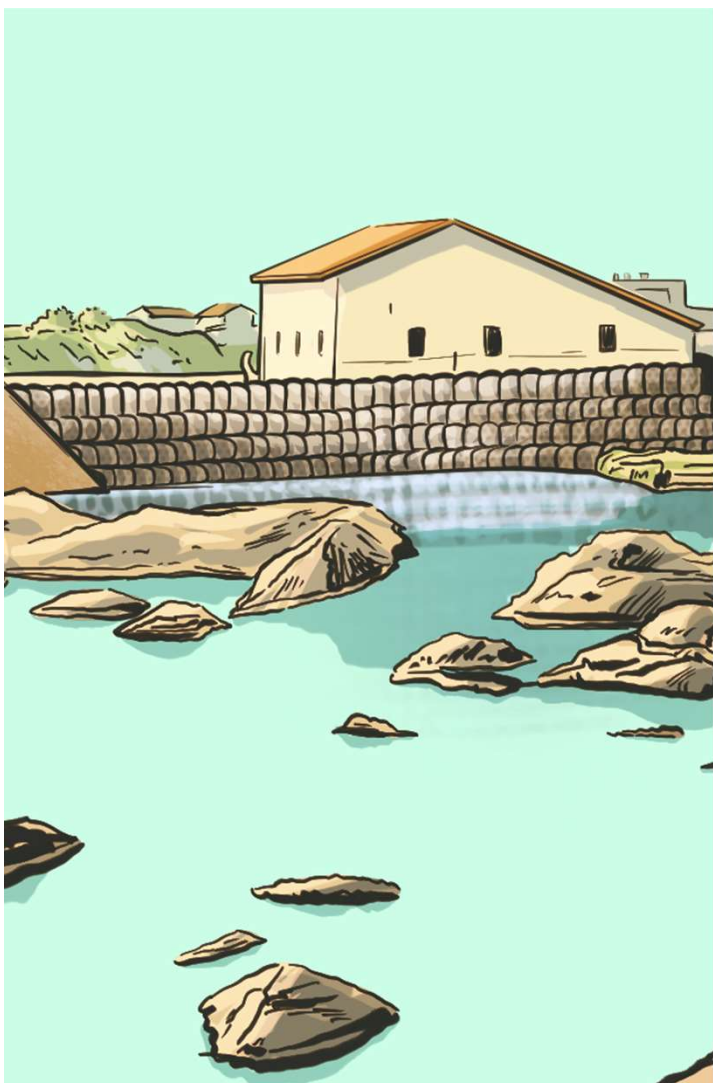
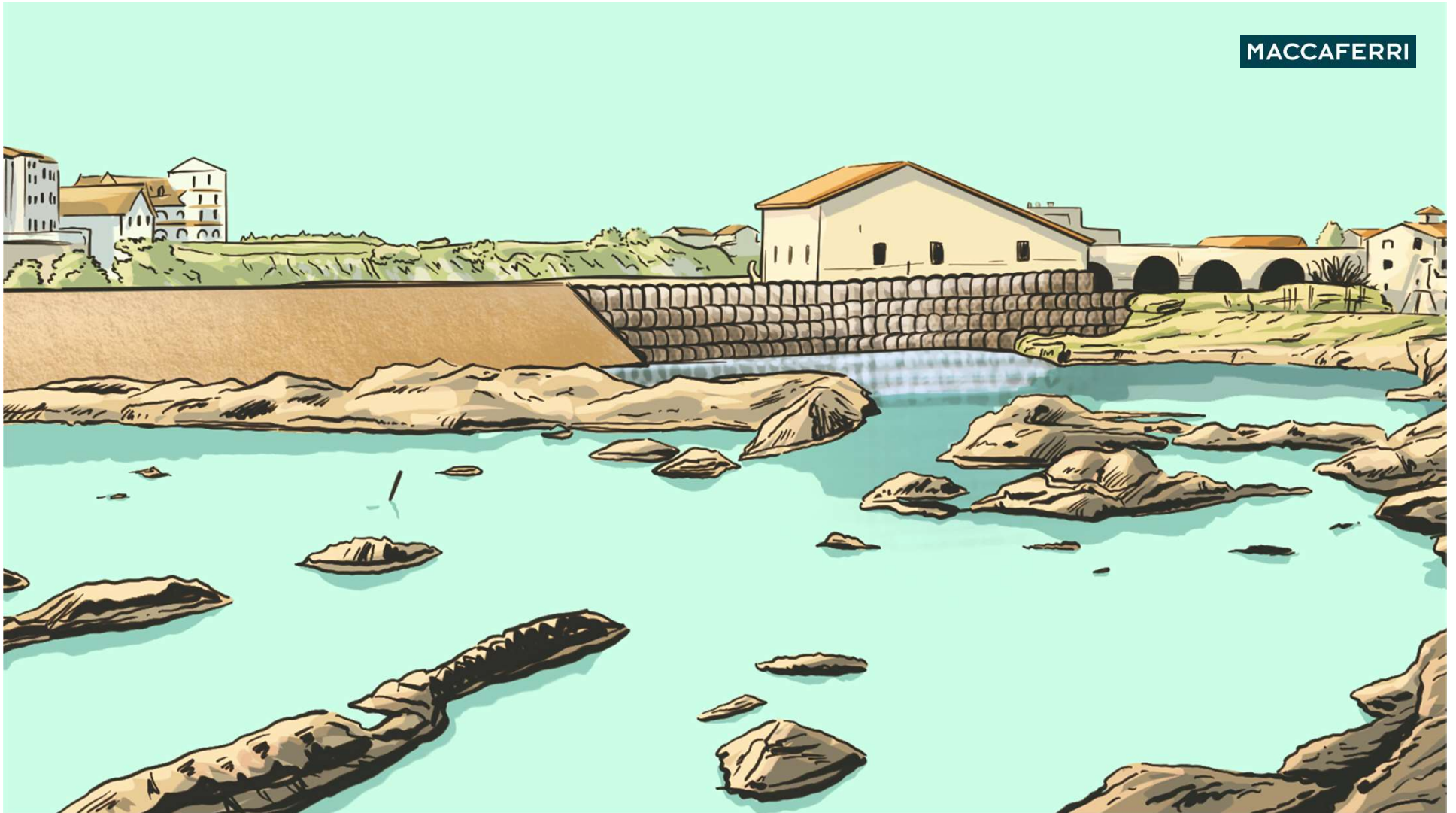




GABION: OUR LEGACY IN EVERY TWIST

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MACCAFERRI



Webinar Agenda

10'

130 years of Gabion solutions

10'

The Gabion today

10'

A world with Gabions

Speaker



Stefano Rignanesi
Business Development Coordinator

MACCAFERRI

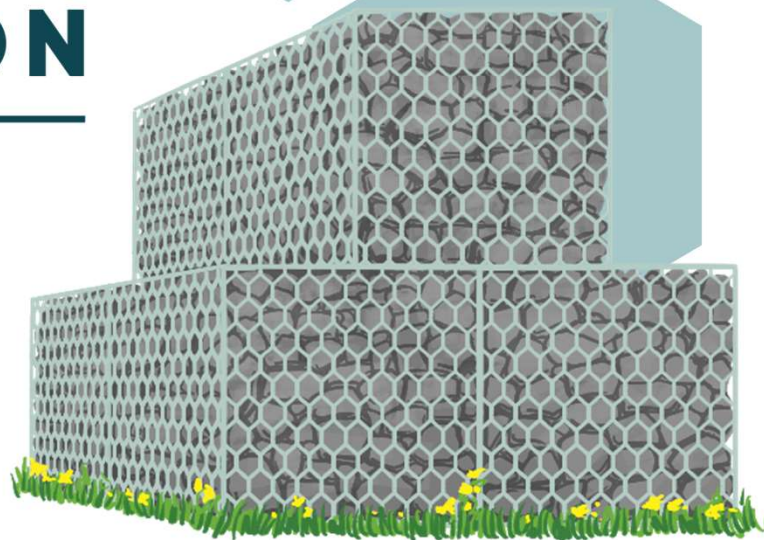
130

GABION
— 1894 —

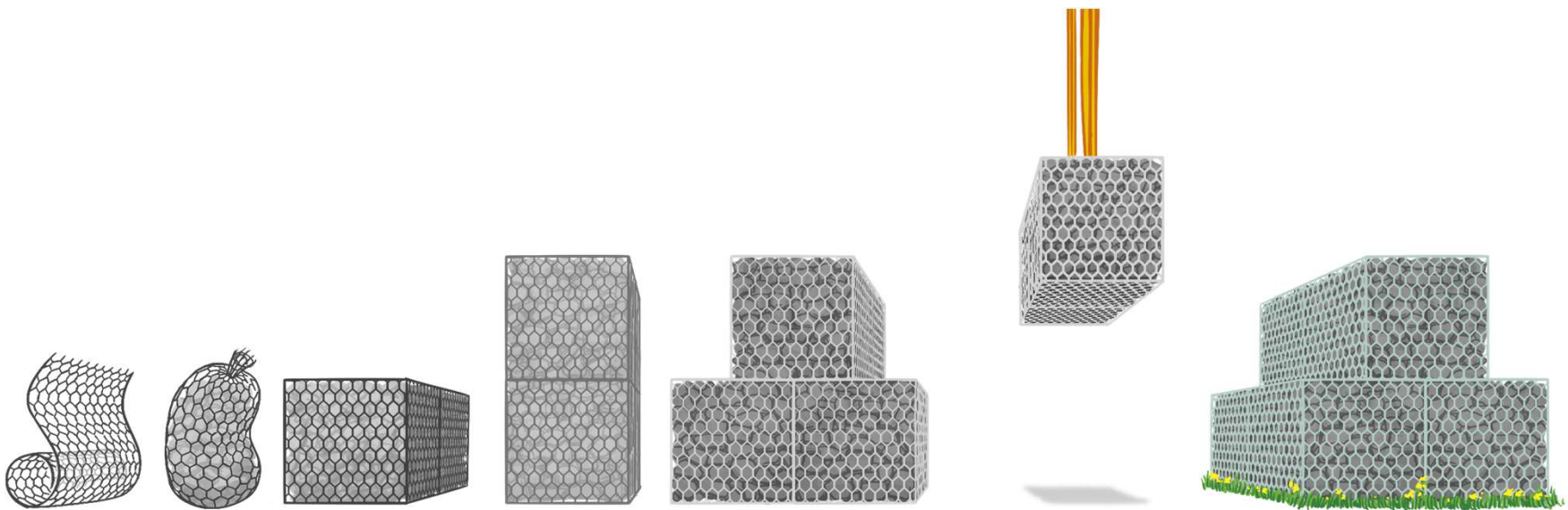
MACCAFERRI

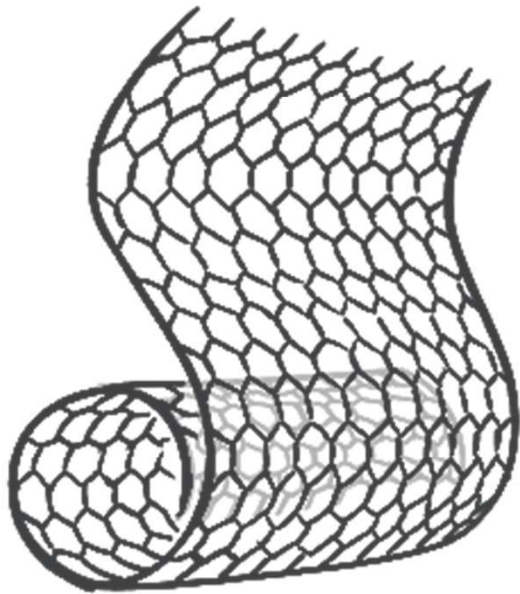


GABION
— 1894 —



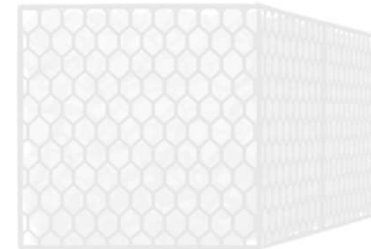
How did we got here?





1879

The blacksmith mesh



M

1879

M

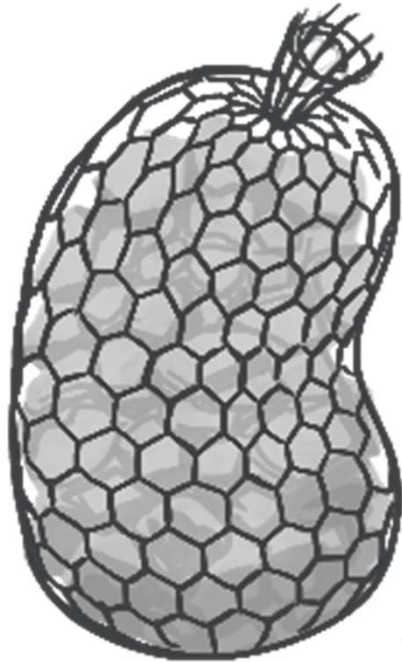
1894

M

1906

M

1952

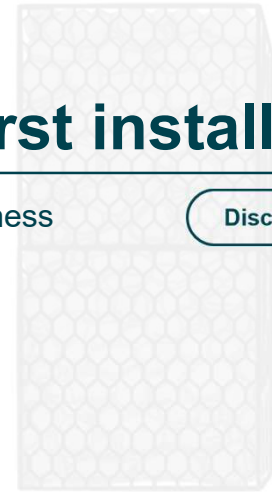
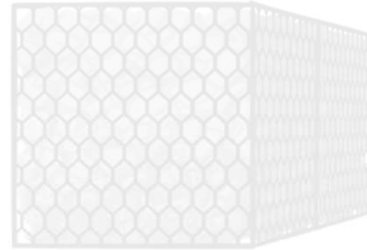


1894

The first installation

Responsiveness

[Discover more](#)



M

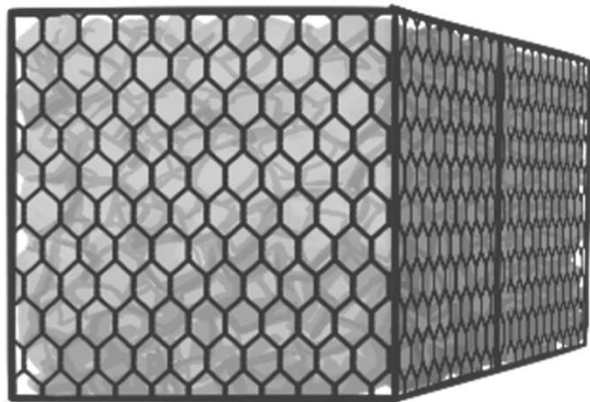
1894

M

1906

M

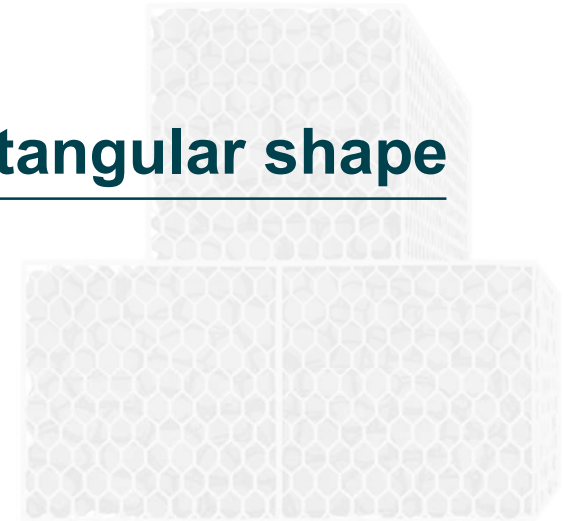
1952



1906

The rectangular shape

Modularity



M

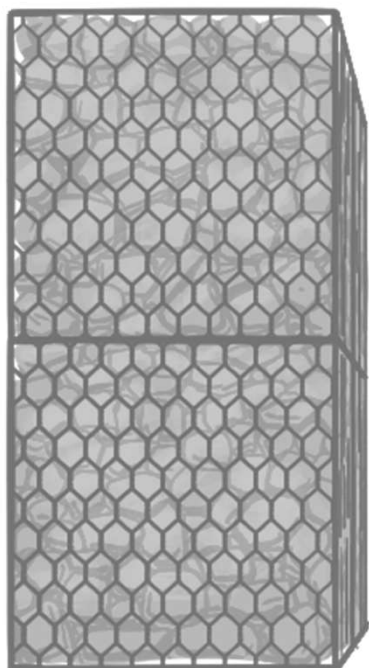
1906

M

1952

M

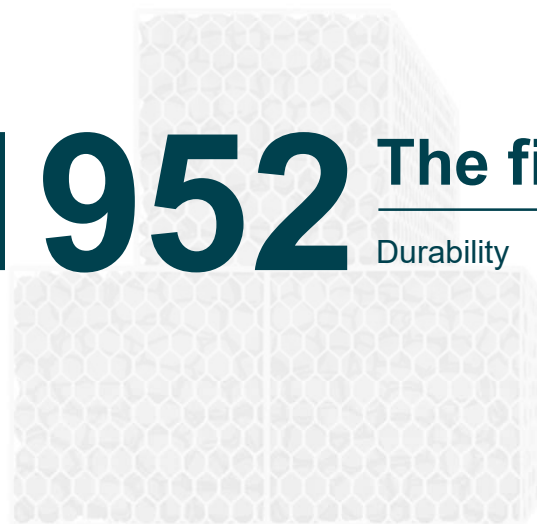
2018



1952

The first coating

Durability

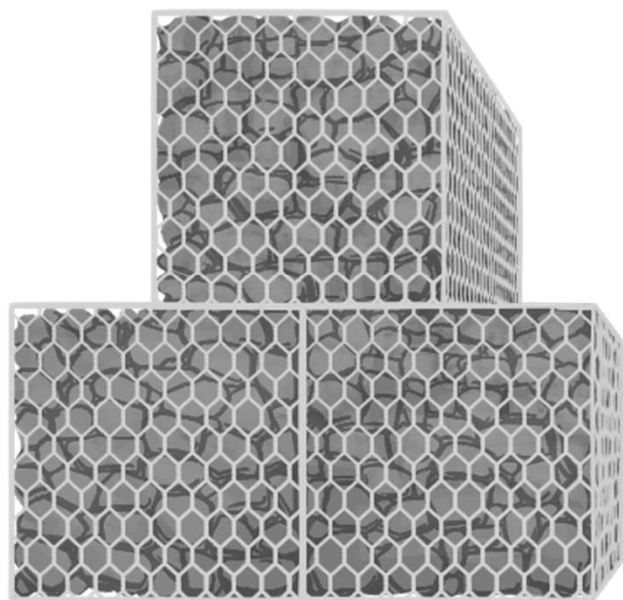


M

1952

M

2018



2018

The Polimac® coating

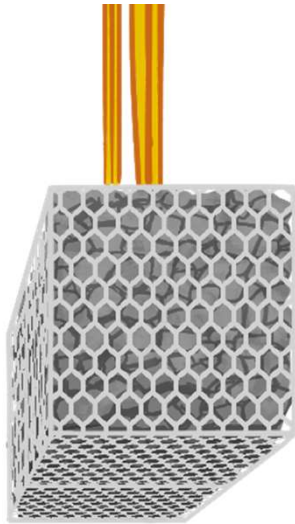
Sustainability

[Discover more](#)



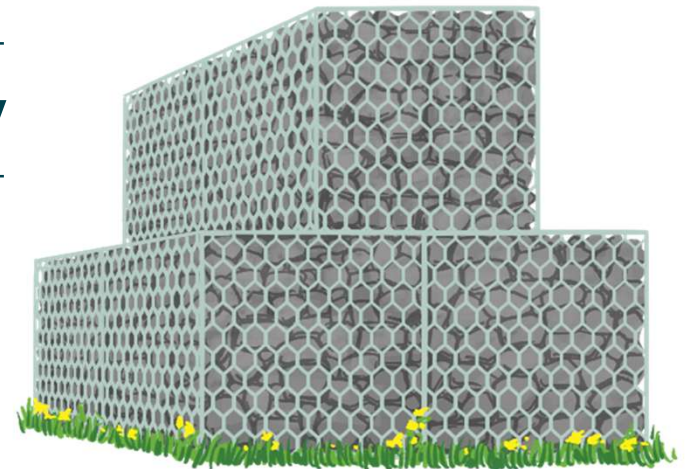
M

2018



2024

The Gabion today



Performance

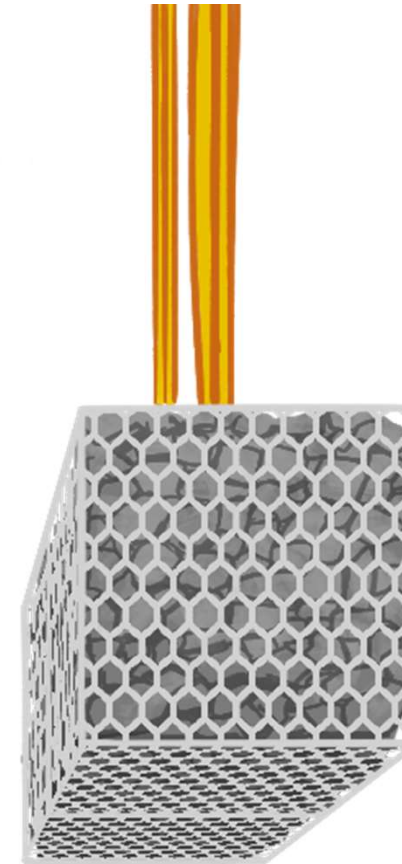
Software

Certified Quality

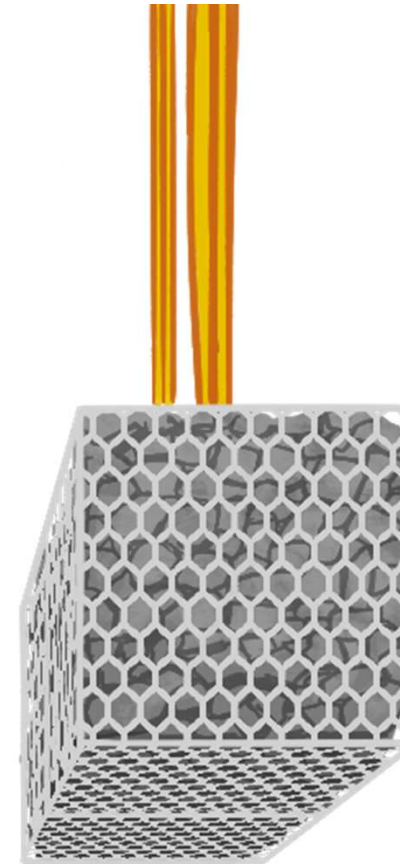
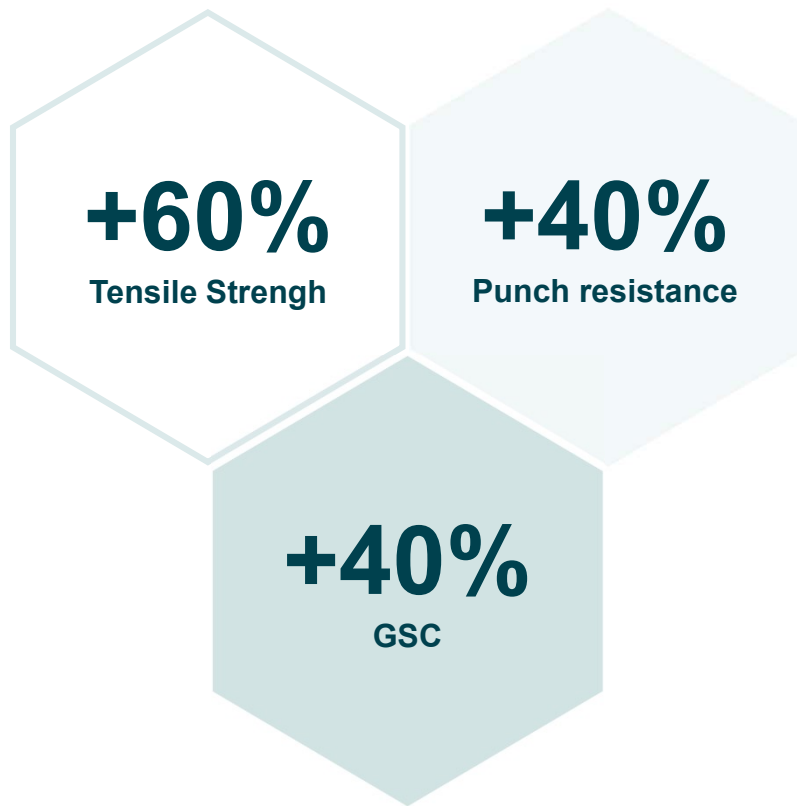
Sustainability

Enhanced wires

To optimize construction times, it is crucial to use larger wires as they enable the implementation of pre-assembled, ready-to-use solutions. This approach significantly reduces installation times, ensuring greater efficiency and speed in construction processes.

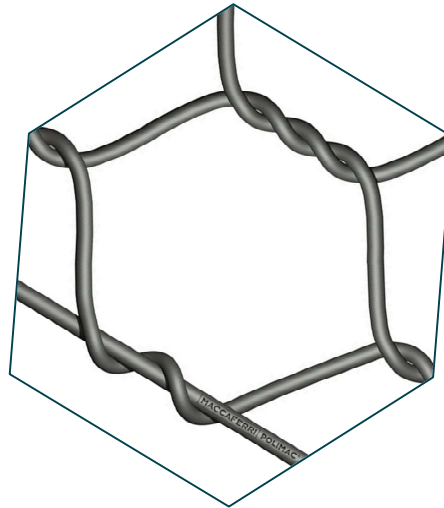


MACCAFERRI

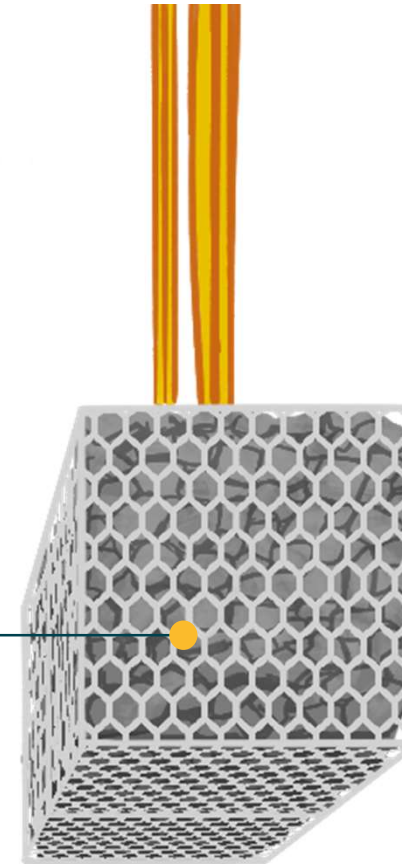


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What are the structural strengths of CubiMac?



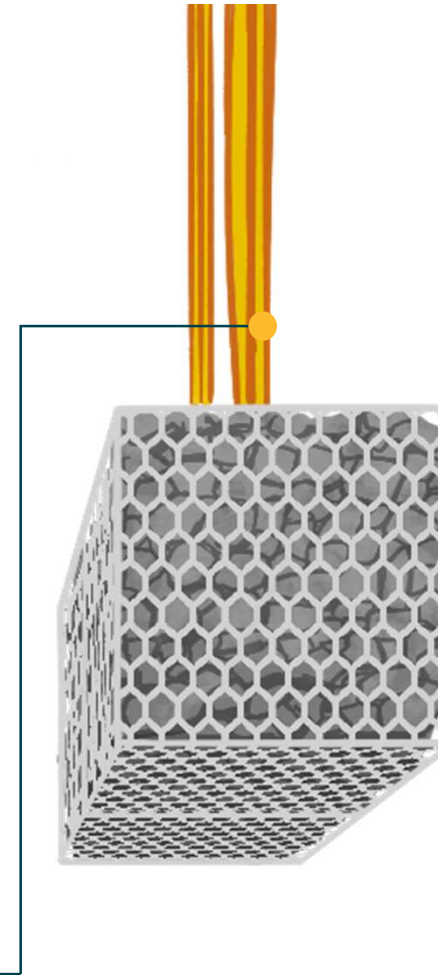
A heavy and **robust** grade of hexagonal **double twist wire mesh** (Ø 3.4 mm) was manufactured to resist deformation, especially during the lifting process





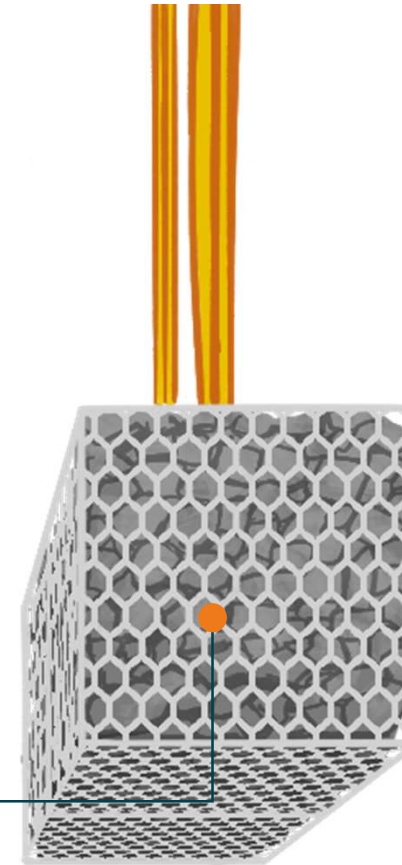
Lifting Elements and Frame

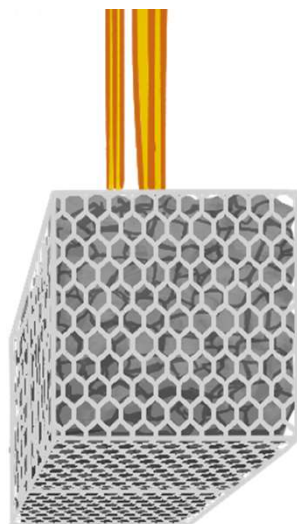
Lifting system tested and certified with CE mark



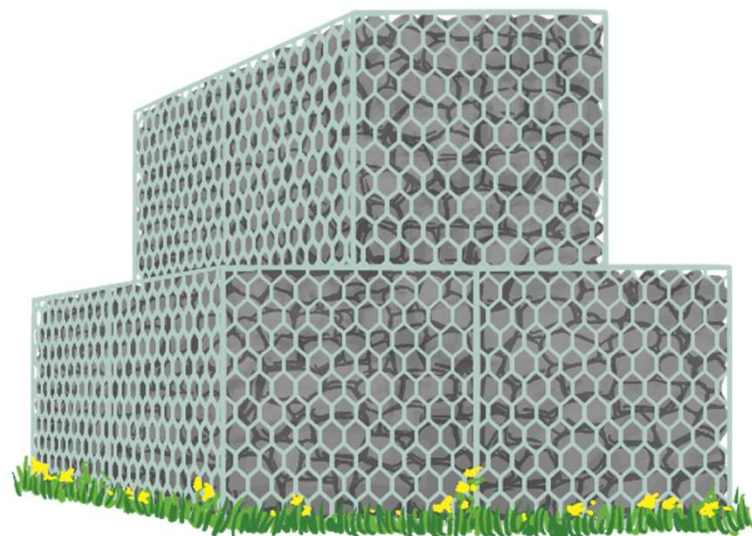


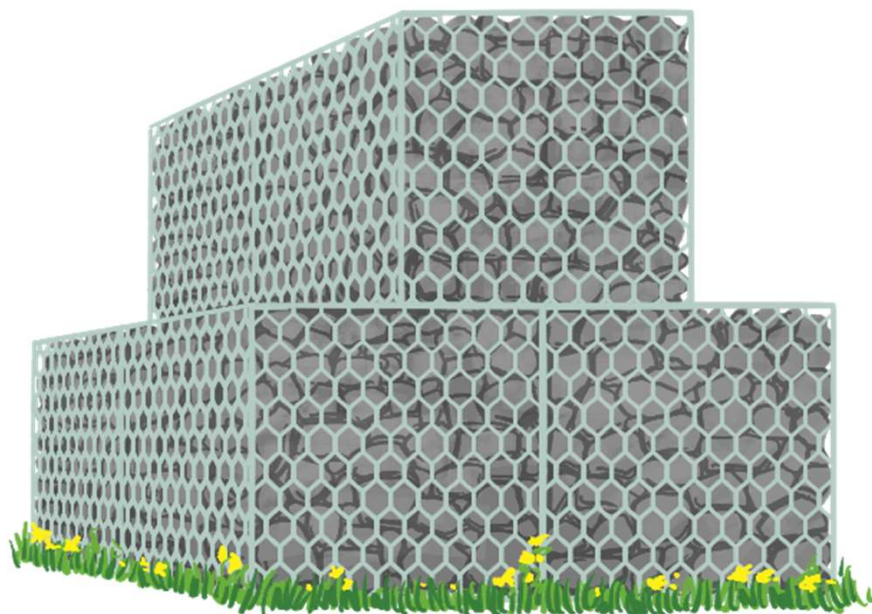
The **PoliMac®** coating gives outstanding protection against mechanical loads and chemical aggression





The Gabion today



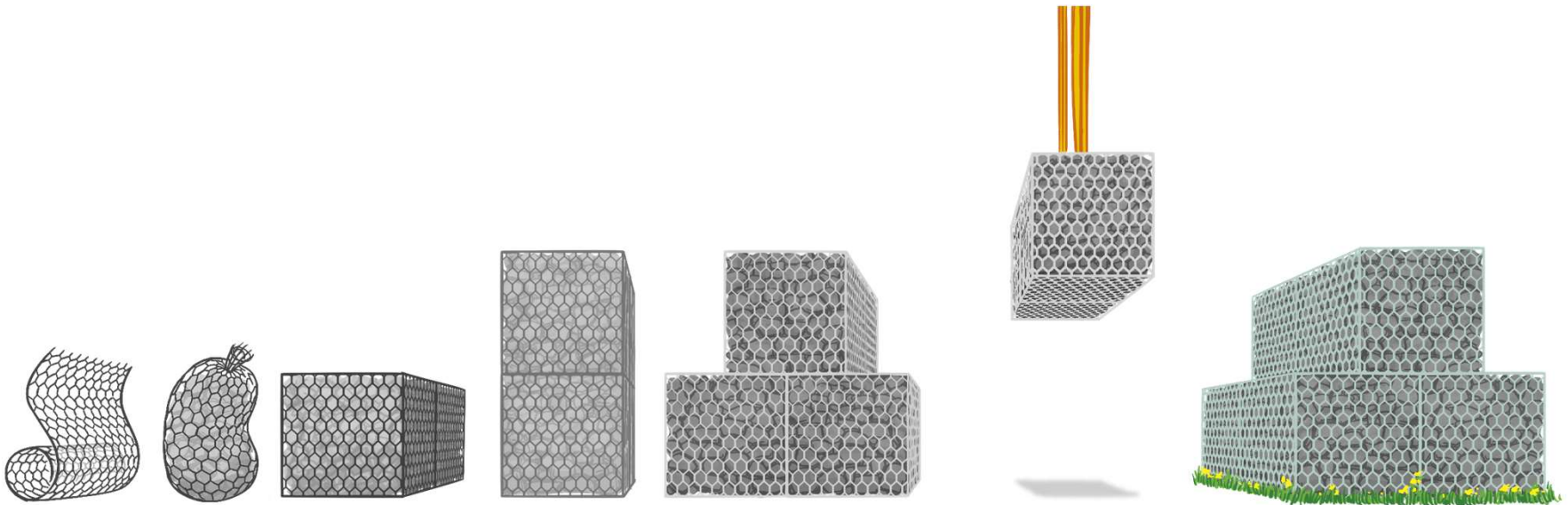


Bio PoliMac®

PoliMac® is also available as full green wire coating. BIO PoliMac® is the bio version of our polymer coating. BIO PoliMac® is made of bio-nafta derived from sustainable raw materials originated from organic wastes.



Where?





MACCAFERRI

Application

MACCAFERRI

Retaining Walls
& Soil Reinforcement

Landscape & Architecture

Safety & Noise Barrier

Hydraulic Works

Coastal Protection, Marine Structures
& Pipeline Protection



Application

MACCAFERRI

Retaining Walls
& Soil Reinforcement

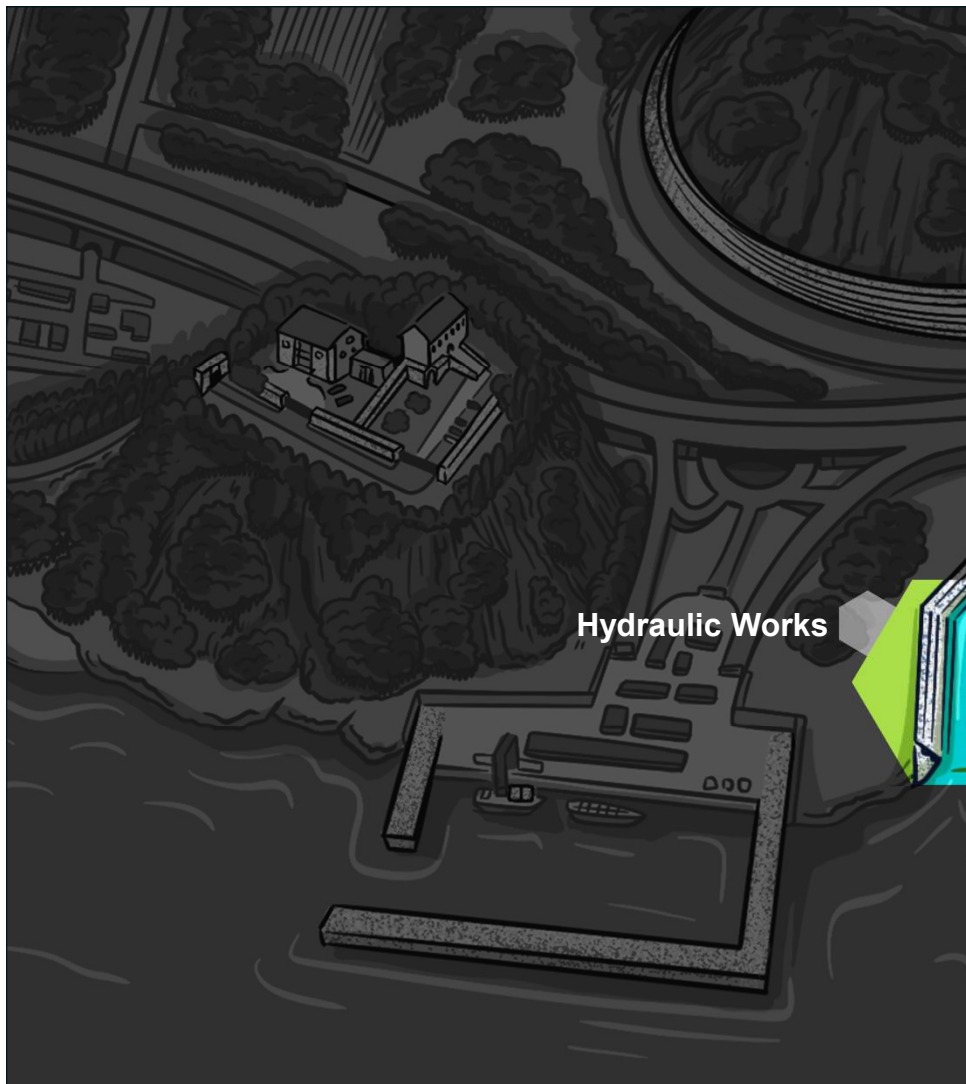
Landscape & Architecture

Safety & Noise Barrier

Hydraulic Works

Coastal Protection, Marine Structures
& Pipeline Protection



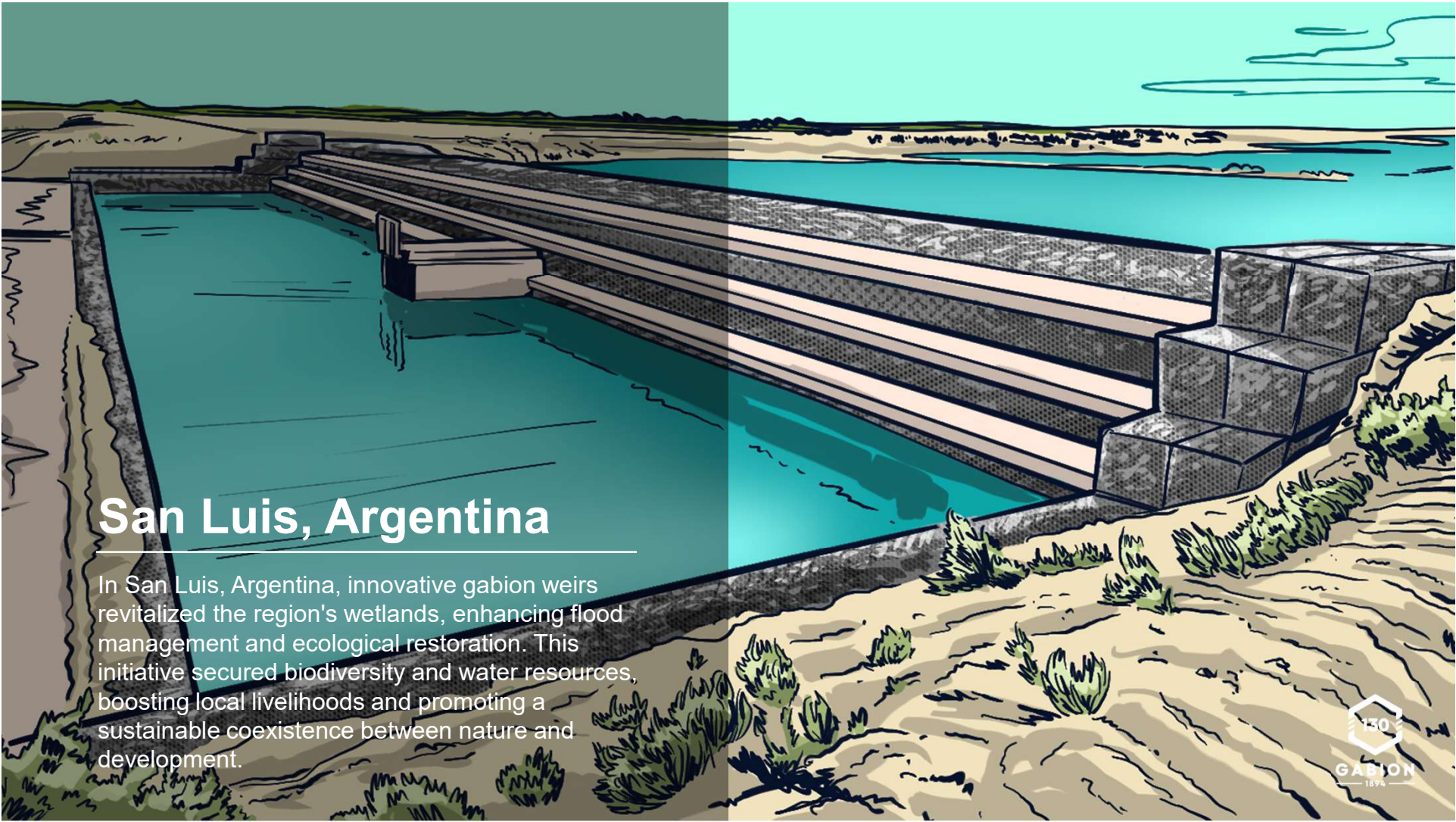


Hydraulic Works



MACCAFERRI



An illustration of a gabion weir, a structure made of wire mesh cages filled with stones, used for water control. The weir is situated in a dry, arid landscape with sparse green shrubs. Water is visible on the left side of the weir, and the right side shows the dry ground. The sky is a clear, light blue.

San Luis, Argentina

In San Luis, Argentina, innovative gabion weirs revitalized the region's wetlands, enhancing flood management and ecological restoration. This initiative secured biodiversity and water resources, boosting local livelihoods and promoting a sustainable coexistence between nature and development.

MACCAFERRI

**Retaining Walls
& Soil Reinforcement**

Landscape & Architecture

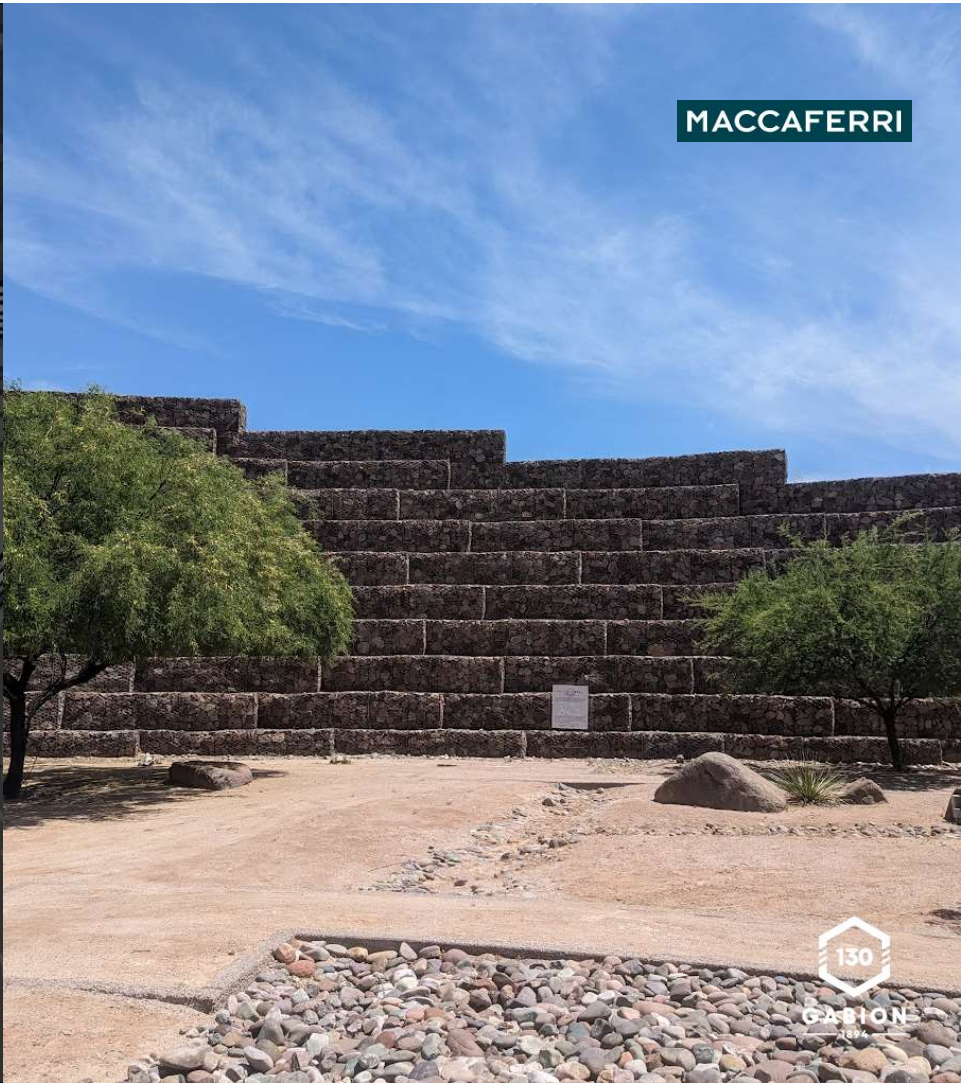
Safety & Noise Barrier

Hydraulic Works

**Coastal Protection, Marine Structures
& Pipeline Protection**



GABION
— 1894 —



Maricopa City, USA

The Huhugam Heritage Center in Arizona merges tradition with innovation, featuring a protective barrier made of gabions. This design not only provides security but also showcases Native American pottery patterns, representing a fusion of cultural pride and modern engineering.

MACCAFERRI

**Retaining Walls
& Soil Reinforcement**

Landscape & Architecture

Safety & Noise Barrier

Hydraulic Works

**Coastal Protection, Marine Structures
& Pipeline Protection**

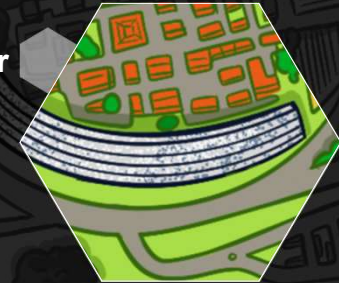


GABION
— 1894 —



MACCAFERRI

Safety & Noise Barrier





MACCAFERRI

Stuttgart, Germany

Stuttgart 21 transformed urban connectivity by employing CubiMac™ prefilled gabions for a new railway bridge over the River Neckar, setting a global benchmark for innovative and sustainable urban development.



MACCAFERRI

**Retaining Walls
& Soil Reinforcement**

Landscape & Architecture

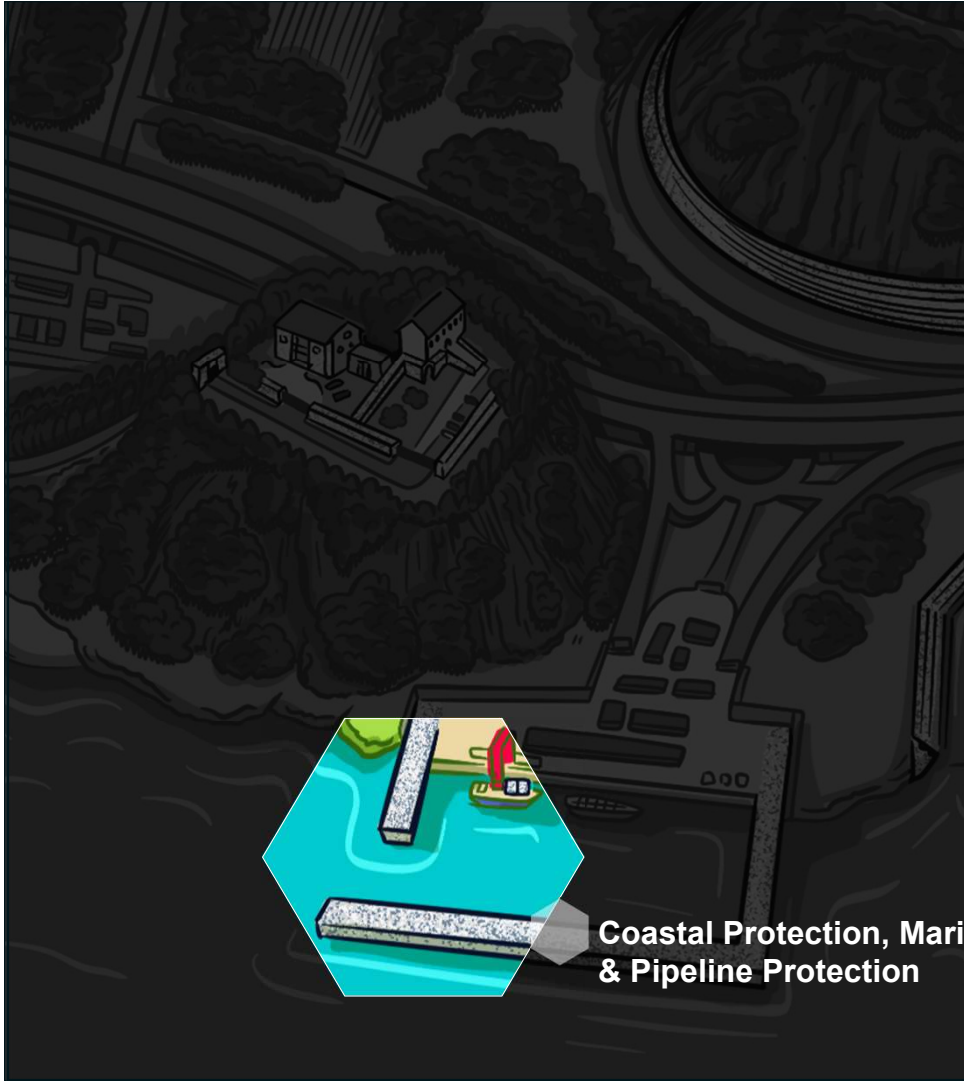
Safety & Noise Barrier

Hydraulic Works

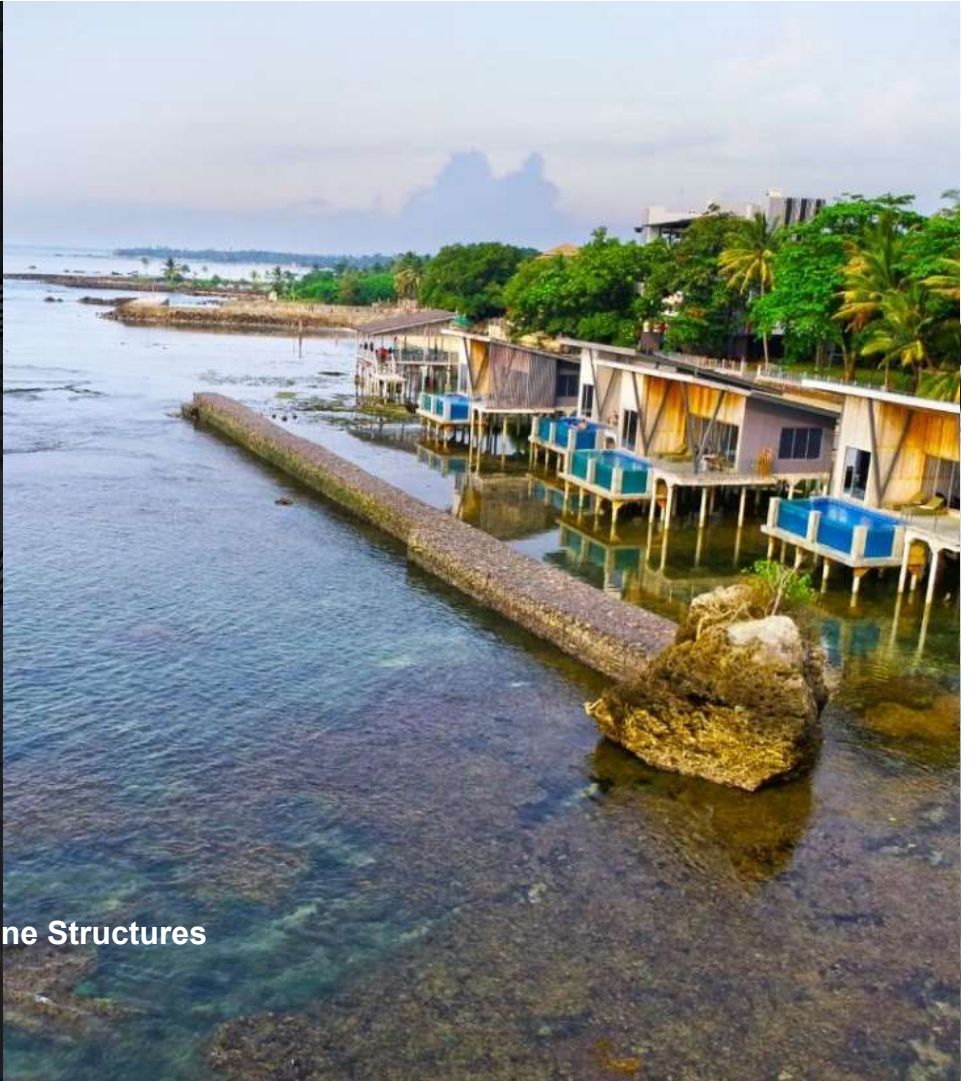
**Coastal Protection, Marine Structures
& Pipeline Protection**

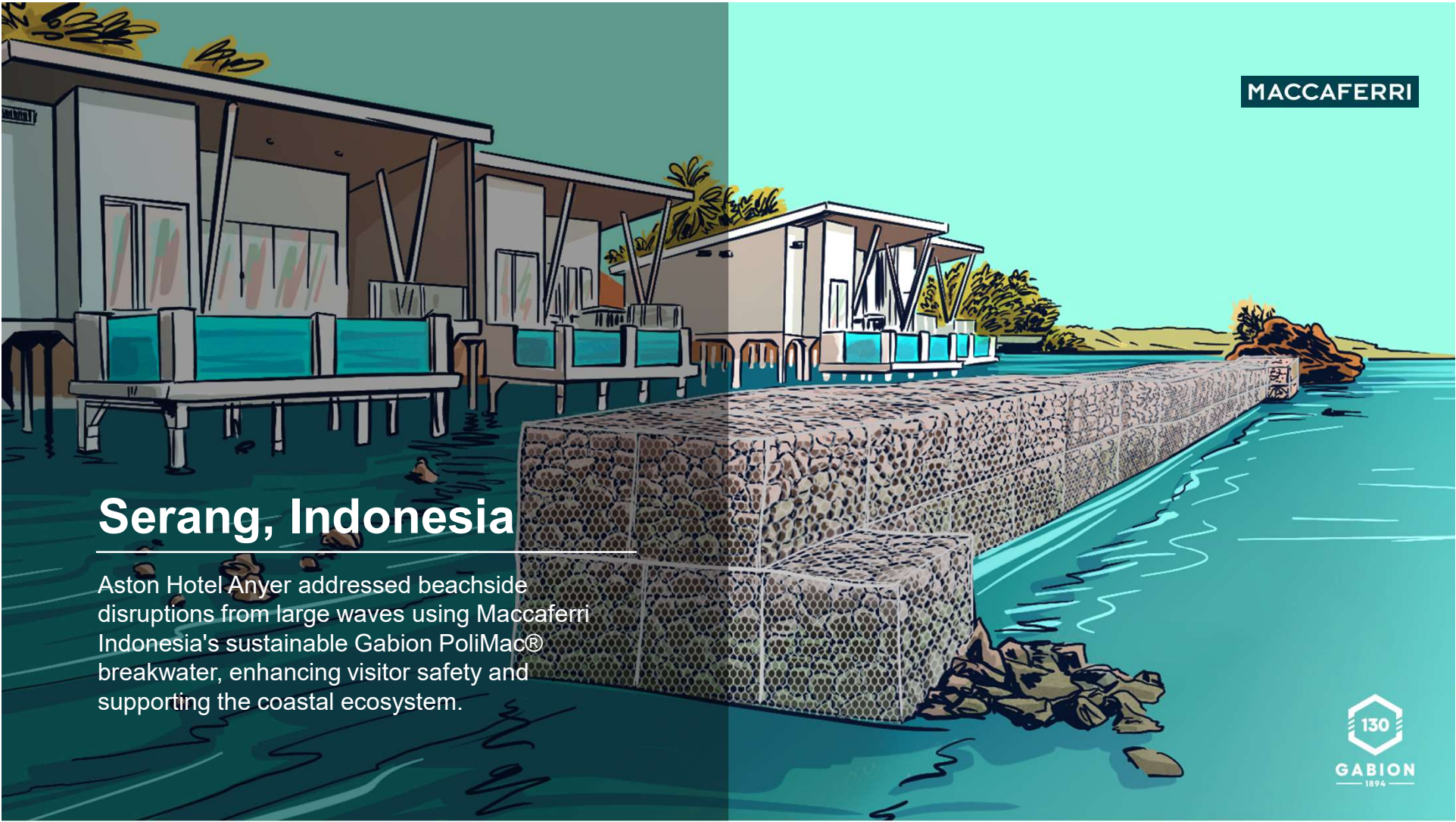


GABION
— 1894 —



Coastal Protection, Marine Structures
& Pipeline Protection



An artistic illustration of a coastal resort. In the foreground, a long breakwater made of stone-filled gabion baskets extends from the shore into the sea. To the left, a modern resort building with a flat roof and large windows is elevated on stilts. A wooden walkway with railings leads from the building towards the breakwater. The sea is depicted with stylized waves. The sky is a solid light blue. The overall style is a clean, modern illustration with a limited color palette of blues, greys, and earthy tones.

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Serang, Indonesia

Aston Hotel Anyer addressed beachside disruptions from large waves using Maccaferri Indonesia's sustainable Gabion PoliMac® breakwater, enhancing visitor safety and supporting the coastal ecosystem.

MACCAFERRI

**Retaining Walls
& Soil Reinforcement**

Landscape & Architecture

Safety & Noise Barrier

Hydraulic Works

**Coastal Protection, Marine Structures
& Pipeline Protection**



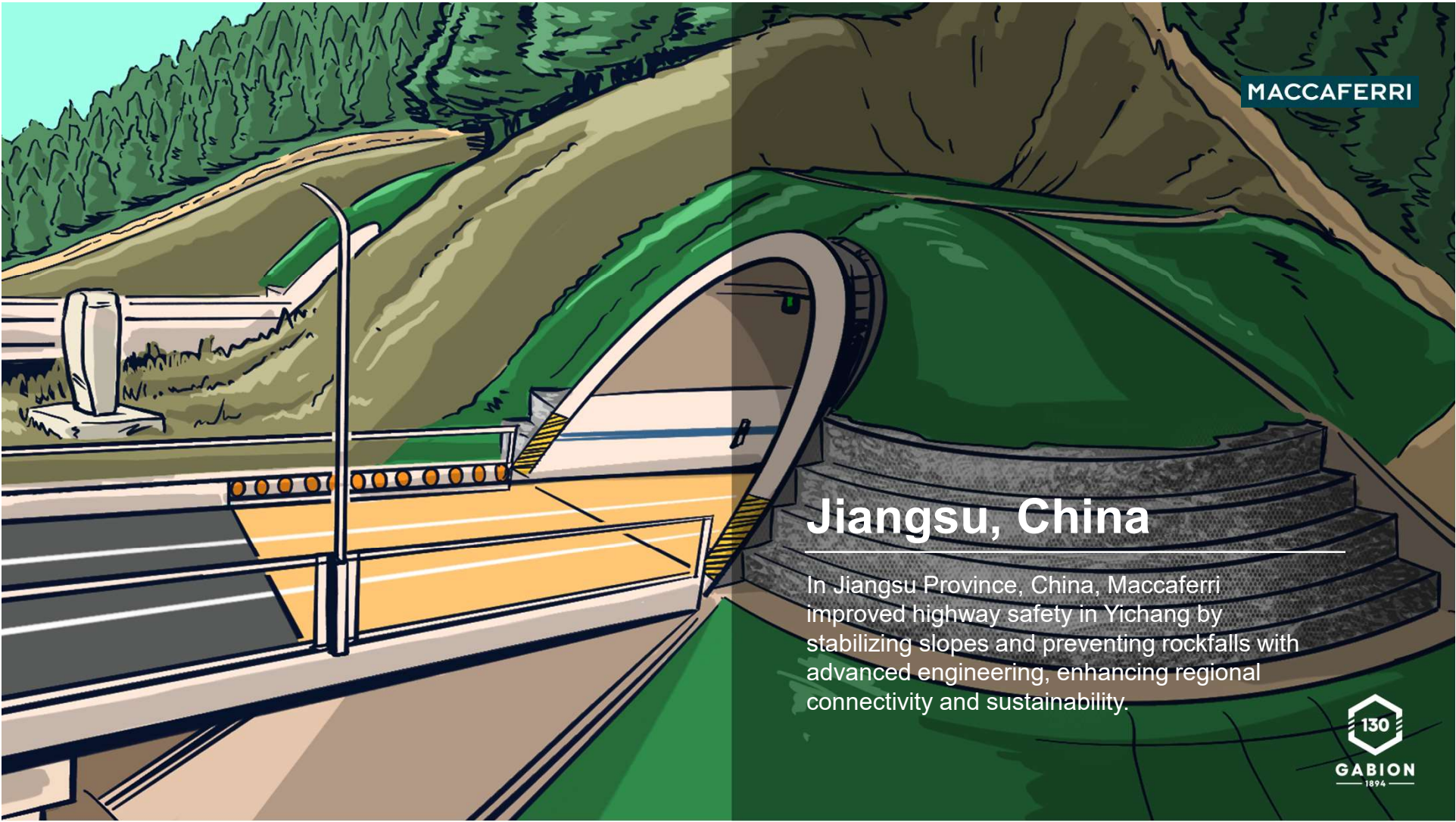


MACCAFERRI



Retaining Walls
& Soil Reinforcement





MACCAFERRI

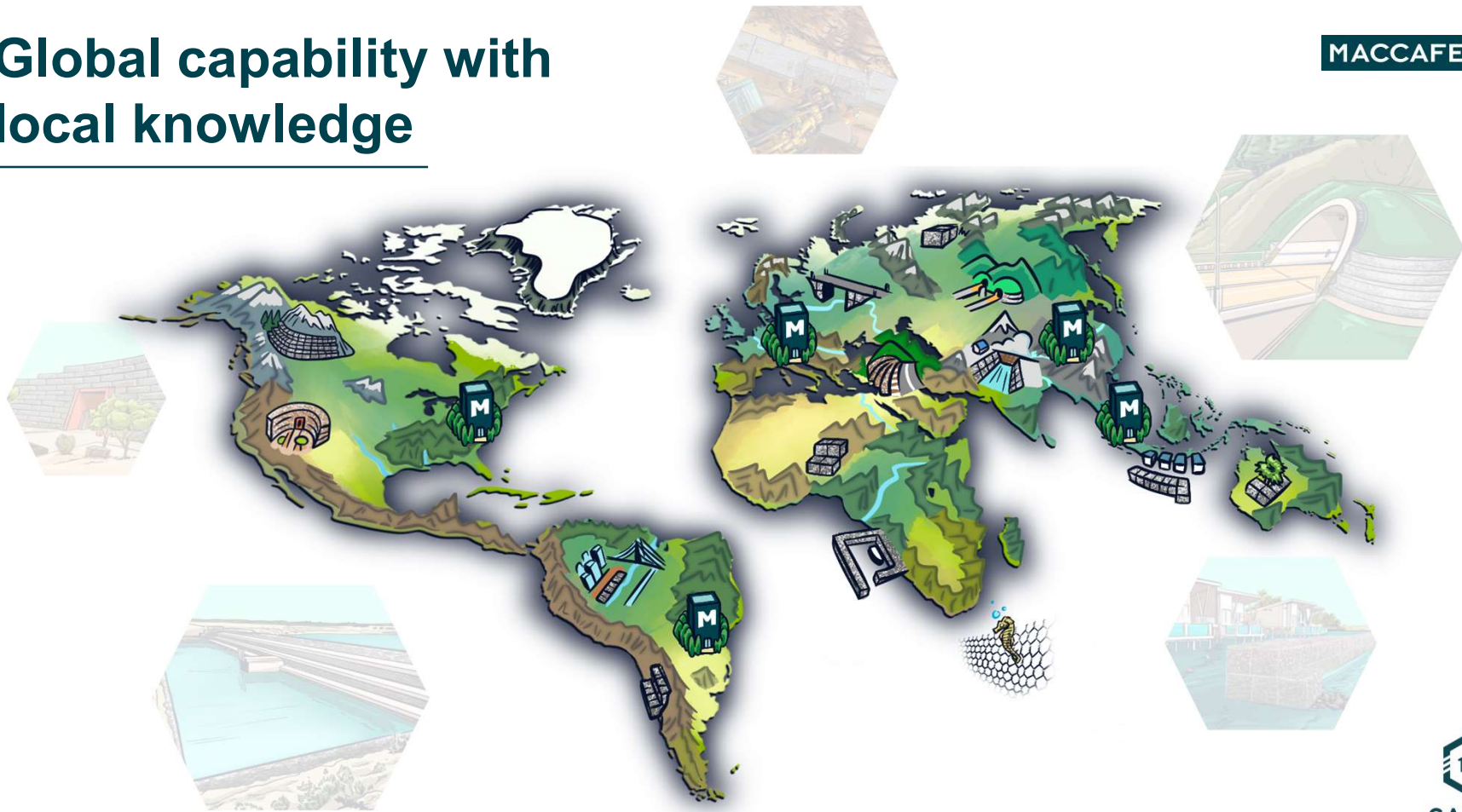
Jiangsu, China

In Jiangsu Province, China, Maccaferri improved highway safety in Yichang by stabilizing slopes and preventing rockfalls with advanced engineering, enhancing regional connectivity and sustainability.

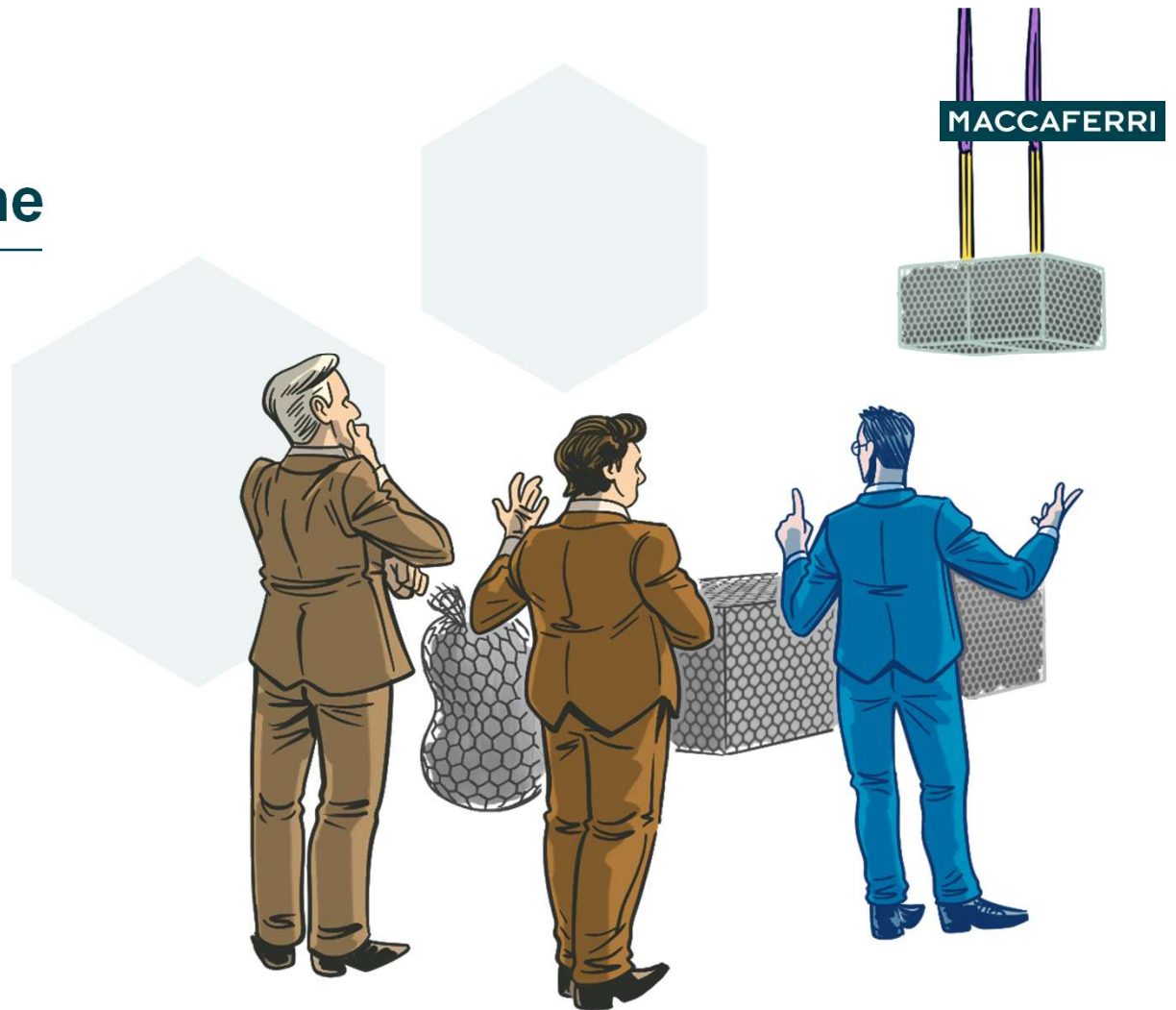


Global capability with local knowledge

MACCAFERRI



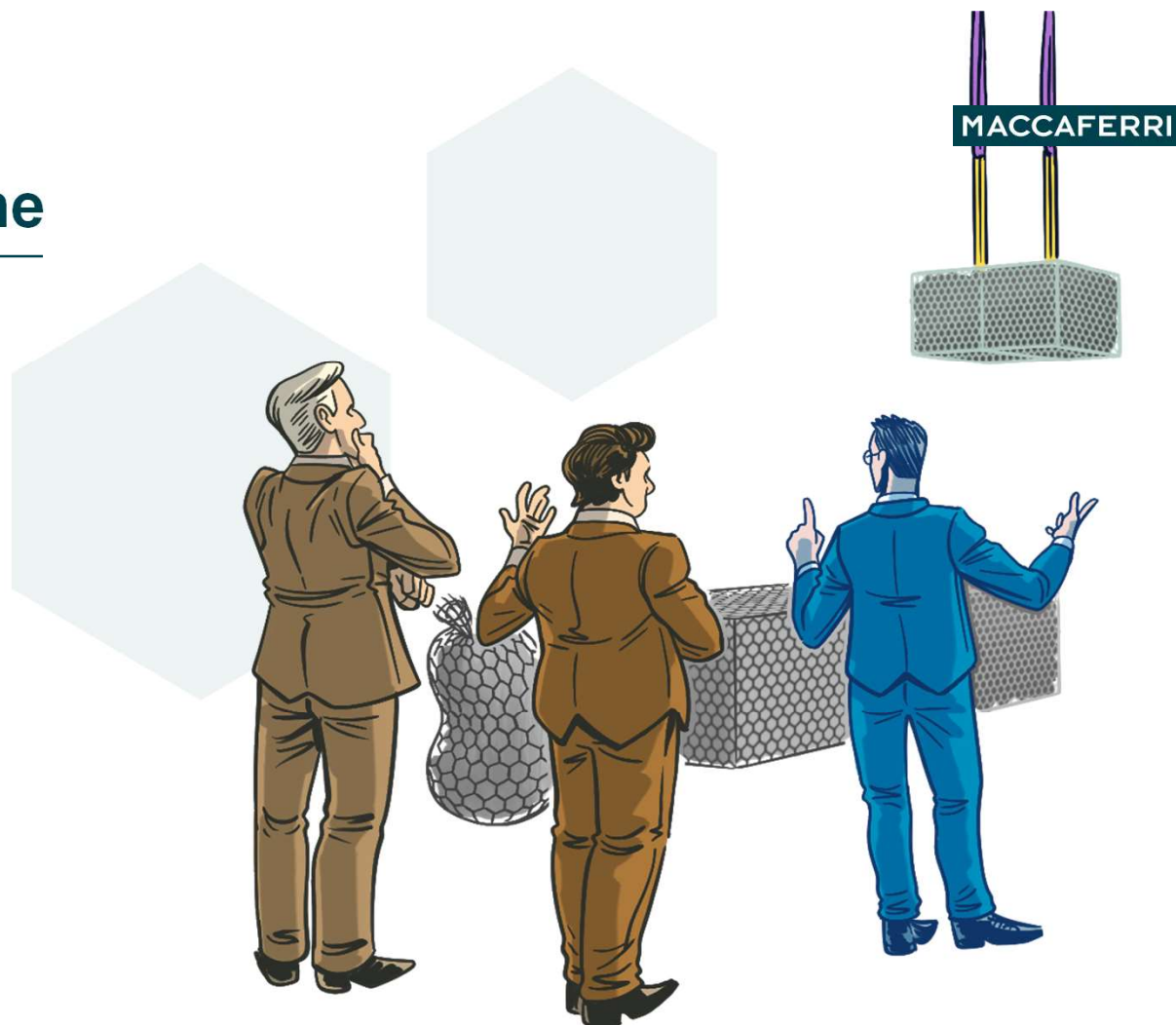
One gabion at a time



One gabion at a time



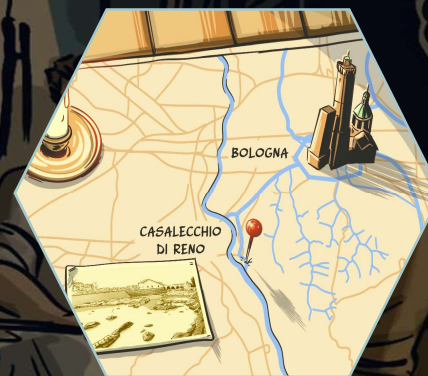
Q&A



MACCAFERRI



GABION
— 1894 —



Celebrating the 130th anniversary of the gabion, we recognize its revolutionary role since its introduction in the late 19th century at the Chiusa di Casalecchio di Reno, in Bologna, Italy. This innovative solution has become a testament to enduring engineering and resilience in Casalecchio di Reno.





The Reno River flood turns Casalecchio di Reno into a scene of despair. Factories stop without water power, causing significant economic harm and jeopardizing many families' livelihoods. The community urgently seeks a solution for renewal and a prosperous future.



On October 1st, 1893, Casalecchio di Reno faced a crisis. The Reno River surged to 4.70 meters, threatening history. The collapsing wall flooded fields and approached the railway, leaving the canal dry. Protecting the community's heart, the Casalecchio di Reno Weir, became urgent.



MACCAFERRI

The gabions quickly prove effective. As the community builds the levee to seal the breach, they face complex technical challenges. Using sack gabions filled with river pebbles and strategic design, they showcase the ingenuity of this pioneering solution. In 1894, the completion is celebrated, marking a significant success achieved in just 34 working days.

From devastation, a beacon of hope arises: Maccaferri. This small, family-run iron processing business in Casalecchio di Reno proposes using gabions—interwoven metal nets—for reconstruction.

Driven to protect the community, they transform their vision into a solid defense against adversity, heralding a new era of prosperity and renewal.

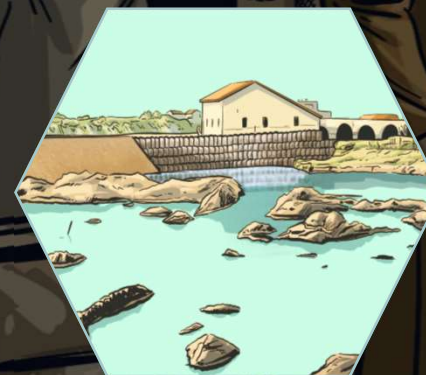


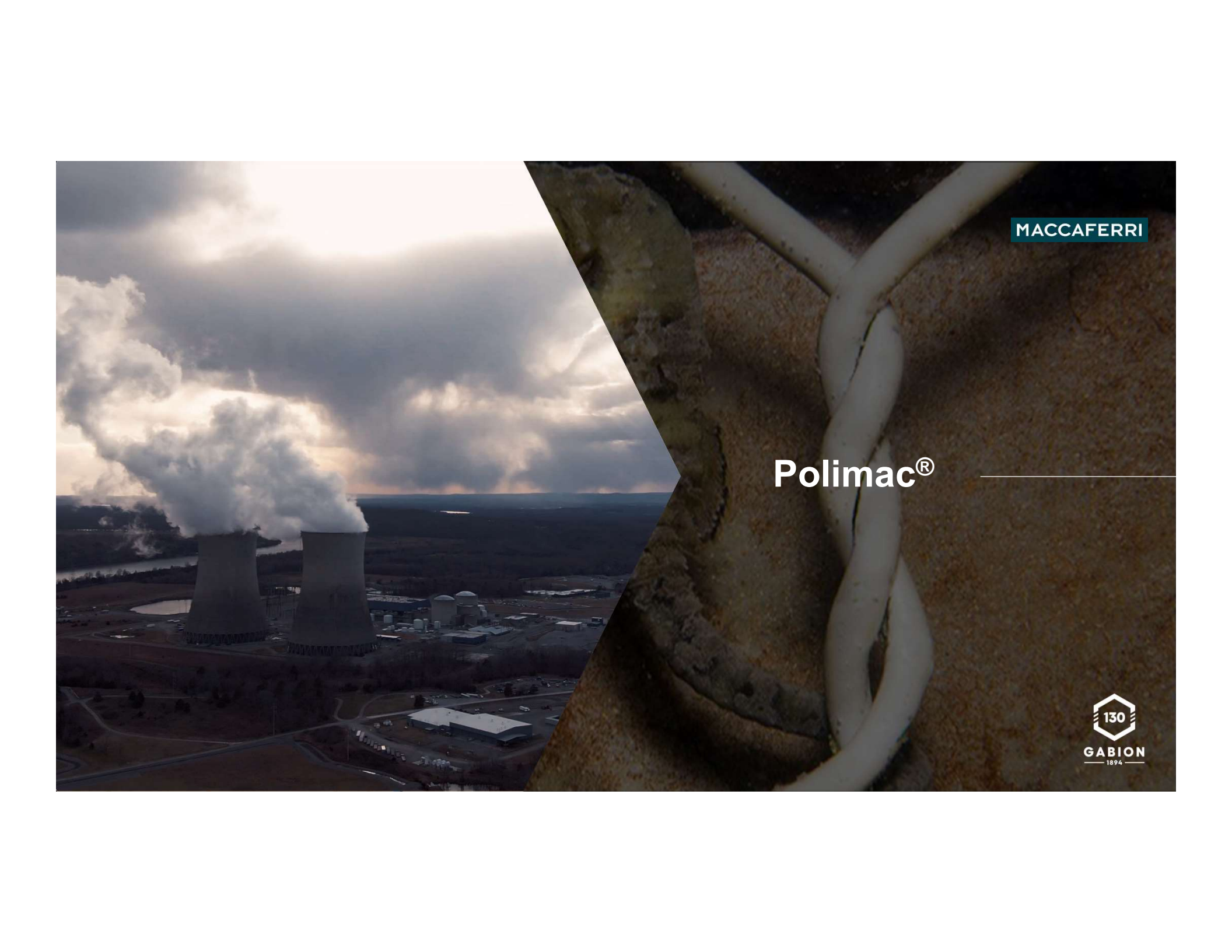
MACCAFERRI



In 1894, the then-small family business Maccaferri introduced gabions and played a key role in restoring the Chiusa in Casalecchio di Reno. This intervention not only solved a critical infrastructure issue but also catapulted Maccaferri gabions to global fame. This act marked a significant transformation for Casalecchio di Reno, paving the way for community development and prosperity.

The 1894 celebration, with over 700 attendees, symbolizes the readiness and efficacy of the "burghe" metal gabions filled with river pebbles. The event gains national attention, highlighting the prompt response to a natural disaster and innovation in levee construction through Maccaferri's revolutionary contribution.





MACCAFERRI

Polimac®



MACCAFERRI

MACCAFERRI POLIMAC®

New coating
PoliMac®

Long-life
metallic coating

Steel wire
Low carbon

For 140 years, we have been **working to provide an answer** to these problems with **more resilient engineering solutions**. PoliMac® coating is a **polymer blend** with excellent adhesion to the wire, **specially adapted to withstand the application conditions in extremely aggressive environments**.

PoliMac® **meets the environmental project requirements**;

PoliMac® **achieves the technical performance** required by the construction industry;

PoliMac® **maximizes longevity and structural efficiency** through increased abrasion and chemical resistance.





Mechanical Performance

- **ABRASION TEST**
ASTM A975-21; EAD 200019-01-0102
- **HARDNESS TEST**
ASTM D 2240

x12

Better resistance to abrasion, including installation damage

+23%

Harder than traditional polymeric coatings



Environmental Friendliness

- **LECHEATE TEST**
EPA 1312
- **ELUATE TEST**
M GeoK E: 2016

0 Contaminants

Our PoliMac® coating proved to be harmless and safe for the environment.





Weathering Resistance

- **LOW TEMPERATURE BRITTLENESS**
ASTM D 746
- **UV EXPOSURE**
ISO 4892-3; ISO 527-1
- **CORROSION SPREAD TEST**
ASTM A975-21

-35°

Maintains its properties up to very cold conditions

x4

Better elongation than traditional polymeric coating

<30%

Measured maximum corrosion length is less than a mesh repetition

MACCAFERRI

MACCAFERRI POLIMAC®

New coating
PoliMac®

Long-life
metallic coating

Steel wire
Low carbon

PoliMac® coated solutions at **120 years**
have the aim of **cutting maintenance
costs**, ensuring the **most sustainable
integration with the natural environment**.

PoliMac®

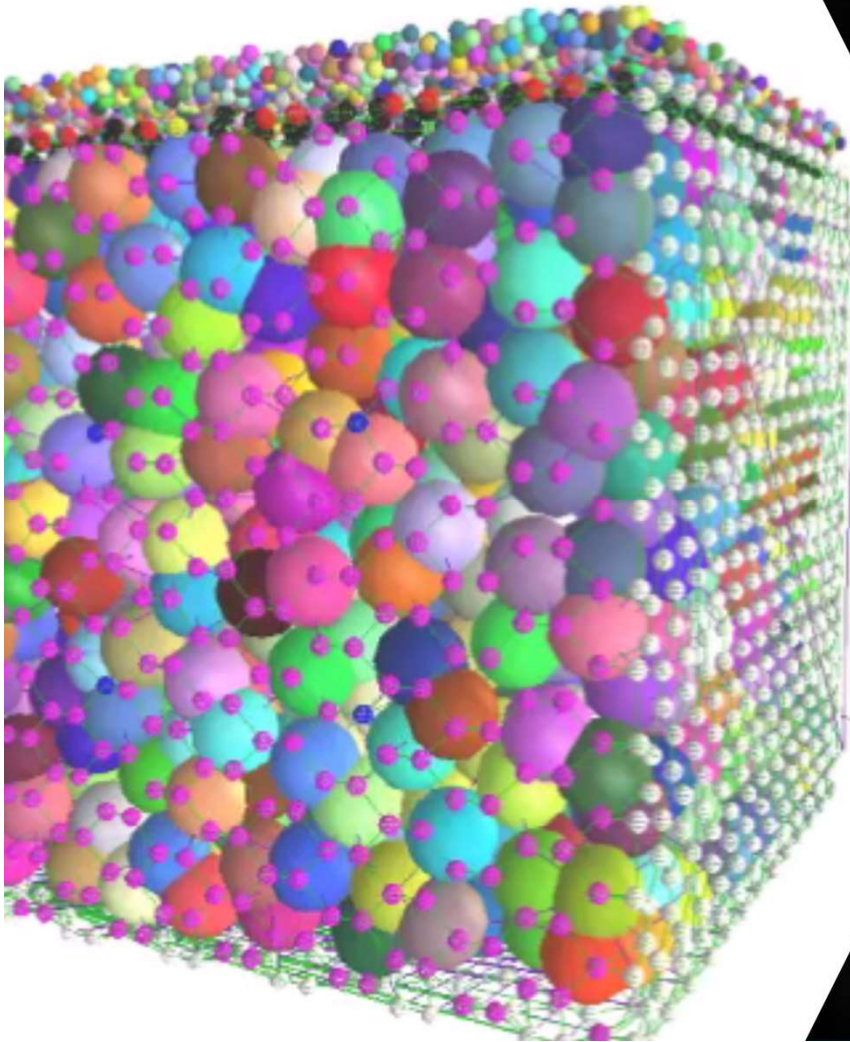
wire protection for a changing world

OVER

120

YEARS OF WORKING LIFE





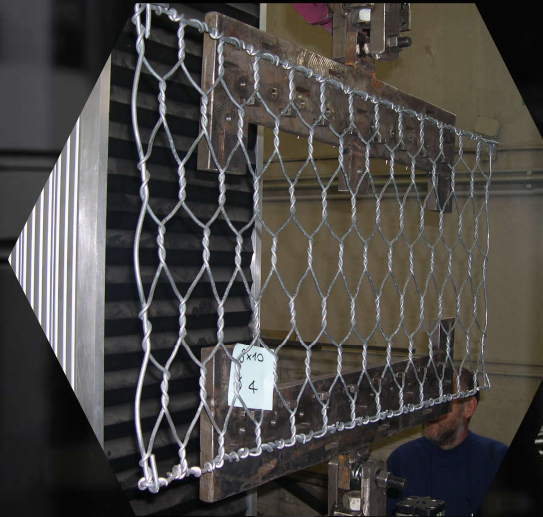
MACCAFERRI

Performance

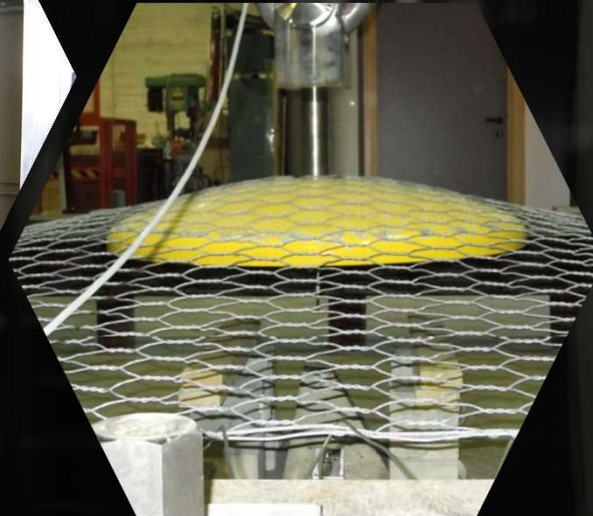


MACCAFERRI

Tensile Strength Test



Punch Test



WOVEN MESH GABION

MACCAFERRI

Flexibility Test



MACCAFERRI

Deformability



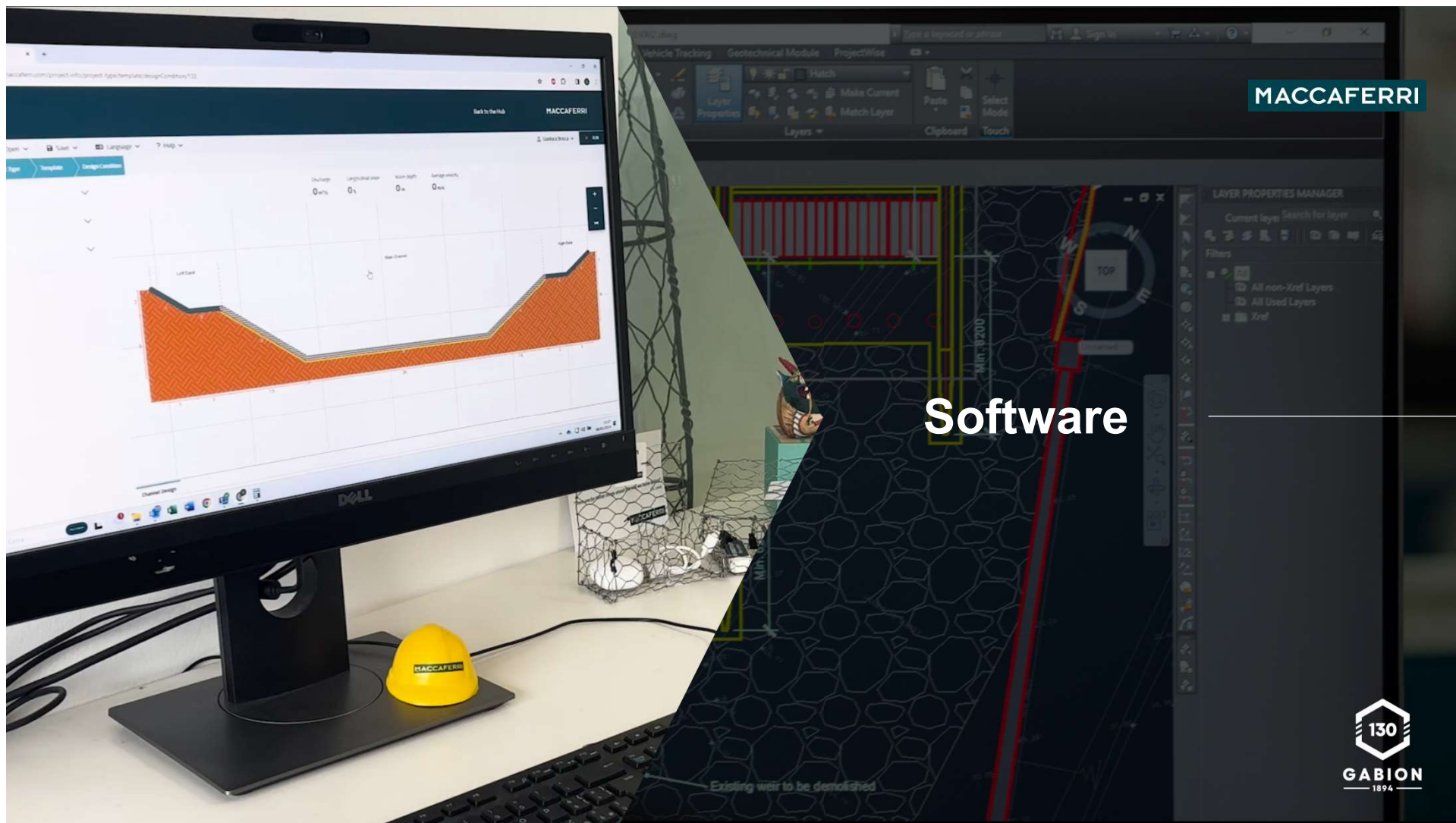
GABION SERVICEABILITY COEFFICIENT

An **experimental coefficient** that evaluates the **gabion performance over time**, considering **mechanical and environmental stresses**

GSC introduces **LONG TERM PERFORMANCE @ 120 years** of service life through the following **REDUCTION FACTORS (RF)**:

- Chemical & Environmental effects [Corrosion] (RF_{env})
- Installation Damage (RF_{id})
- Weathering + UV degradation (RF_{UV})
- Extrapolation of data (RF_d)

$$GSC_{120yrs} = \frac{GMC_{t=0}}{RF_{env} RF_{id} RF_{UV} RF_d}$$



MACCAFERRI

GAWAC 3.0

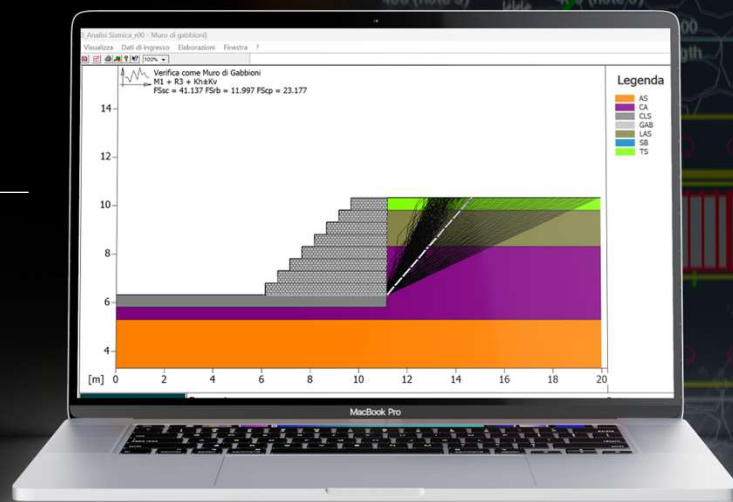
GAWAC 3.0 is the new software developed for the design and optimisation of Gabion Walls.

The results from the research on gabions walls and the new approach to design under serviceability were implemented in GAWAC 3.0



MACCAFERRI

MACSTARS

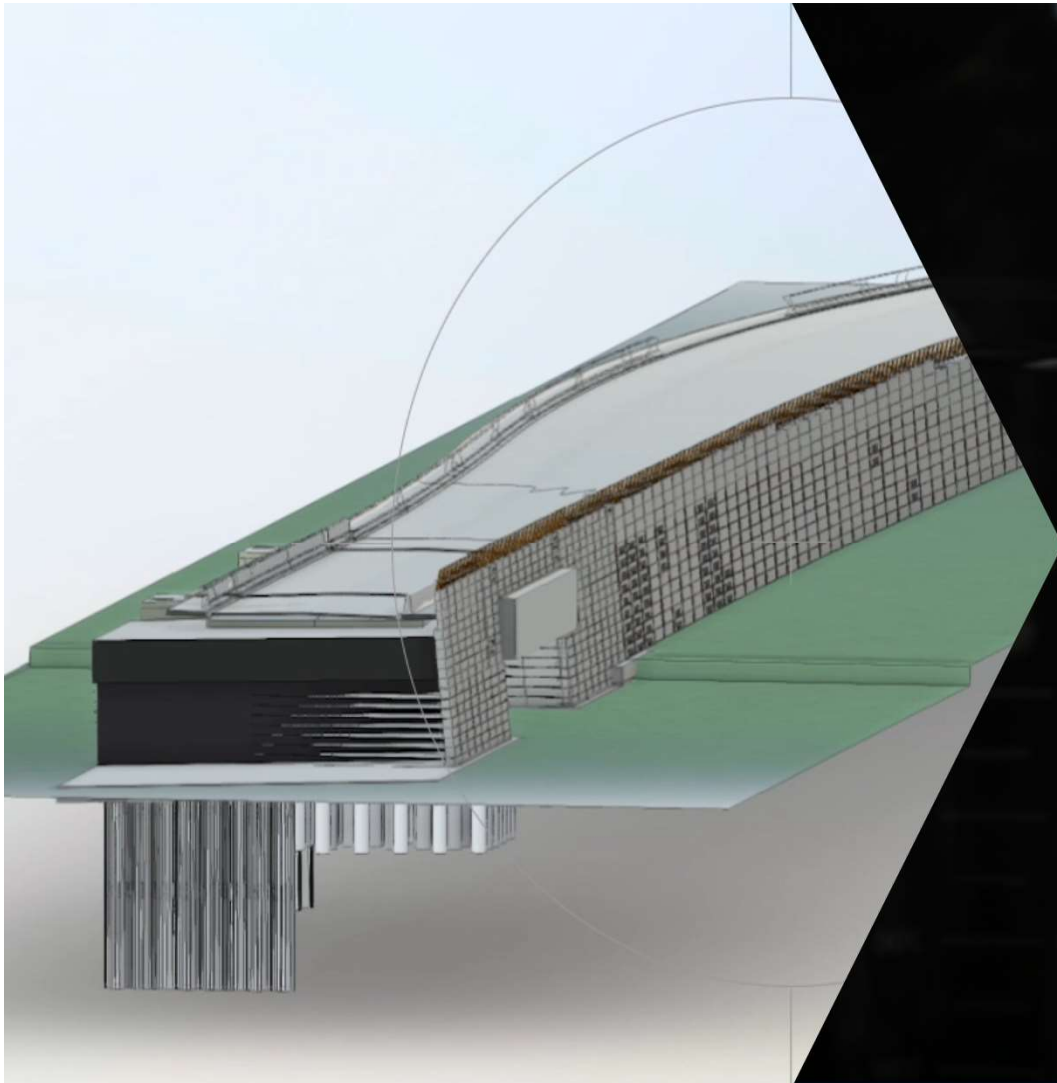


MacSTARS enables the design of high-end and challenging structures in the most diverse conditions.

Within MacSTARS W, engineers can select the most up to date and certified products (e.g. BBA and CE marked) to be used within their retaining wall or reinforced soil slope/wall.

10,000+
projects designed per year





MACCAFERRI

**Certified
Quality**



MACCAFERRI

CE Certificate

ETA n. 15/0219

CE
1301-CPR-1229

BBA Certificate



MACCAFERRI

EPD Certificate



BIM

bimstore





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Pioneering Sustainability



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ECO PLATFORM



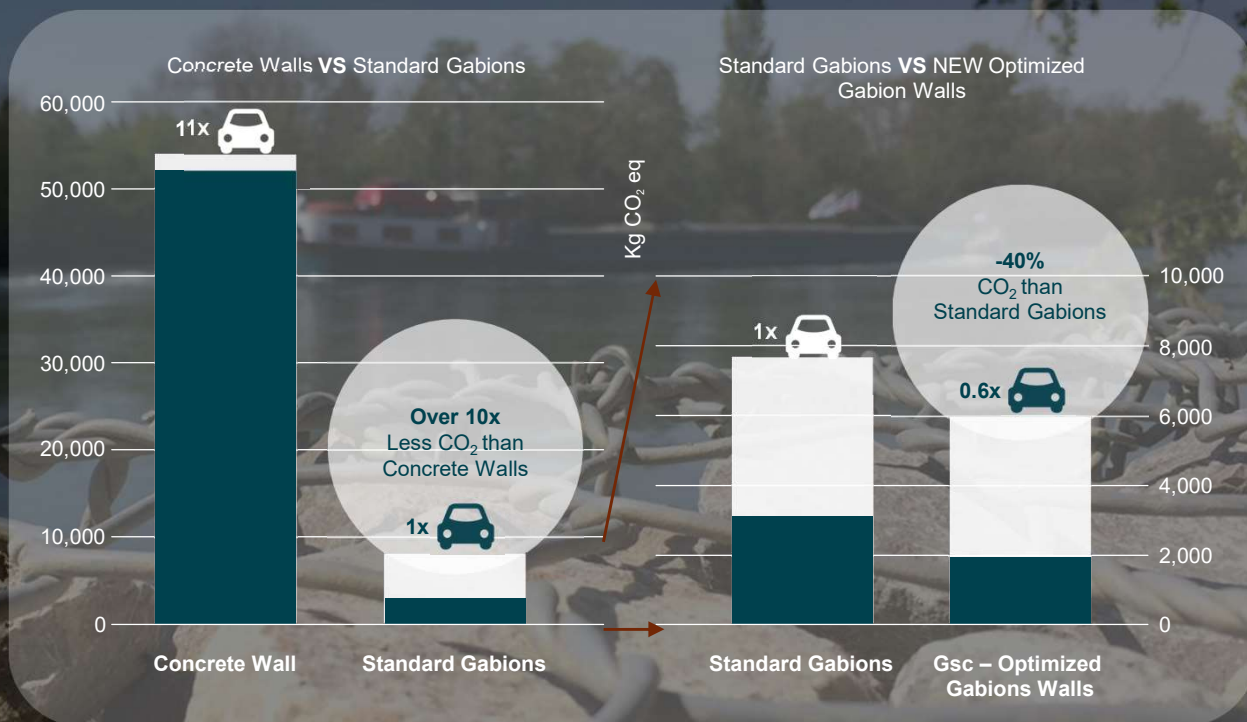
EPD is a key tool for assessing and improving the sustainability of building materials and plays a crucial role in promoting a transition towards a more environmentally friendly and efficient building sector. It is a declaration that is becoming mandatory for every construction material in Europe.



A Green Thought Drives our Solutions

CO₂ Emissions for the
Construction of 80m² wall

-  Annual CO₂ emissions of a passenger vehicle
-  Transport (KgCO₂eq)
-  Material Input (KgCO₂eq)



Comparison based on a 8m high wall, assuming the availability of a stone quarry within 100km from the jobsite

Proximity to high level stakeholders

