(for soil or rock)



CW configuration:
with 4 anchors
(for concrete wall)

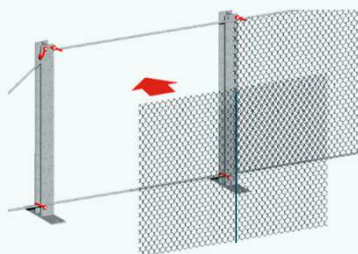


MACCAFERRI LOW ENERGY BARRIERS

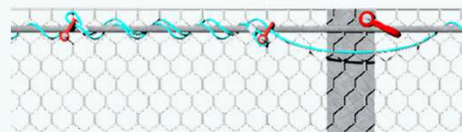
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RB 70 and RB 35

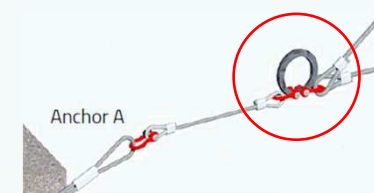
DT mesh **panels** of 4 m length



A sewing rope for the panel / longitudinal wire ropes connection

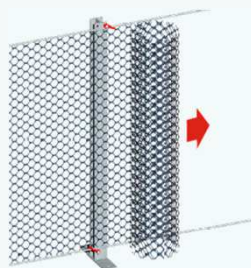


Energy dissipating device on lateral sides



RB 35 H2

DT mesh **rolls** of 21 or 31 m length



Shackles for the roll / longitudinal wire ropes connection

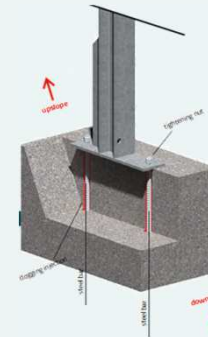
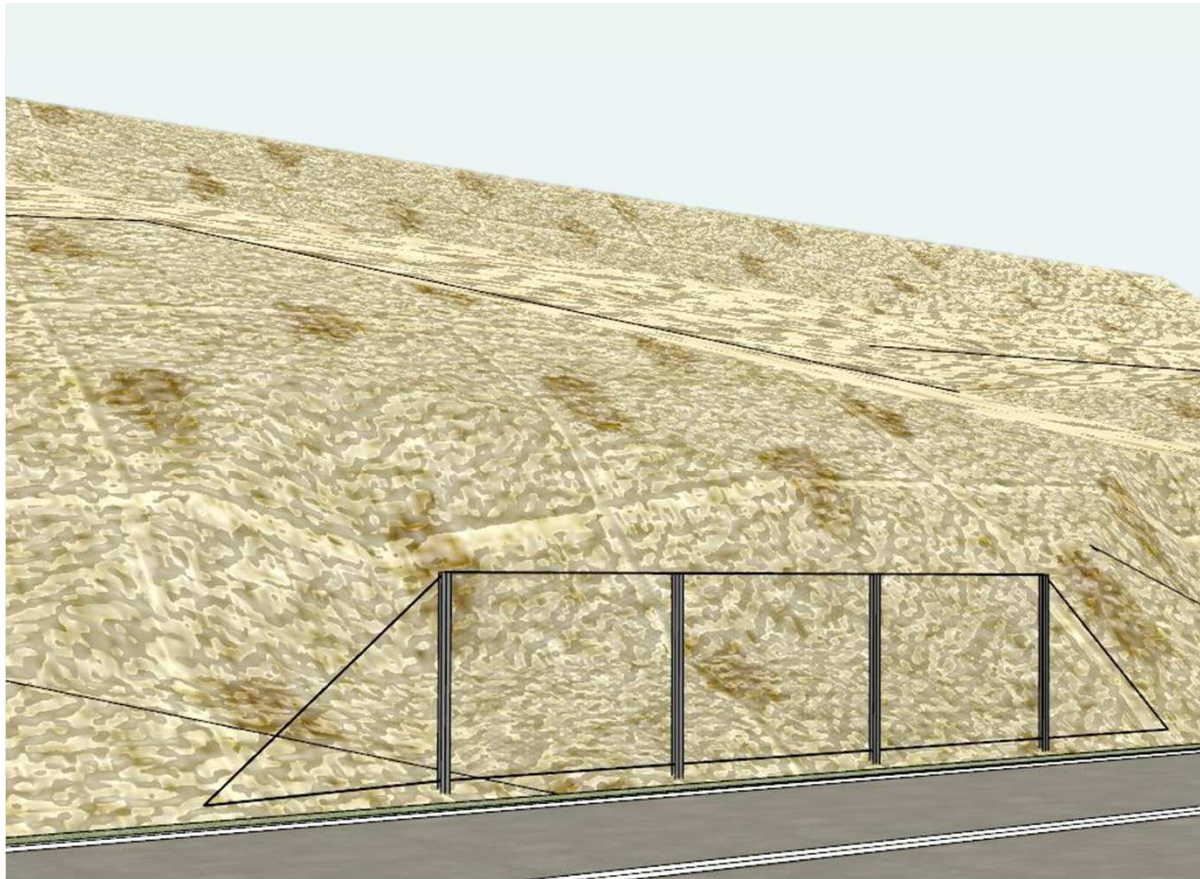


No energy dissipating device on lateral sides



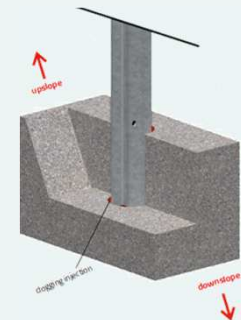
MACCAFERRI LOW ENERGY BARRIERS - ANCHORS

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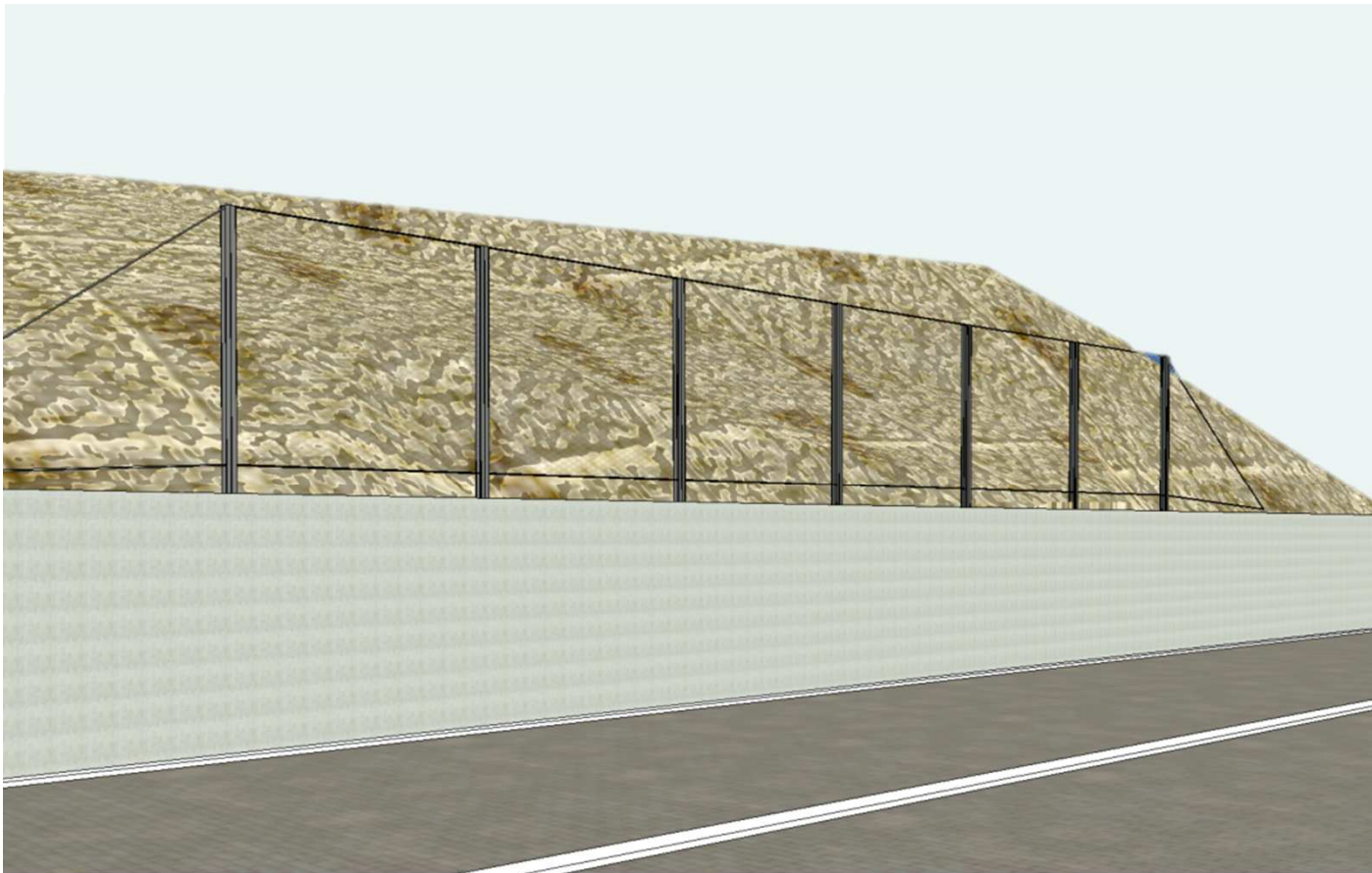
Standard configuration:
with 2 anchors
(for soil or rock)

NP configuration:
no plate at the
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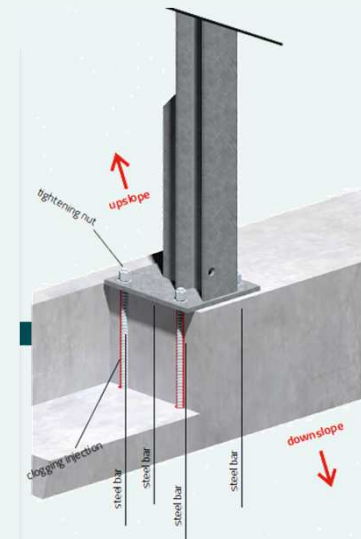


MACCAFERRI LOW ENERGY BARRIERS - ANCHORS

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CW configuration:
with 4 anchors (for
concrete wall)



In its

140 years of experience

Maccaferri has carried out thousands of projects around the world.



LE NOSTRE STORIE DI SUCCESSO

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Oggebbio, VCO (Italia)



LE NOSTRE STORIE DI SUCCESSO

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Oggebbio, VCO (Italia)



OUR SUCCESS STORIES

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Gorges du Creuset (38), Francia



OUR SUCCESS STORIES

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Gorges du Creuset (38), Francia



MACCAFERRI'S BARRIERS BENEFITS

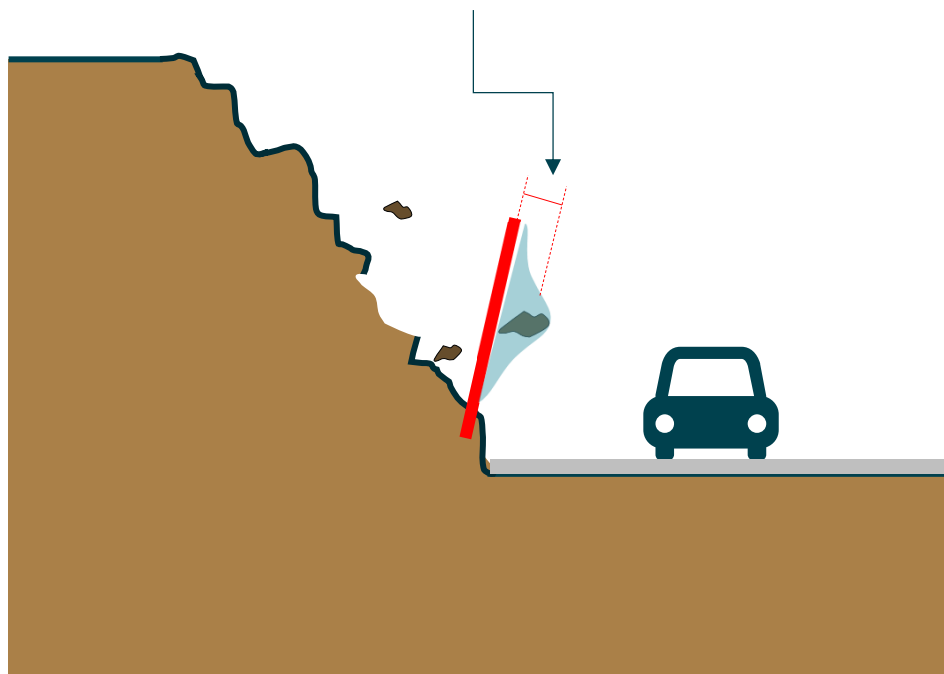
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SERVICEABILITY

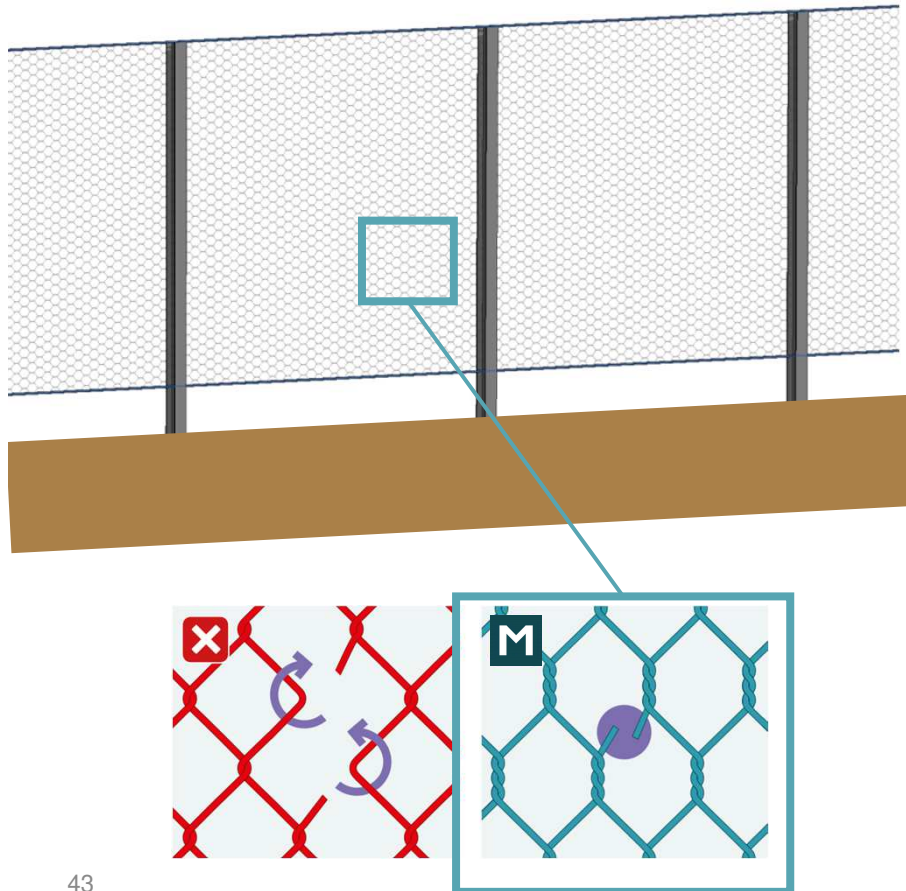
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The **maximum elongation** is an important aspect during the design because the barrier can be installed closer to the protected area



ENHANCED SERVICEABILITY

Maccaferri RB Rockfall Barriers are among **the barriers with the shortest elongation** on the market, **maximising the serviceability** of the protected asset.



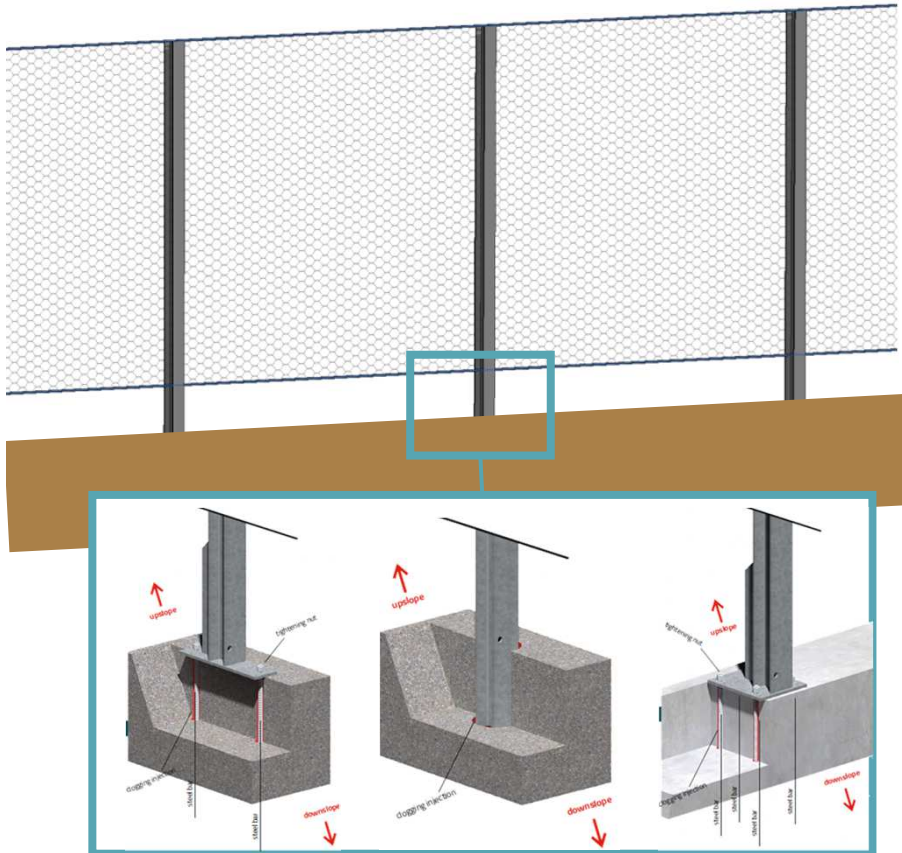
MORE PERFORMANCE

Rockfall Barriers interception structures are made with **double twisted wire panels**.

Double twist structure **prevents the opening of adjacent meshes** in case of wire break.

DESIGN OPTIONS

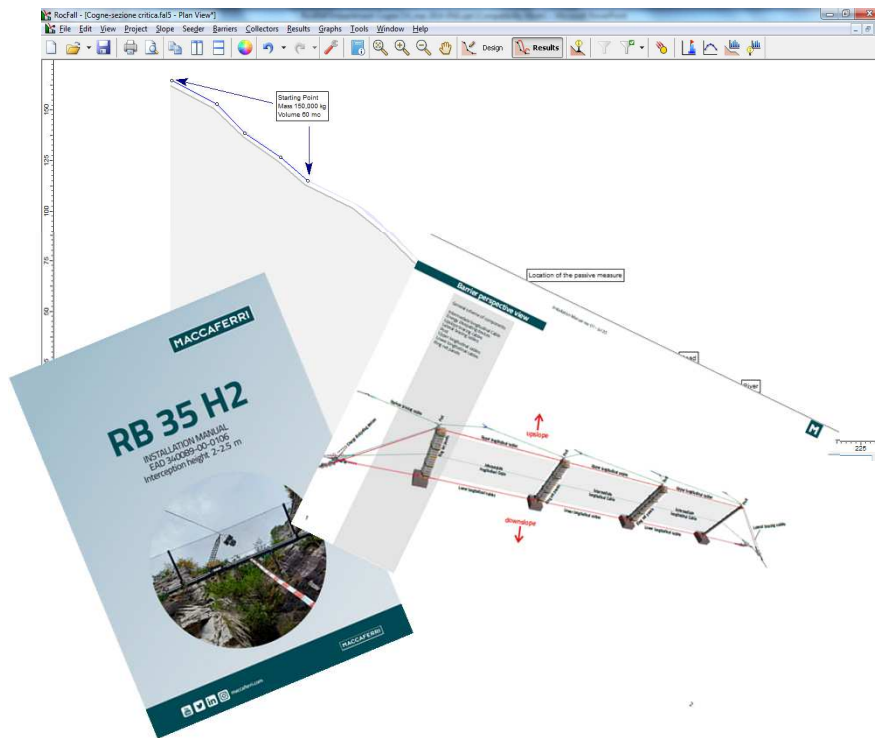
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LESS DRILLING

Foundations are an **economical fundamental aspect** during the **installation**.

Contractors look carefully at number and length of upslope, lateral & post anchors. Maccaferri low energy barriers have been **designed to provide a wide range of configurations** for anchoring the barriers (Standard, NP, CW) for **saving drilling operations costs**.



Choosing Maccaferri barriers means having a **specialized support** during all the project phases:

➤ **Design** (choice of the barrier)

Installation support (staking out)

Certificate of correct installation & Maintenance guide

SMART ROCKFALL BARRIERS

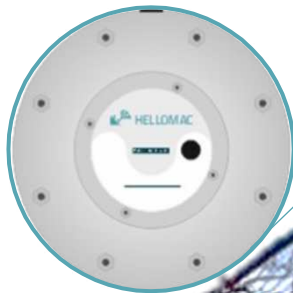
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MAKE YOUR ROCKFALL PROTECTION SMARTER

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HELLOMAC in our next
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STAY TUNED!



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LIVE Q&A

