Unveiling Strength: Exploring Double Twist Mesh Solutions for Enhanced Geotechnical Stability

Date: May 28, 2024
Author: Justin Naidoo

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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.

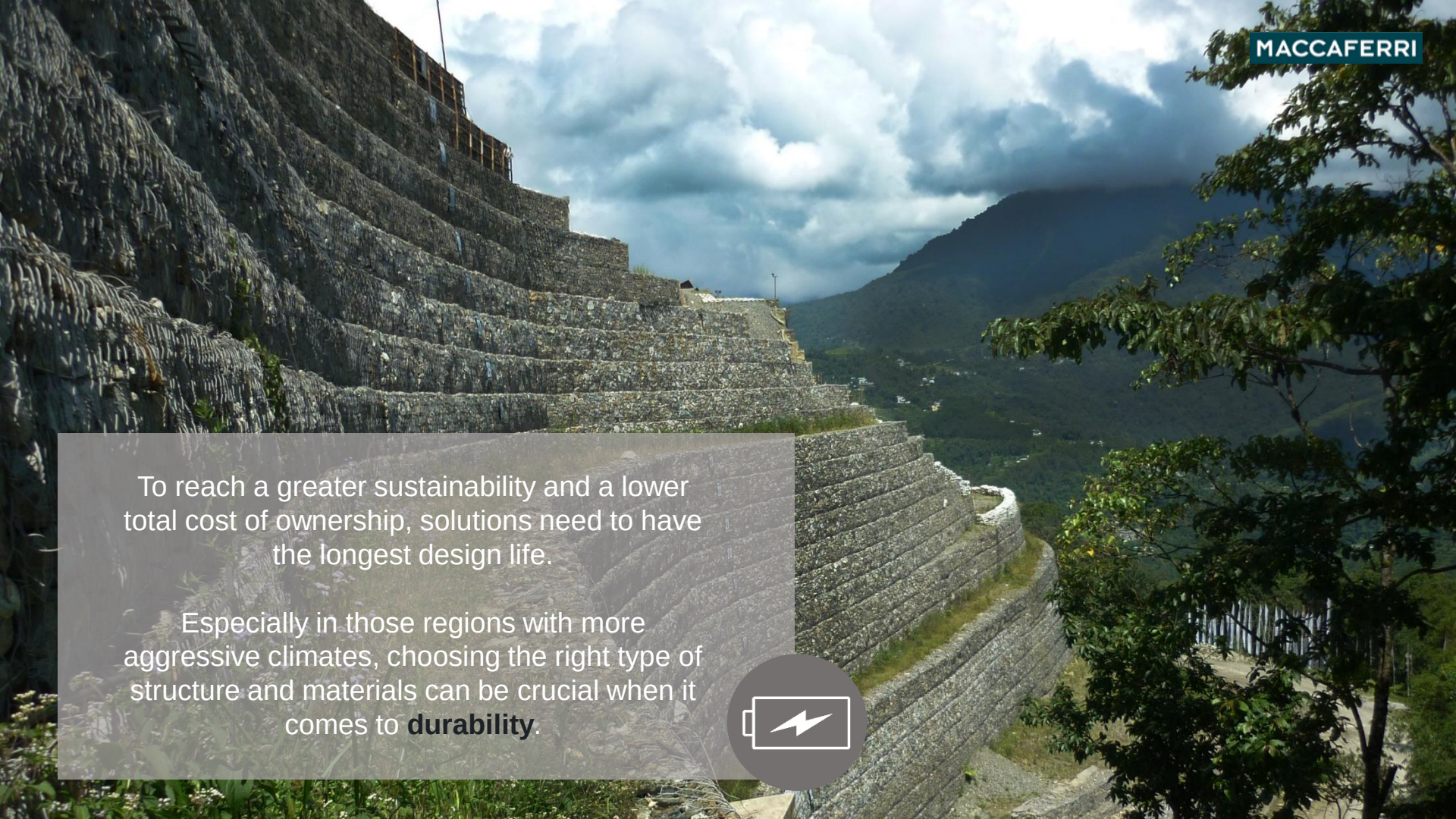
Productivity on construction sites has always a great impact on a project's success.

Sometimes, emergencies like floods and landslides require a **rapid intervention** to contain damages.

Retaining walls and soil reinforcement solutions sometimes need to reach great heights while keeping a small ground footprint.

The **lack of space** can lead to a great challenge when designing these structures.

Often, the **scarcity of materials** and the limited access to the construction site can represent an issue in constructing soil reinforcement structures.



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**.

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**.

INTRODUCTION TO MACCAFERRI

For over 140 years, Officine Maccaferri has researched, designed and developed solutions to solve problems related to the Civil Engineering and Construction Market.

Officine Maccaferri's worldwide headquarters are located in Bologna, Italy. The Company has on-the-ground operations in almost 100 countries worldwide and employs 2,181 people.

The Company promotes the most sophisticated high-quality products – including woven hexagonal wire mesh steel products, geosynthetics and fibers.

DOUBLE TWISTED STEEL WIRE MESH (DT MESH) PRODUCTS

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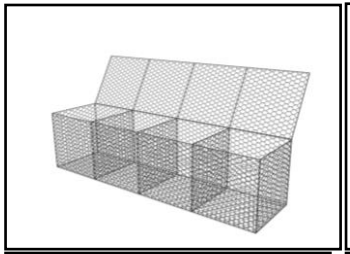
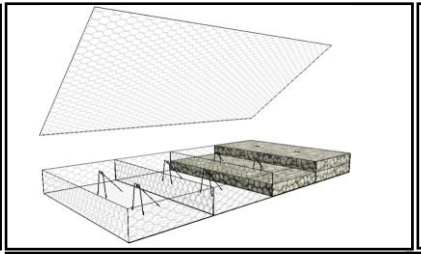
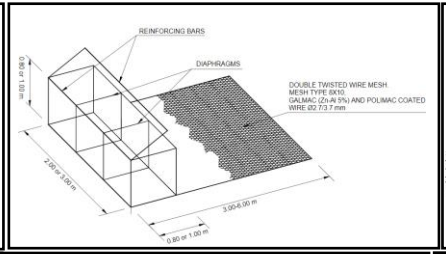
GABION



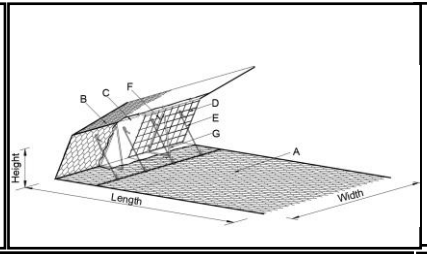
RENO MATTRESS PLUS



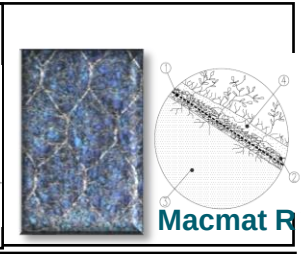
TERRAMESH SYSTEM

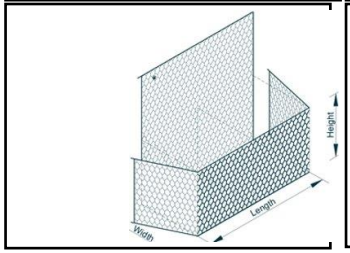


GREEN TERRAMESH

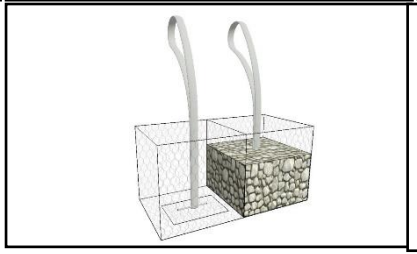


RENOMESH Green

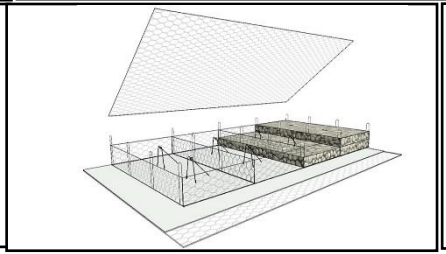




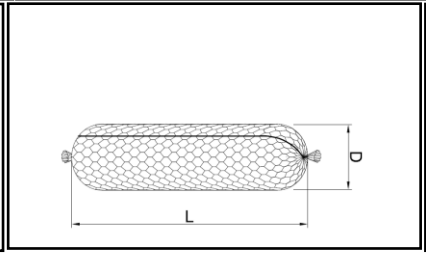
GABION STRONG FACE



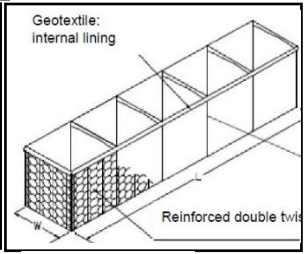
CUBIMAC



RENOMAC

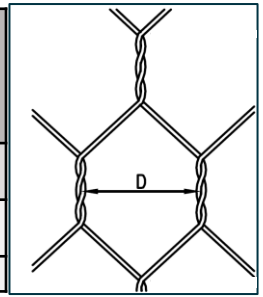


SACK GABION



FLEXMAC

MESH			Wire diameter
Mesh type	D [mm]	Size tolerances [mm]	[mm]
6 x 8	60	-0 / +8	2.2
8 x 10	80	-0 / +10	2.7
			3



DOUBLE TWISTED STEEL WIRE MESH (DT MESH)

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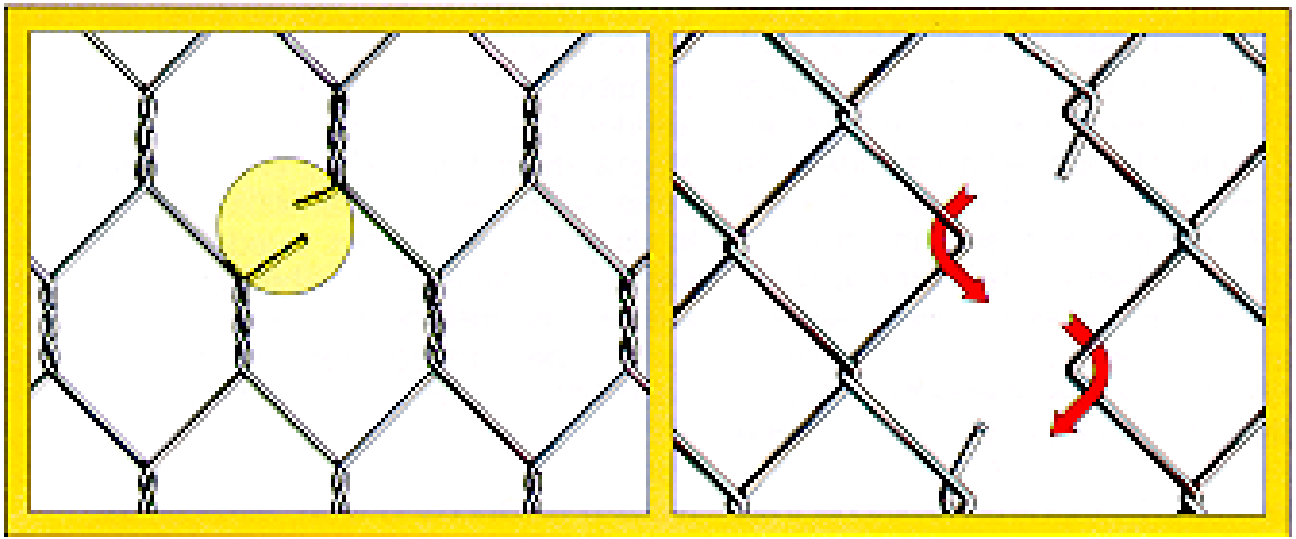
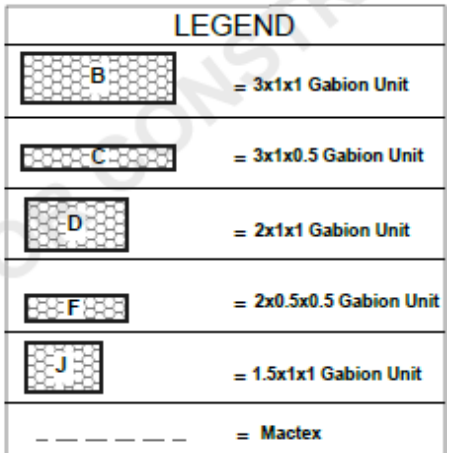
Why is it double twisted?

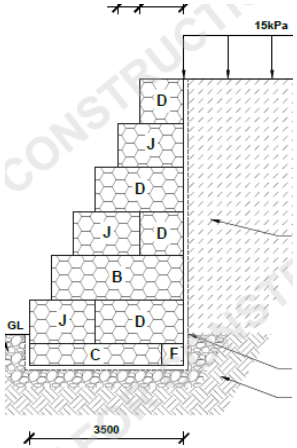


DOUBLE TWIST **SINGLE TWIST**

RETAINING STRUCTURES : GRAVITY GABION WALLS

Gravity walls : Double Twisted Wire Mesh Gabion





RETAINING STRUCTURES : GRAVITY GABION WALLS

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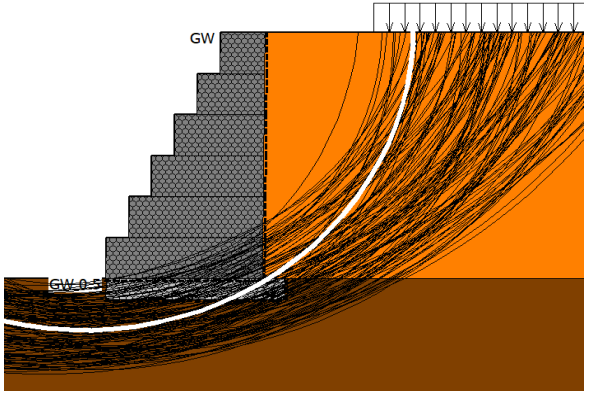
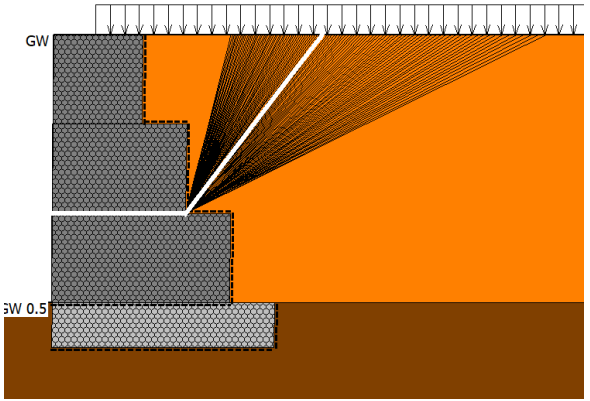
Gravity walls : Double Twisted Wire Mesh Gabion





RETAINING STRUCTURES : GRAVITY GABION WALLS

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Functions	Application
• Drainage and Erosion control • Energy dissipation • Environmental enhancement • Architectural features	• Retaining walls • Channel linings • Hydraulic control structures • Architectural works

SOIL REINFORCEMENT : TERRAMESH SYSTEM

The TerraMesh solutions are fabricated from a double twisted steel wire mesh: the facing is integrally manufactured with the DT soil reinforcement.

All the TerraMesh solutions are made of **PoliMac** coated wire mesh.

Reinforcing soils with the TerraMesh in conjunction with our **Paraproducts** enables them to stand higher and steeper, to accommodate higher loads and to reuse on-site soils.

GEOGRIDS REINFORCEMENT

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SOIL REINFORCEMENT : TERRAMESH SYSTEM MSE WALL

SOIL REINFORCEMENT : TERRAMESH SYSTEM MSE WALL

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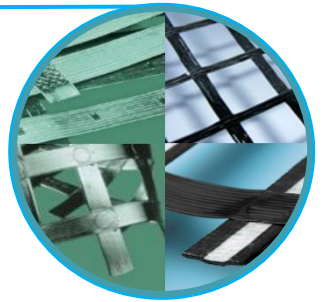
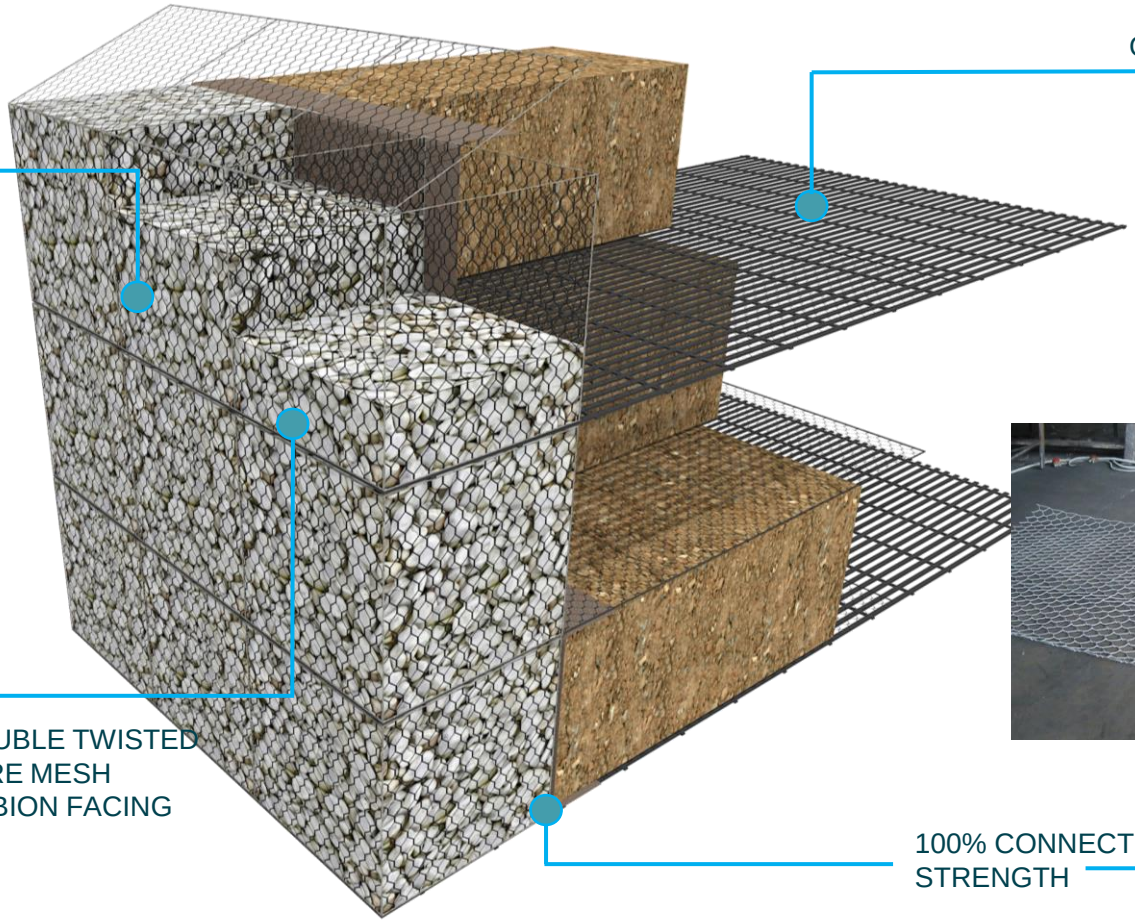
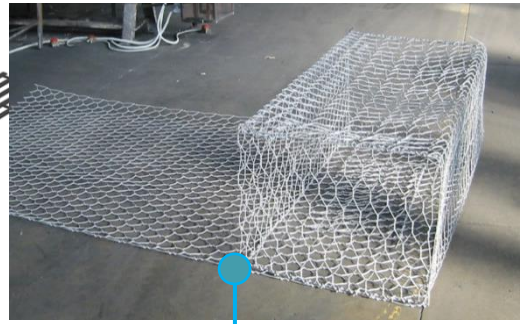
Terramesh System 3D View

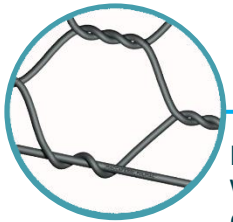
VERTICAL AND NATURAL ROCK FACING

GEOGRID









DOUBLE TWISTED WIRE MESH GABION FACING

100% CONNECTION STRENGTH

SOIL REINFORCEMENT : TERRAMESH SYSTEM MSE WALL

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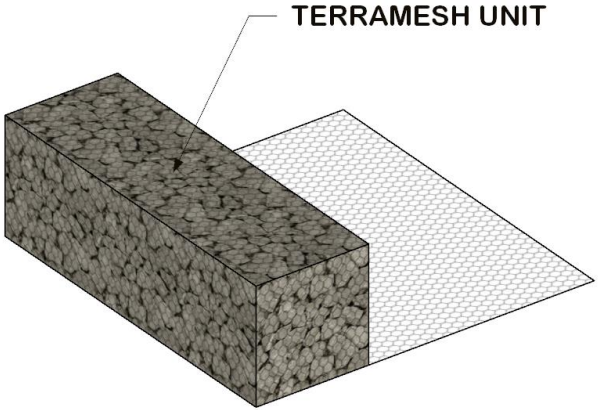
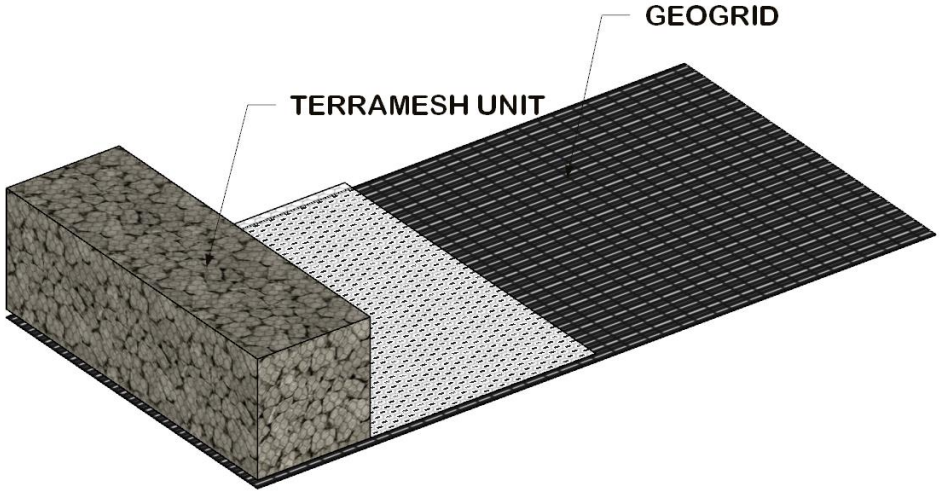
Installation Sequence



Isometric view of a stone filled Terramesh Unit

The tail of Terramesh acts as the secondary soil reinforcement with 100% connection strength for the MSE wall facing.



Isometric view Paralink geogrid with Terramesh Unit

High strength geogrid type ParaLink will act as the primary soil reinforcement for the MSE wall.

SOIL REINFORCEMENT : TERRAMESH SYSTEM MSE WALL

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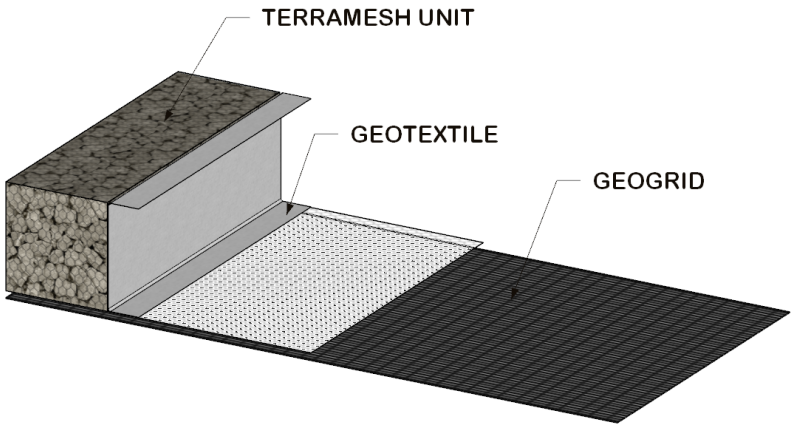
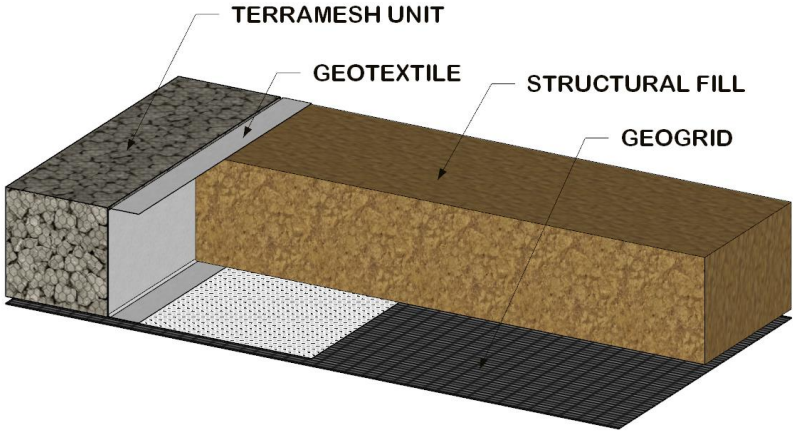
Installation Sequence





Isometric view with geotextile separation layer

The non-woven geotextile layer will as a seperation / filtration layer between the stone facing and the compacted backfill.

Isometric view of compacted structural backfill

The structural fill will be compacted in layers. In-situ soil or graded rockfill can be used for this purpose based on test results.

SOIL REINFORCEMENT : TERRAMESH SYSTEM MSE WALL

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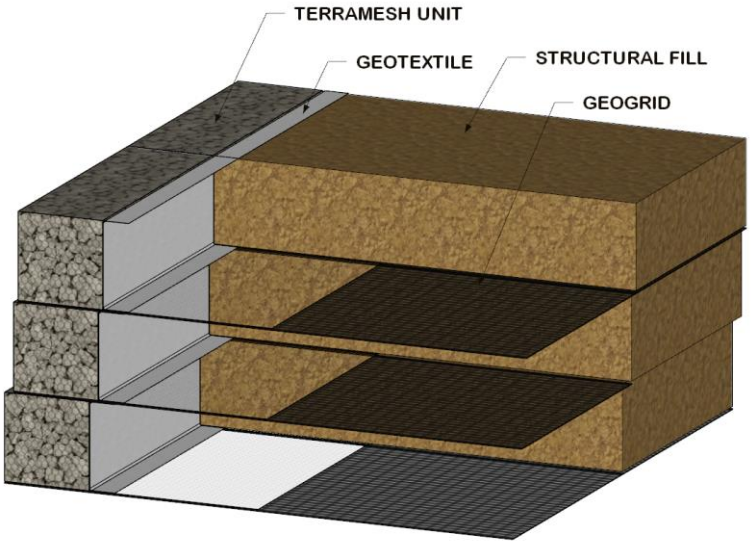
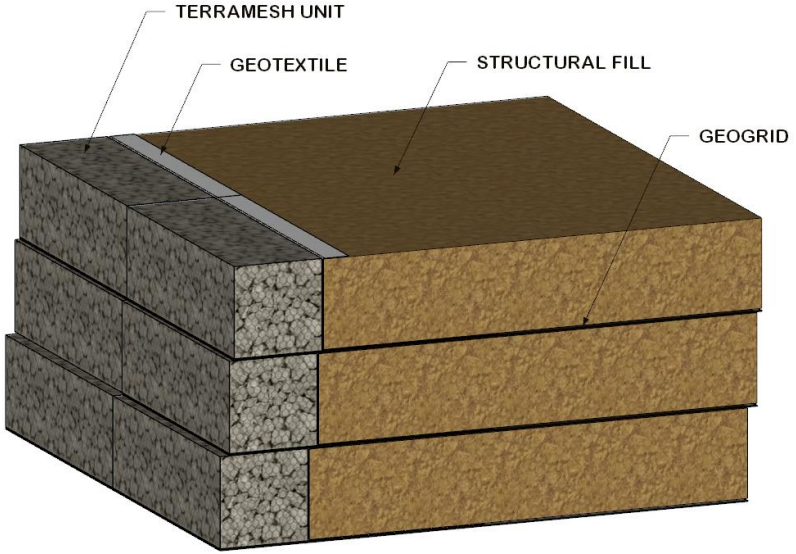
Installation Sequence



Isometric view of various components as work progresses (from wall inside)



Isometric view of various components as work progresses (from wall outside)

SOIL REINFORCEMENT : TERRAMESH SYSTEM MSE WALL

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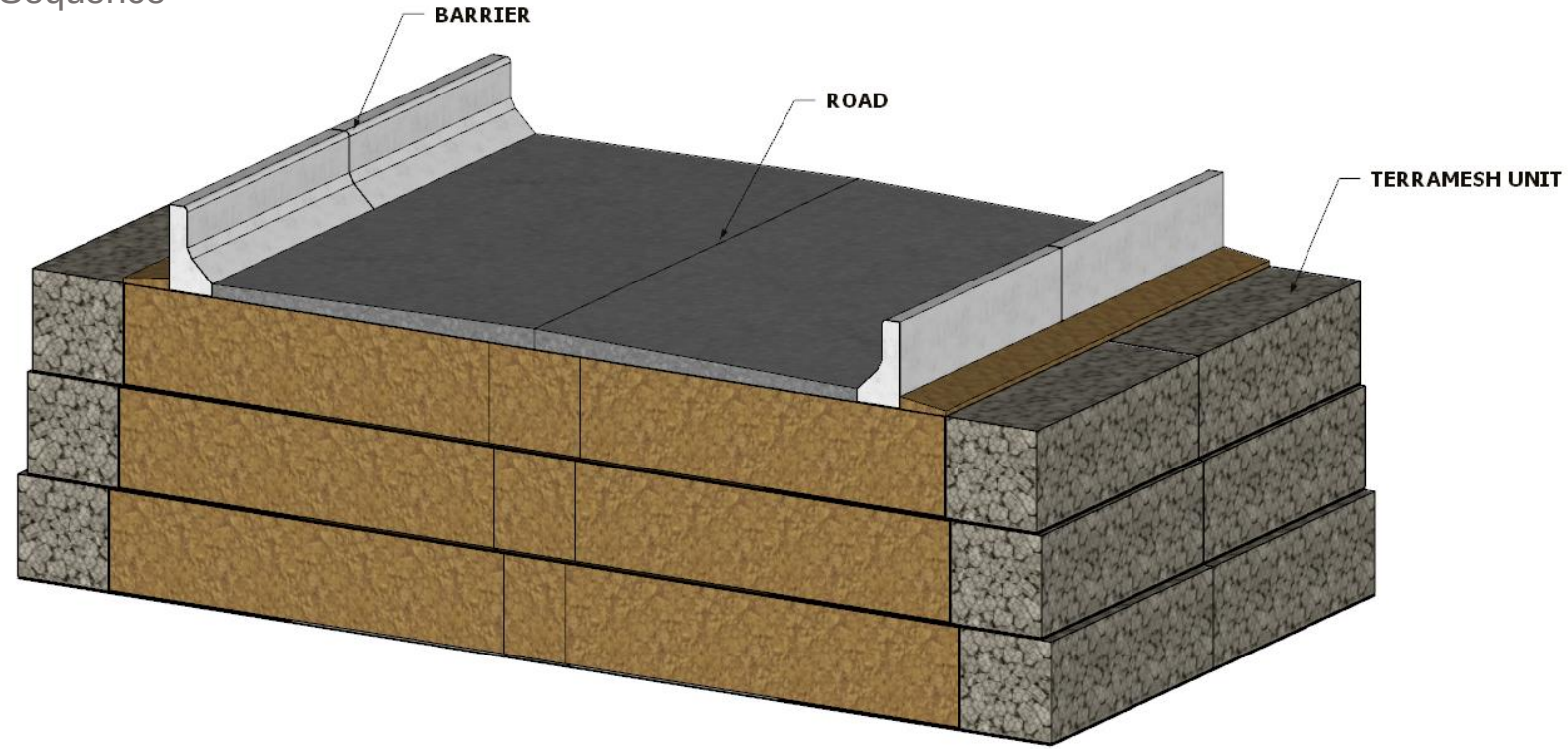
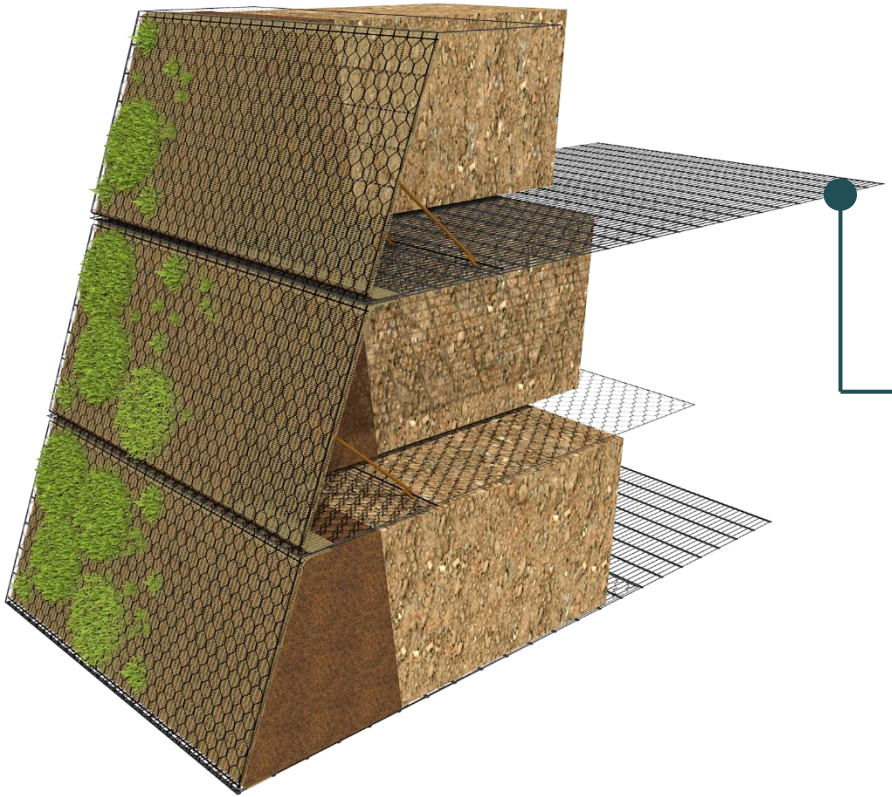
Installation Sequence



Isometric view of a 3m high ramp with Terramesh system

SOIL REINFORCEMENT : GREEN TERRAMESH SYSTEM MSE WALL

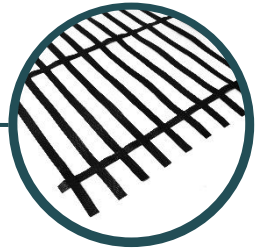


ParaLink

300 kN/m up to 1600 kN/m

ParaGrid

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



SOIL REINFORCEMENT : GREEN TERRAMESH SYSTEM MSE WALL

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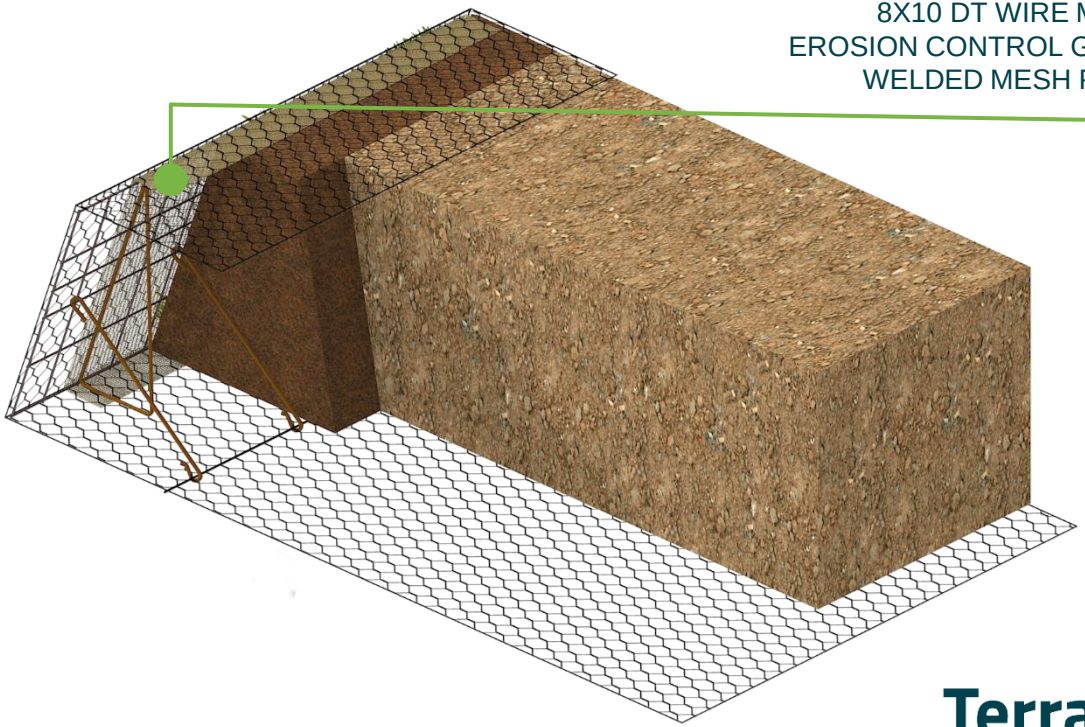
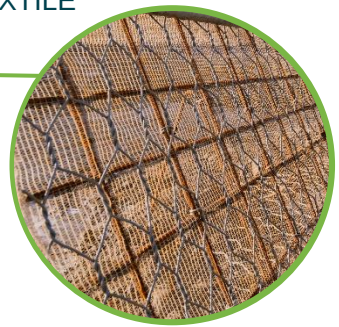
Installation Sequence



8X10 DT WIRE MESH
EROSION CONTROL GEOTEXTILE
WELDED MESH PANEL



TerraMesh Green
Rise to the challenge

SOIL REINFORCEMENT : GREEN TERRAMESH SYSTEM MSE WALL

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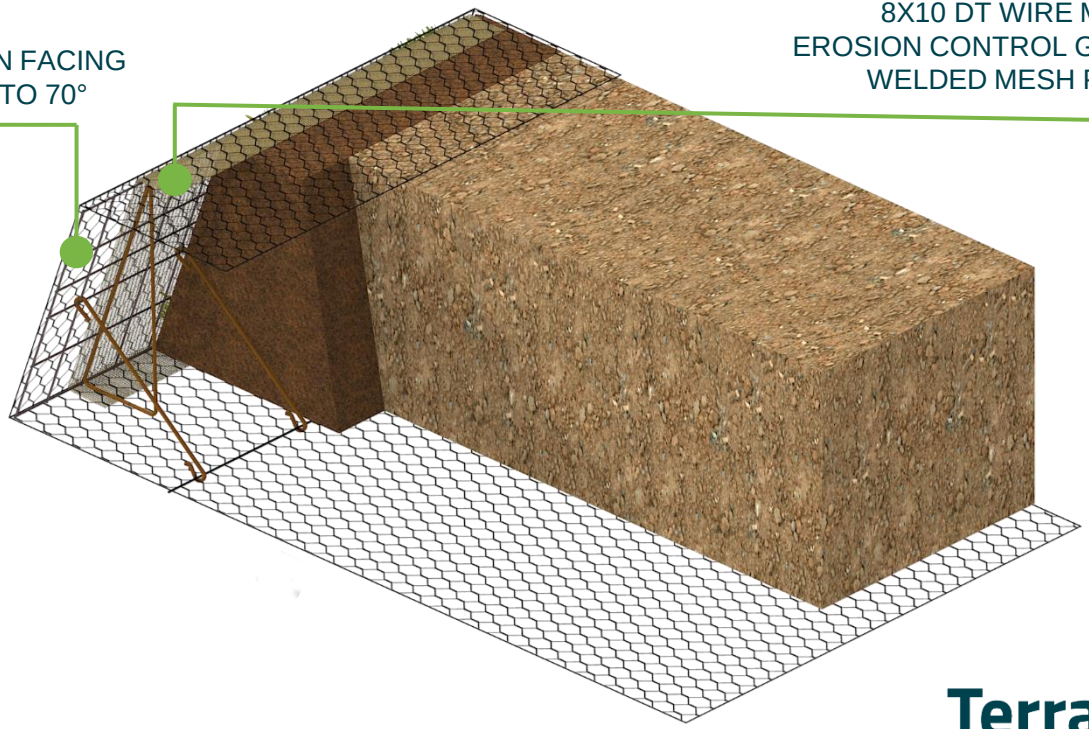
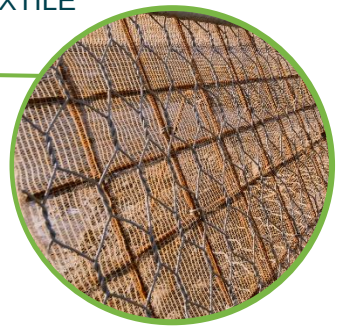
Installation Sequence

GREEN FACING
UP TO 70°



8X10 DT WIRE MESH
EROSION CONTROL GEOTEXTILE
WELDED MESH PANEL



TerraMesh Green
Rise to the challenge

SOIL REINFORCEMENT : GREEN TERRAMESH SYSTEM MSE WALL

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Installation Sequence

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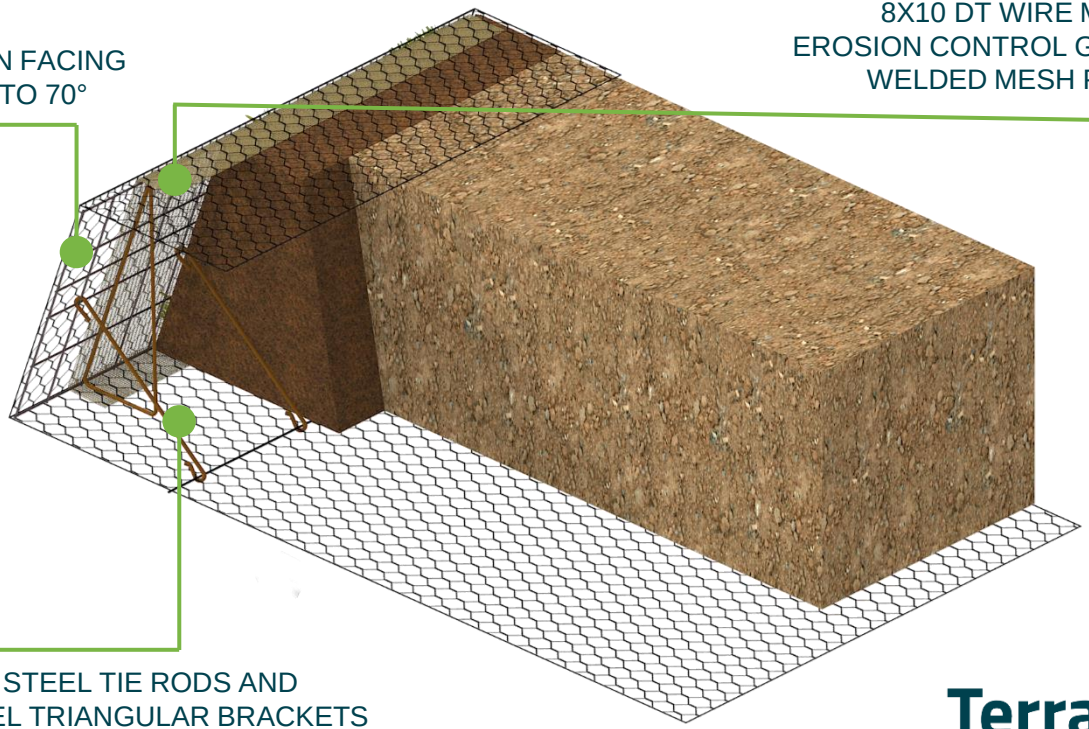
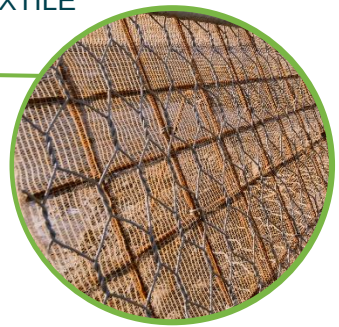
UP TO 70°



8X10 DT WIRE MESH
EROSION CONTROL GEOTEXTILE
WELDED MESH PANEL



STEEL TIE RODS AND
STEEL TRIANGULAR BRACKETS

TerraMesh Green
Rise to the challenge

SOIL REINFORCEMENT : GREEN TERRAMESH SYSTEM MSE WALL

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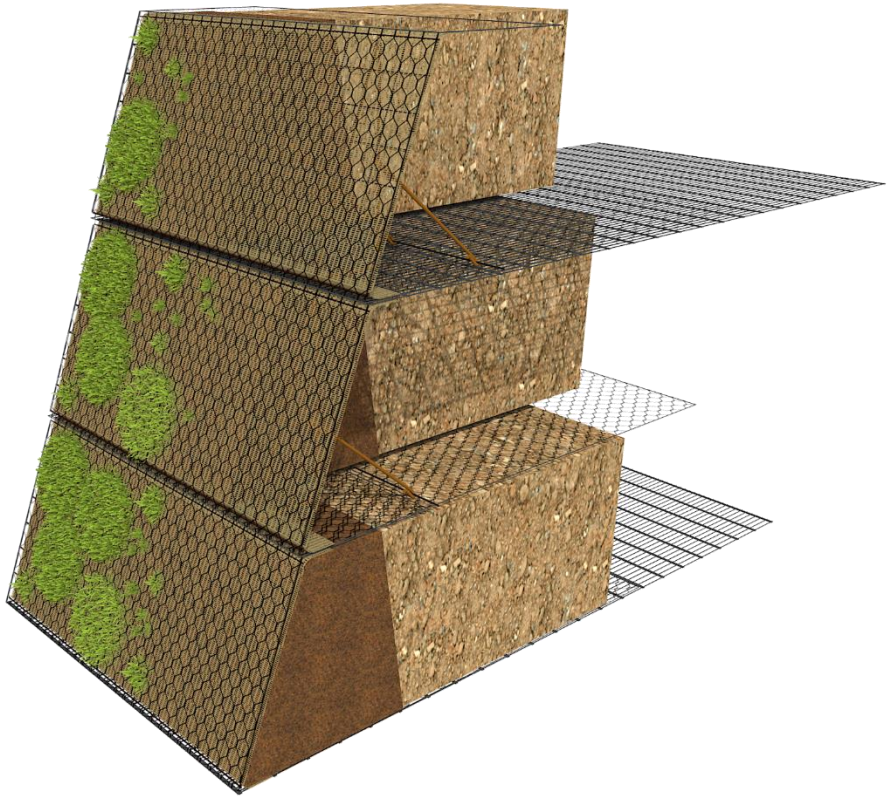
Installation Sequence



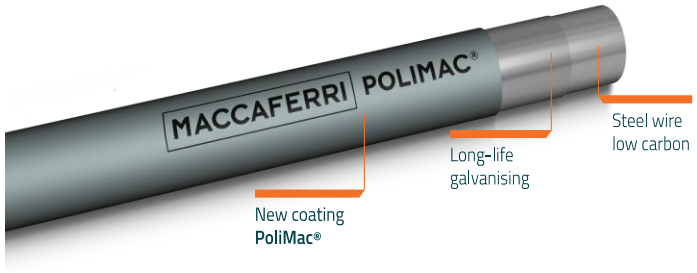
The geogrid reinforcement enable soil to accommodate **greater loads**, due to their high tensile strength, low strain and good interaction with the soil.

Paraproducts provide the necessary strength to guarantee the overall stability of the **highest structures** with **steep slopes**.

The combined use of Paraproducts with TerraMesh units maximises the **speed of construction**.

Paraproduct reinforcement enables the use of marginal soils making this solution feasible with any **locally available filling**.

TERRAMESH MSE WALL SYSTEM : DURABILITY & CERTIFICATION



PoliMac®
WIRE PROTECTION FOR A CHANGING WORLD

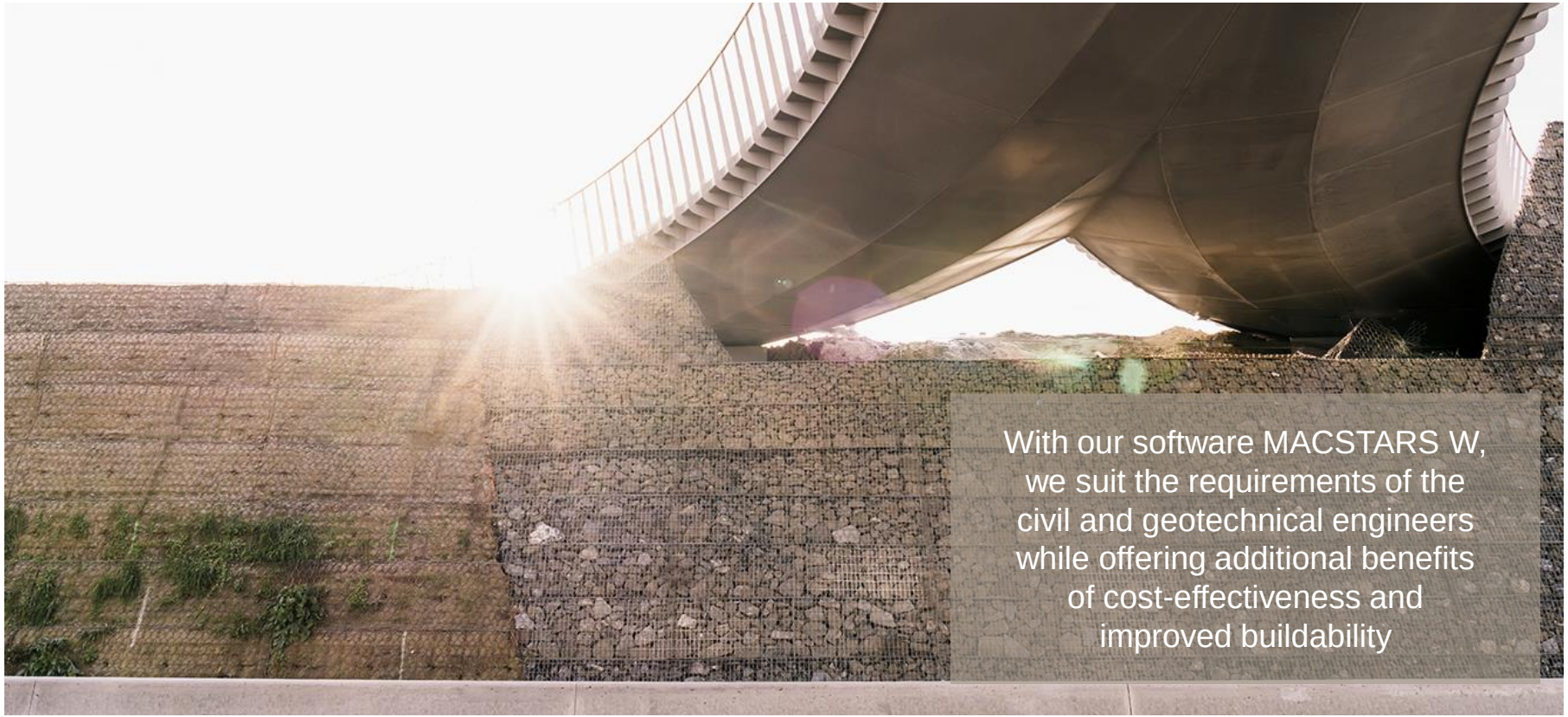
12x Better resistance to **abrasion**, including installation damages

2x More resistance to **chemical aggressions***

4x More performance in **cold weather**

4x More resistance to **UV rays****

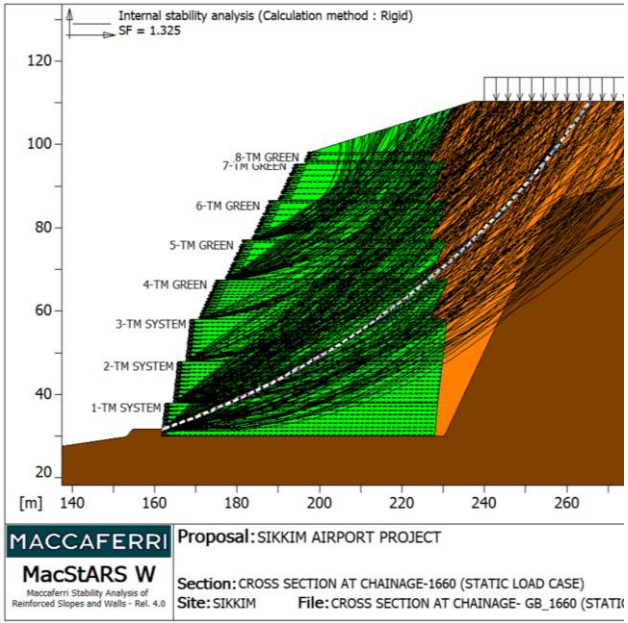
DESIGNING HYBRID STRUCTURES



FROM MACSTARS W TO INSTALLED PROJECT

MACCAFERRI

Sikkim Airport Project, India



10,000+

projects designed per year

OUR BEST PROJECTS AROUND THE WORLD

In its

140 years of experience

Maccaferri has carried out thousands of projects around the world.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TASIAST GOLD MINE, MAURITANIA

MACCAFERRI

Client: **KINROSS**

Designer: **AUSENCO**

Contractor: **TASIAST MAURITANIE LTD SA**

Products used (Qty.): **TERRAMESH™ 2,200 m2 - PARALINK™ 45,000 m2**

Date of construction: **09/2017 - 03/2018**


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HUBEI SHENNONGJIA AIRPORT TERRAMESH™ RETAINING WALL PROJECT

A fast access to the world's ecological treasure house

MACCAFERRI

Client: **BEIJING JINGGANG AIRPORT CONSTRUCTION CO. LTD.**

Designer: **CIVIL AVIATION NEW ERA AIRPORT DESIGN INSTITUTE GUANGZHOU BRANCH**

Contractor: **BEIJING CHINA AVIATION PORT CONSTRUCTION ENGINEERING CO., LTD.**

Products used (Qty.): **TERRAMESH™ SYSTEM 19,127 pcs**

Date of construction: **07/2011 - 09/2012**


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MUSEUM OF THE FUTURE

A green contribution to a piece of art

MACCAFERRI

Client: **MERAAS**

Designer: **BURO HAPPOLD ENGINEERING**

Contractor: **BAM INTERNATION**

Products used (Qty.): **TERRAMESH™ GREEN 3,500 m2 - MACWEB 3,000 m2 - MACDRAIN™ W 12,500 m2 - MACMAT HS 6,000 m2 BIOMAC™ NATURAL 9,000 m2 - DT MESH HS 3,000 m2**

Date of construction: **11/2018 - 04/2021**

Aerial view of Pakyong Airport/Source: Airport Authority of India (AAI) - VDR

MACCAFERRI SOLUTIONS FOR CONSTRUCTION OF NEW AIRPORT AT PAKYONG, SIKKIM

The 2012 international ground engineering project of the year

Client: **AIRPORTS AUTHORITY OF INDIA (AAI)**

Designer: **PUNJJ LIOYD LTD AND MACCAFERRI**

Contractor: **MOTT MCDONALD INDIA PVT LTD**

Date of construction: **2009 - 2018**

Aerial view of Pakyong Airport/Source: Airport Authority of India (AAI) - VDR

ENVIRONMENTAL SUSTAINABILITY

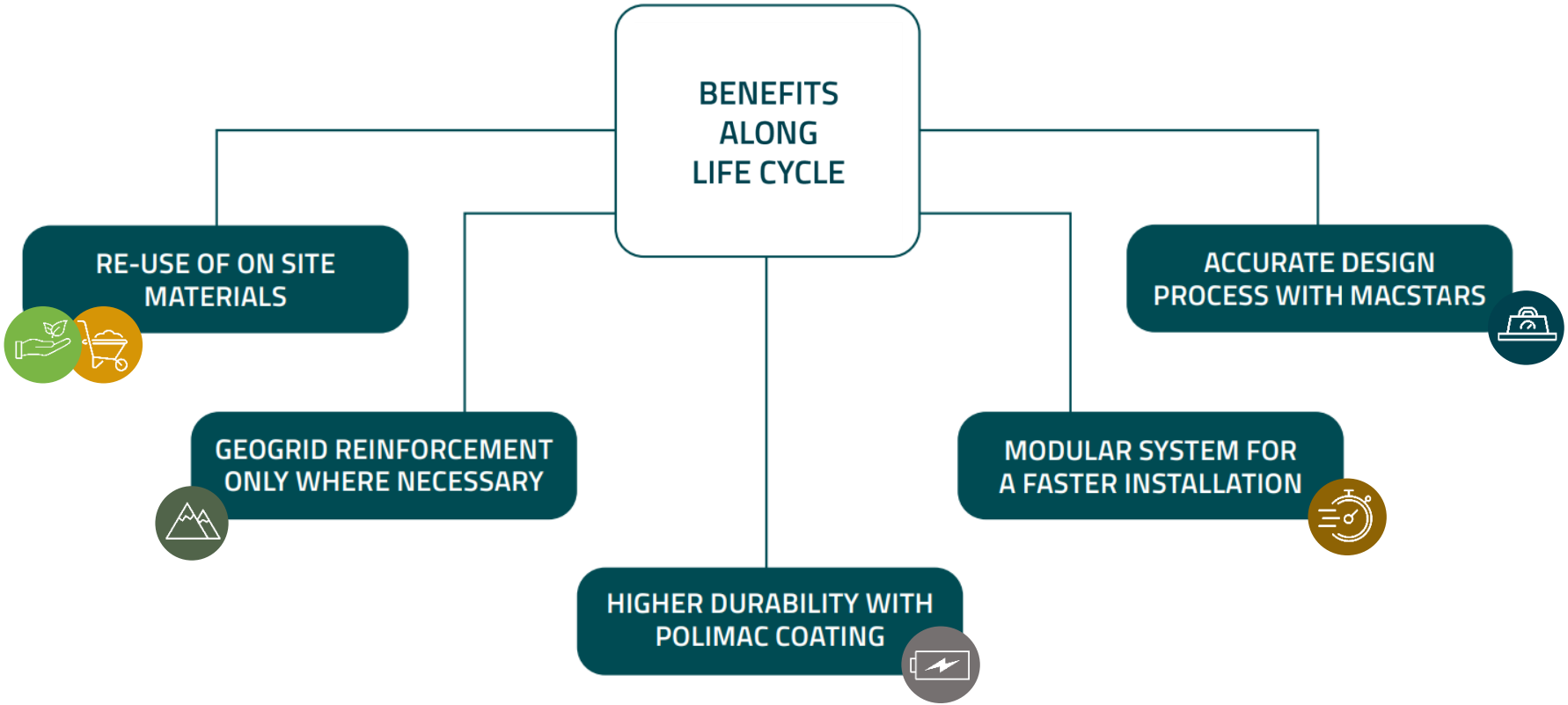
All our efforts are aimed at delivering the most environmentally sustainable solutions

We endeavour to reduce the environmental impact of our solutions and to achieve a balance between the technical performance and the natural integration.

The TerraMesh family has a low environmental impact (GWP 1,04 kgCO_2eq)

WHY IS DOUBLE TWIST THE BEST

MACCAFERRI



CERTIFIED QUALITY

MACCAFERRI

Why choosing a TerraMesh solution?

Our design process is focused on test campaigns and investments in performance evaluation of our solutions.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION
HAPAS Certificate 16/H247

EPD®
THE INTERNATIONAL EPD® SYSTEM
Certification Number SP 01468

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CE
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PAR AFNOR CERTIFICATION
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CERTIFIED QUALITY

MACCAFERRI

Why choosing a TerraMesh solution?

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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION
HAPAS Certificate 16/H247

EPD®
THE INTERNATIONAL EPD® SYSTEM
Certification Number SP 01468

ETA n. 16/0767
CE
1301-CPR-1230

HITEC

PAR AFNOR CERTIFICATION
NF

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

CERTIFIED QUALITY

MACCAFERRI

Why choosing a TerraMesh solution?

Our design process is focused on test campaigns and investments in performance evaluation of our solutions.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION
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HITEC

PAR AFNOR CERTIFICATION
NF

Transparent and comparable information about the life-cycle environmental impact of products

CERTIFIED QUALITY

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Continuous control of product performance in compliance with EU legislation

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Highway Innovative Technology Evaluation Center – an evaluation performed by a panel of experts - final report is the result of an impartial, consensus-based approach to evaluating the system

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HITEC

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NF

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

MACCAFERRI

TerraMesh Q&A

Rise to the challenge

Any questions? Type them in the chat box!

Thank you!

We look forward to seeing you at our next webinar!