MACCAFERRI

TerraMesh™

Rise to the challenge

REINFORCED SOIL WALLS AND SLOPE REINFORCEMENT

When it comes to soil slopes with poor bearing capacity, when the ground must support extreme loads, or even when construction takes place in seismic areas, retaining walls and soil reinforcement structures can solve the earth retention problem.

Whether our clients need a small retaining wall in a housing development, a tall crusher wall in a mine or massive reinforced soil structures on a major infrastructure project, they trust Maccaferri to help.

Retaining Walls & Soil Reinforcement solutions

ALTERING SOIL SLOPES CAN LEAD TO MANY CHALLENGES.

Bearing capacity

When it comes to weak soils that need to support high loads or many loading and unloading cycles, the structures must be designed with great precision and constructed with quality materials.

Fast installation

Productivity on construction sites had always a great impact on a project's success; having a slow installation process can lead to productivity issues. Moreover, sometimes emergencies like floods and landslides require a rapid intervention to contain damages.

Challenging topography

Retaining walls and soil reinforcement solutions sometimes need to reach great heights while keeping a small ground footprint: lack of space can lead to a great challenge when designing soil reinforcement structures.

Availability of materials

Often, the scarcity of materials and the limited access to the construction site can represent an issue in constructing soil reinforcement structures. During the design process, the availability of materials during installation needs to be considered.

High durability

To reach a greater sustainability and a lower total cost of ownership, solutions need to have the longest design life. Especially in those regions with more aggressive climates, choosing the right type of structure and materials can be crucial when it comes to durability.

Environmental impact

When designing engineering solutions, the environmental impact of every structure needs to be considered. The best solutions are the ones that combine great performance with environmental integration.

REINFORCED SOIL WALLS AND SLOPE REINFORCEMENT

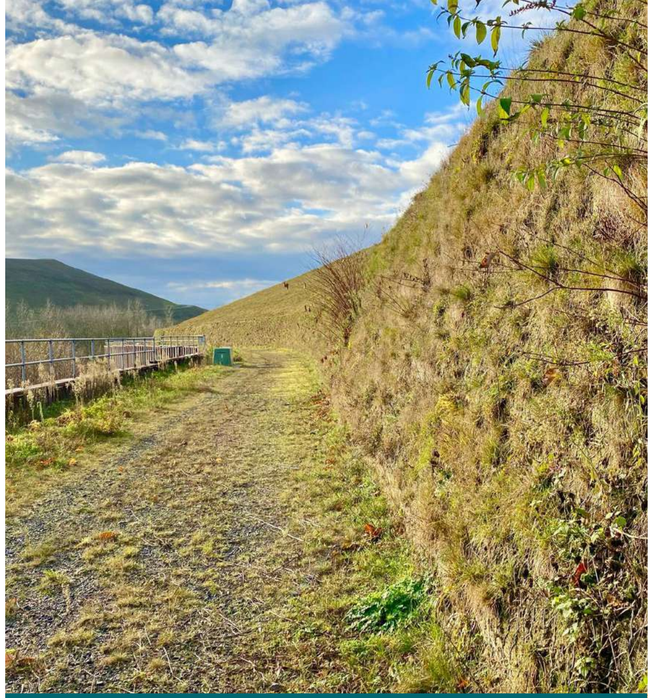
For over 100 years our expertise in slope reinforcement has been built up.

Our skills and experience were dedicated in solving these challenges, through constant innovation. This is how the TerraMesh™ family was born.

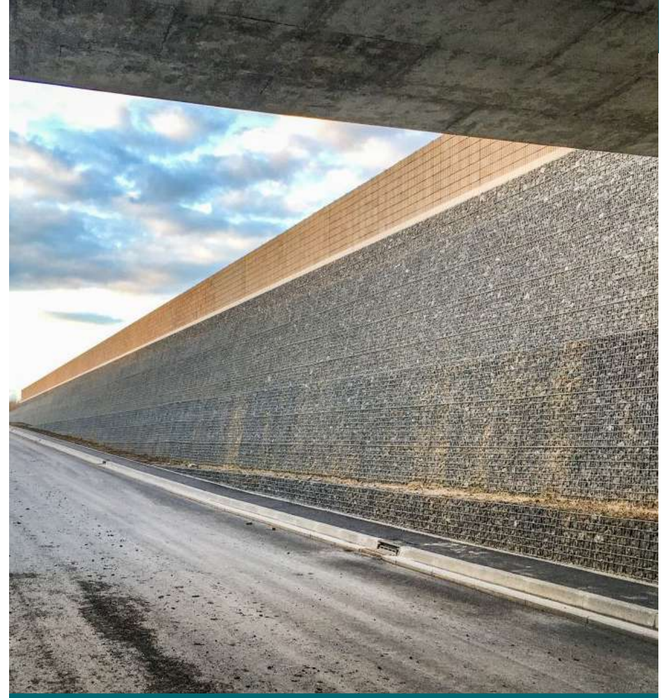
The TerraMesh™ family offers three different facing options:

- The rock facing with **TerraMesh™ System**
- The vegetated facing with **TerraMesh™ Green**
- The architectural facing with **TerraMesh™ Mineral**

TerraMesh™ System



TerraMesh™ Green



TerraMesh™ Mineral

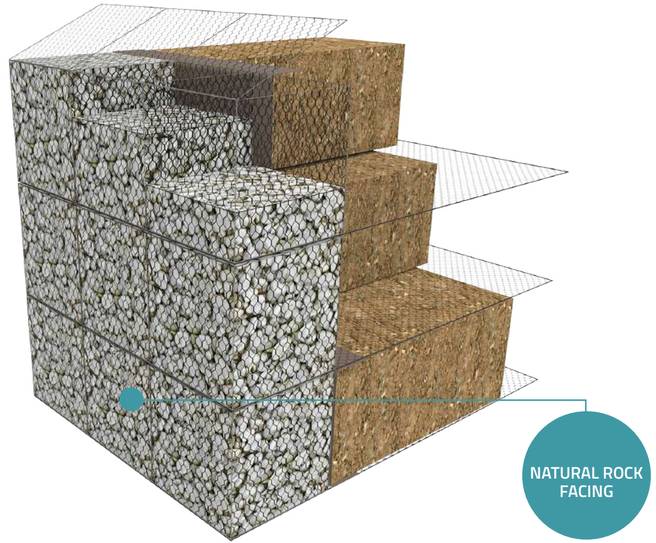
TERRAMESH™ SYSTEM

OUR DESIGN FOR THE EMBANKMENTS OF THE DEMIRKENT VILLAGE ROAD
TERRAMESH™ SYSTEM - ARTVIN DAM WALL - ARTVIN, KARADENIZ, TURKEY

TERRAMESH™ SYSTEM

TerraMesh™ System is a modular system used to form a rock-faced mechanically stabilized earth wall with vertical facing.

We supply pre-fabricated units that do not require cuts on site. A back panel and diaphragms are connected to the main fascia unit, thus creating the rectangular shaped cells used for stone confinement. When the fascia unit is filled with suitable gabion stones, structural backfill is then placed upon the soil reinforcement geogrids and compacted.



120 YEARS DESIGN LIFE

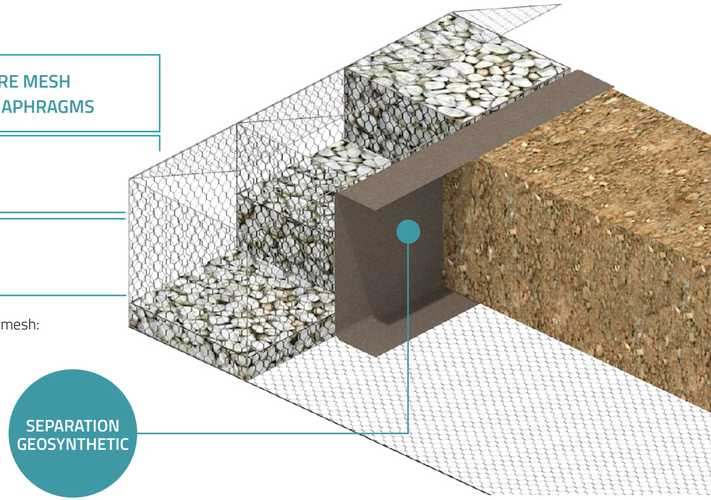
50 m² INSTALLED IN A SHIFT

GREAT PERFORMANCE UNDER HIGH LOADS

FRONT	8x10 DOUBLE TWISTED WIRE MESH BASKET WITH INTERNAL DIAPHRAGMS
UNIT DIMENSION	UP TO 3 m UNIT WIDTH UP TO 1 m UNIT HEIGHT
FACING	CONFINED STONES 90°

TerraMesh™ System is made of continuous PoliMac coated double twist wire mesh: it does not require internal connections minimising the risk of on-site errors

TerraMesh System
Rise to the challenge



TERRAMESH™
GREEN

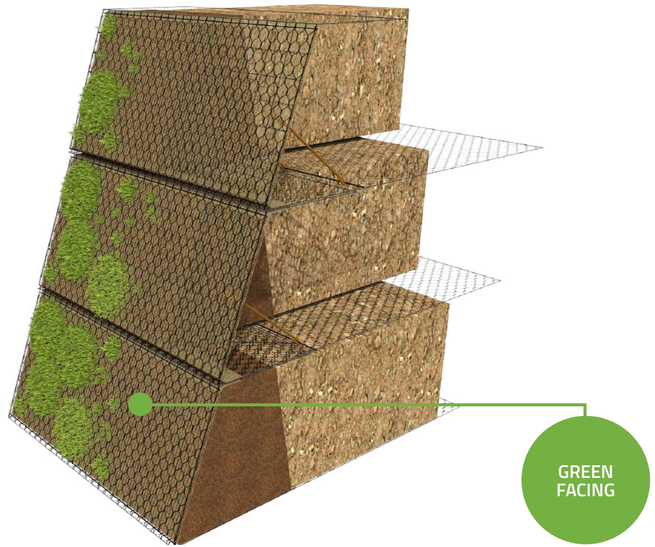
A GREEN CONTRIBUTION TO A PIECE OF ART
TERRAMESH™ GREEN - MUSEUM OF THE FUTURE - DUBAI, UNITED ARAB EMIRATES

photo credit: www.bam.com

TERRAMESH™ GREEN

TerraMesh™ Green is an environmentally friendly modular system used to form green-faced soil reinforced slopes and embankments.

The pre-fabricated units are simply erected on site, the bracing angles support the face at the designated angle. A good quality topsoil is placed immediately behind the front face: the topsoil together with the angled front and the erosion control blanket are designed to promote a rapid vegetation growth.



120 YEARS DESIGN LIFE

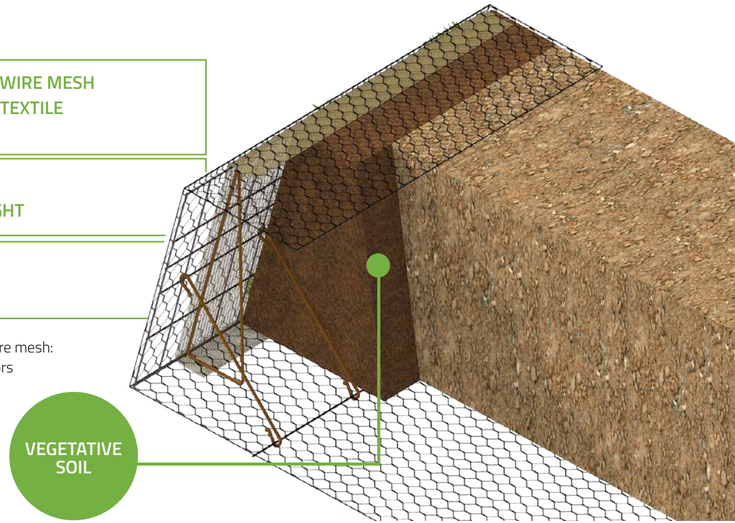
150 m² INSTALLED IN A SHIFT

ENHANCED ECOSYSTEM DIVERSITY AND CARBON SEQUESTRATION

FRONT PANEL	8x10 DOUBLE TWISTED WIRE MESH EROSION CONTROL GEOTEXTILE WELDED MESH PANEL
UNIT DIMENSION	UP TO 3 m UNIT WIDTH UP TO 0.76 m UNIT HEIGHT
FACING	VEGETATIVE SOIL UP TO 70°

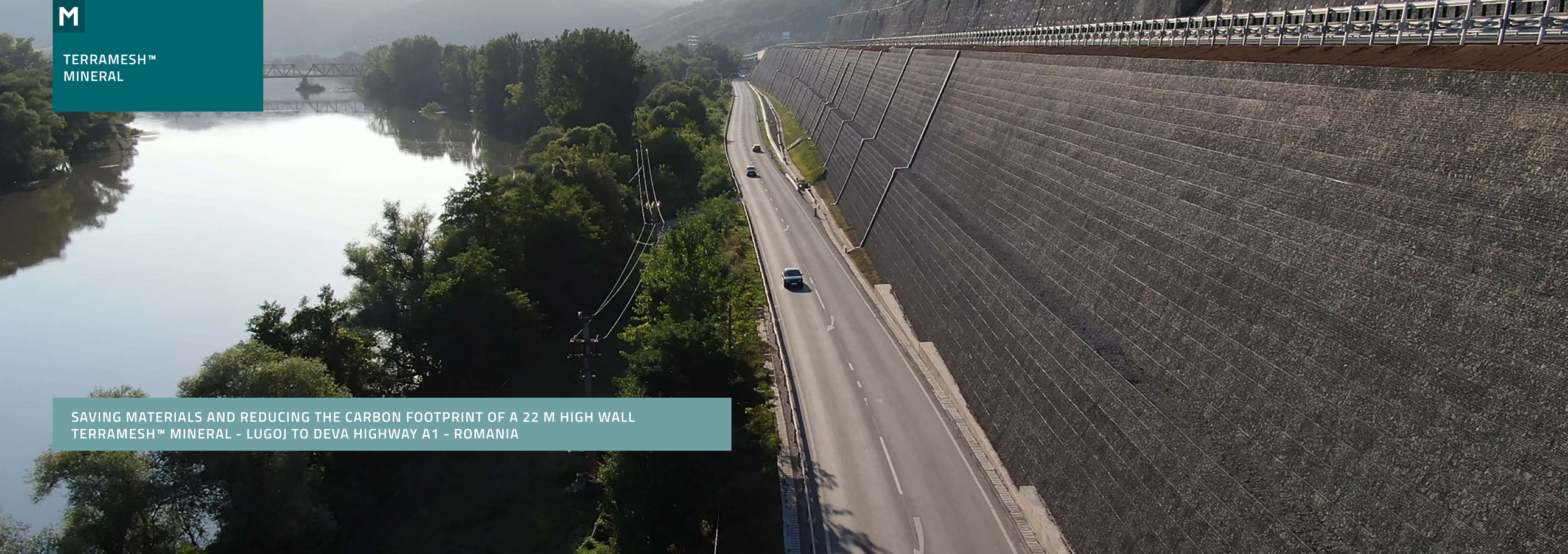
TerraMesh™ Green is made of continuous PoliMac coated double twist wire mesh: it does not require internal connections minimising the risk of on-site errors

TerraMesh Green
Rise to the challenge



TERRAMESH™
MINERAL

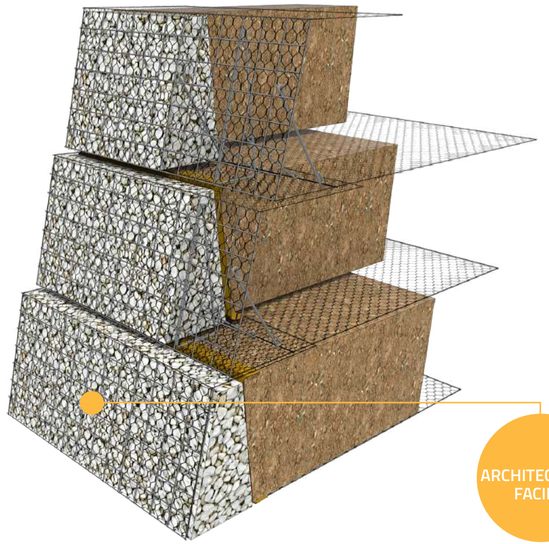
SAVING MATERIALS AND REDUCING THE CARBON FOOTPRINT OF A 22 M HIGH WALL TERRAMESH™ MINERAL - LUGOJ TO DEVA HIGHWAY A1 - ROMANIA



TERRAMESH™ MINERAL

TerraMesh™ Mineral is a unique soil reinforcement system with a sloping rock face finish.

The pre-fabricated units do not need any form of external framework due to the heavily galvanised welded mesh panels and bracing struts which hold the face at the correct angle during construction. TerraMesh™ Mineral is ideal when a clean-faced aesthetic is preferred.



120 YEARS DESIGN LIFE

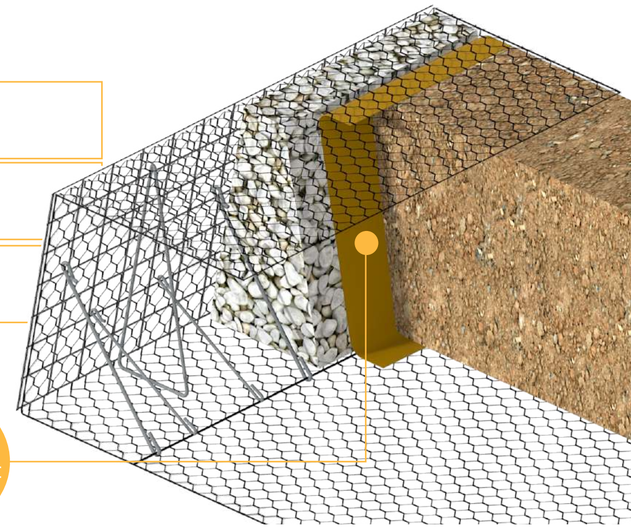
60 m² INSTALLED IN A SHIFT

REDUCED STONE CONSUMPTION

FRONT PANEL	8x10 DOUBLE TWISTED WIRE MESH WELDED MESH PANEL
UNIT DIMENSION	UP TO 3 m UNIT WIDTH UP TO 0.79 m UNIT HEIGHT
FACING	SLOPING ROCK UP TO 87°

TerraMesh™ Mineral is made of continuous PoliMac coated double twist wire mesh: it does not require internal connections minimising the risk of on-site errors

TerraMesh Mineral
Rise to the challenge



PARAMESH WALLS

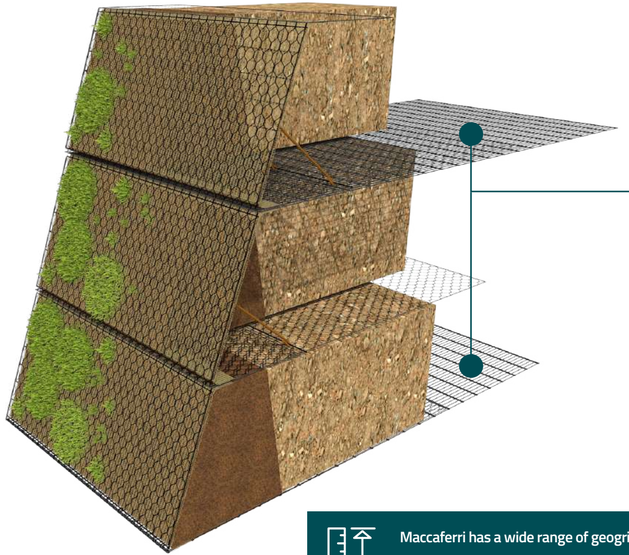
Reinforcing soils with the TerraMesh™ family in conjunction with our Paraproducts enables them to stand steeper, accommodate higher loads and settle less.

Our portfolio of geogrids is one of the widest in the market and enables us to meet specific project needs. We have been manufacturing, testing and innovating our Paraproducts since the 70s.

Paraproducts were successfully installed in thousands of projects including some of the world's tallest earth retaining structures. Over the years, many of our structures were exposed to outstanding mechanical and seismic loads, standing perfectly intact, thanks to their excellent performance.

Bearing capacity	The Paraproduct reinforcement enables the soil to accommodate greater loads, due to their high tensile strength, low strain and good interaction with the soil.
Fast installation	The combined use of Paraproducts with TerraMesh™ units maximises the speed of construction.
Challenging topography	Paraproducts provide the necessary strength to guarantee the overall stability of the highest structures with steep slopes.
Availability of materials	Paraproduct reinforcement enables the use of marginal soils making this solution feasible with any locally available filling.

"ParaLink and ParaGrid are amongst the most tried and tested geogrids in the world. "



ParaLink™
100 kN/m up to 1350 kN/m

ParaGrid™
30 kN/m to 200 kN/m in the longitudinal direction

ParaDrain™
50 kN/m to 200 kN/m in the longitudinal direction

Drainage function

Maccaferri has a wide range of geogrids with a variety of polymers, configurations and strengths.

This wide choice allows the optimization of reinforcement elements, which can be used only where necessary, saving materials and reducing the total cost of the structure.

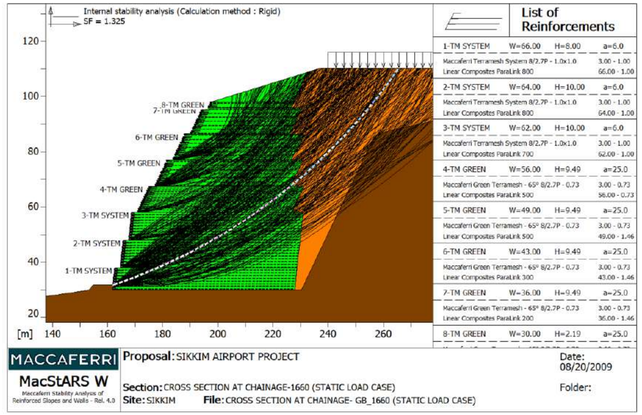
THE DESIGN OF HYBRID STRUCTURES

MACSTARS W, the software that suits the requirements of the civil and geotechnical engineers around the world while also offering additional benefits of cost-effectiveness and improved buildability

Within the MacSTARS W package, 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.

Our software suits the requirements of the civil and geotechnical engineers around the world while also offering additional benefits of cost-effectiveness and improved buildability

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



WORLDWIDE ACCEPTANCE & PROVEN RELIABILITY

USER-FRIENDLY INTERFACE

BUILT-IN LIBRARY OF CHARACTERISTIC VALUES OF PRODUCTS TO BE USED FOR THE DESIGN

MacSTARS accommodates complex soil geometries and other features including:

- Pore water pressure
- Seismic conditions
- External uniform and point load surcharges

The internal and global stability checks, including the reinforcement tension path is compliant with most of the worldwide design standards for retaining walls and reinforced soil slopes

The current library allows the user to design following the Eurocode 7, BS8006:2016 (British), NF P94-270 and NF XP G38-064 (French), DIN 1054 (German), SANS 207 (South African), A-NZ (Australian), Russians, FHWA (American) and NTC 2017 (Italian) standards.

10,000+

PROJECTS DESIGNED PER YEAR

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

QUALITY BEYOND EXPECTATIONS

Our products undergo a rigorous and continuous test campaigns in compliance with international and national standards.

Data published on our products are based on specific assessment of product performance.

Full Scale Compressive Test

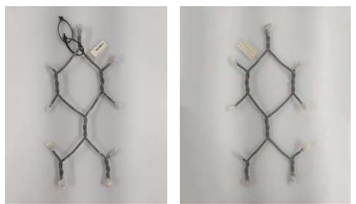
Approval on the product quality including testing in laboratories, onsite evaluations, quality management checks and inspections of production.

Continuous control of product performance in compliance with EU legislation.

Evaluation performed by a panel of experts - final report is the result of an impartial, consensus-based approach to evaluating.

Rigorous certification procedure to ensure that the performances of commercial kits conform to predefined performances criteria.

Our TerraMesh achieved the Environmental Product Declaration (EPD), an independently verified and registered document that communicates transparent and comparable information about the life-cycle environmental impact of products.



Test Specimen, before and after Salt Spray Test (ISO 9227)

PoliMac®

WIRE PROTECTION FOR A CHANGING WORLD

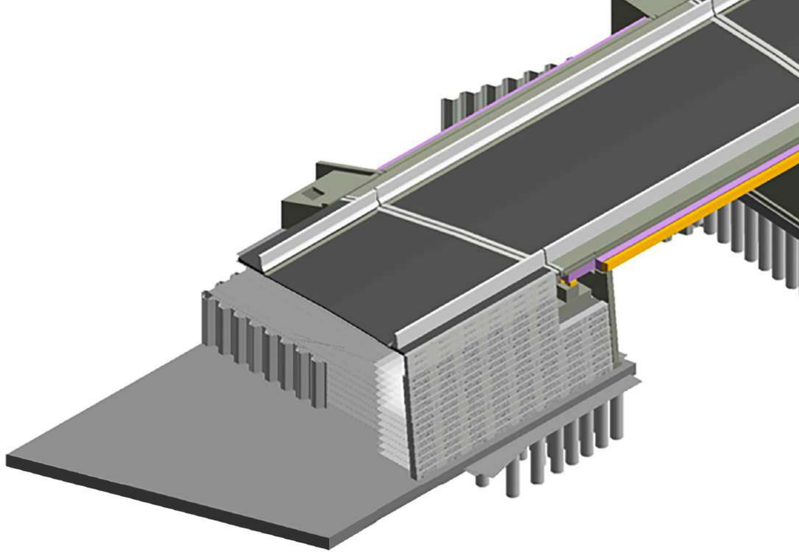
10x	Better resistance to abrasion, including installation damage
2x	More resistance to chemical aggressions*
4x	More performance in cold weather
4x	More resistance to UV rays**

* In terms of resistance to sulphiric, nitric, formic, acetic acids
** In terms of elongation after 2500 hrs of exposure

We encourage a continuous improvement to put the long term economical and environmental impacts of a structure at the centre of the design activity.

Our solutions are based on the re-use of natural materials to minimise the evironmental impact and support the achievement of Sustainable Development Goals of the United nations.

SUSTAINABLE DEVELOPMENT GOALS



TerraMesh is available as BIM object on maccaferri.com/BIM. The use of BIM object improves design and construction processes, preventing on-site operation inaccuracies.

Our TerraMesh BIM objects have been widely used in many projects across the world, including the development of Oosterweel Link, a major infrastructure project in Antwerp (Belgium)

bimstore

Download the digital model for free on bimstore or on maccaferri.com/BIM

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Engineering a Better Solution

Maccaferri's motto is **'Engineering a Better Solution'**; We do not merely supply products, but work in partnership with our clients, offering technical expertise to deliver versatile, cost effective and environmentally sound solutions. We aim to build mutually beneficial relationships with clients through the quality of our service and solutions.

GLOBAL ENGINEERS

In the second half of the 19th century, we invented Gabions and dramatically changed the civil engineering landscape. We are still changing today. We work every day to find better solutions for our clients at every degree of latitude and longitude. Our worldwide network grows through innovation and diversification of sectors of activity and through an increasing range of high quality and environmentally friendly products and applications.

OFFICINE MACCAFERRI GROUP PROFILE

Founded in 1879, our Group soon became a worldwide reference in the design and development of advanced solutions, with offices in over 70 countries and 30 factories worldwide.

Our mission is to pursue excellence through continuous improvement, while delivering to customers engineered solutions that are innovative, advanced and environmentally friendly. We are committed to outstanding safety, quality and sustainability, to create value for all stakeholders as well as our communities.

MACCAFERRI APPLICATIONS

- RETAINING WALLS & SOIL REINFORCEMENT
- HYDRAULIC WORKS
- ROCKFALL PROTECTION & SNOW BARRIERS
- EROSION CONTROL
- SOIL STABILISATION & PAVEMENTS
- BASAL REINFORCEMENT
- COASTAL PROTECTION, MARINE STRUCTURES & PIPELINE PROTECTION
- ENVIRONMENT, DEWATERING & LANDFILLS
- DRAINAGE OF STRUCTURES
- TUNNELLING*
- LANDSCAPE & ARCHITECTURE
- SAFETY & NOISE BARRIERS
- FENCING & WIRE
- AQUACULTURE NETS/CAGES
- CONCRETE FLOORING, PRECAST & OTHER USES*
- INDUSTRIAL MANUFACTURING

MACCAFERRI