Advanced Geocell Technology for Slope Protection

MACCAFERRI

WEBINAR AGENDA

MACCAFERRI

5’ **Introduction**

15’ **Our solution vs traditional solutions**

5’ **Installation and Success Stories**

5’ **Conclusions**

Q&A Session

Speaker

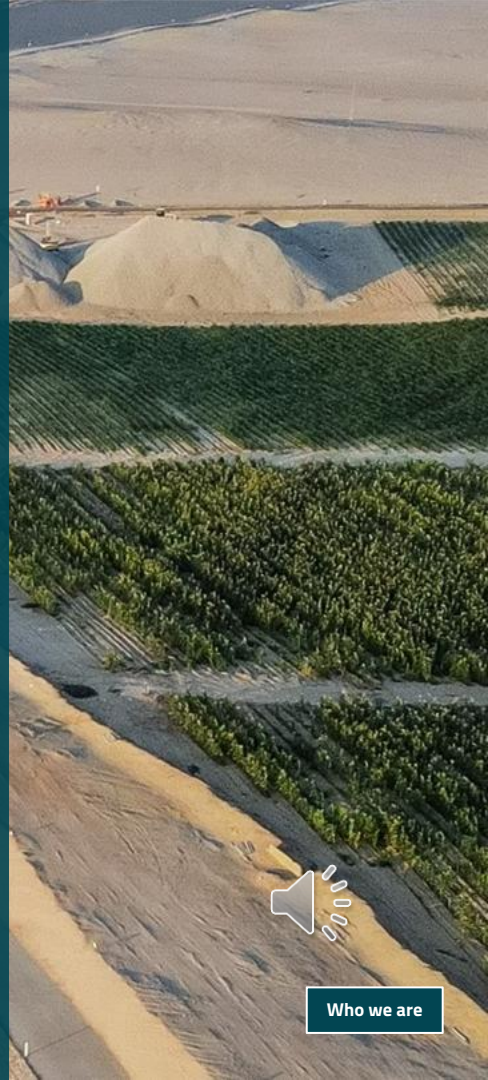
Fabrizia Trovato

erosion CONTROL
sustainable durability

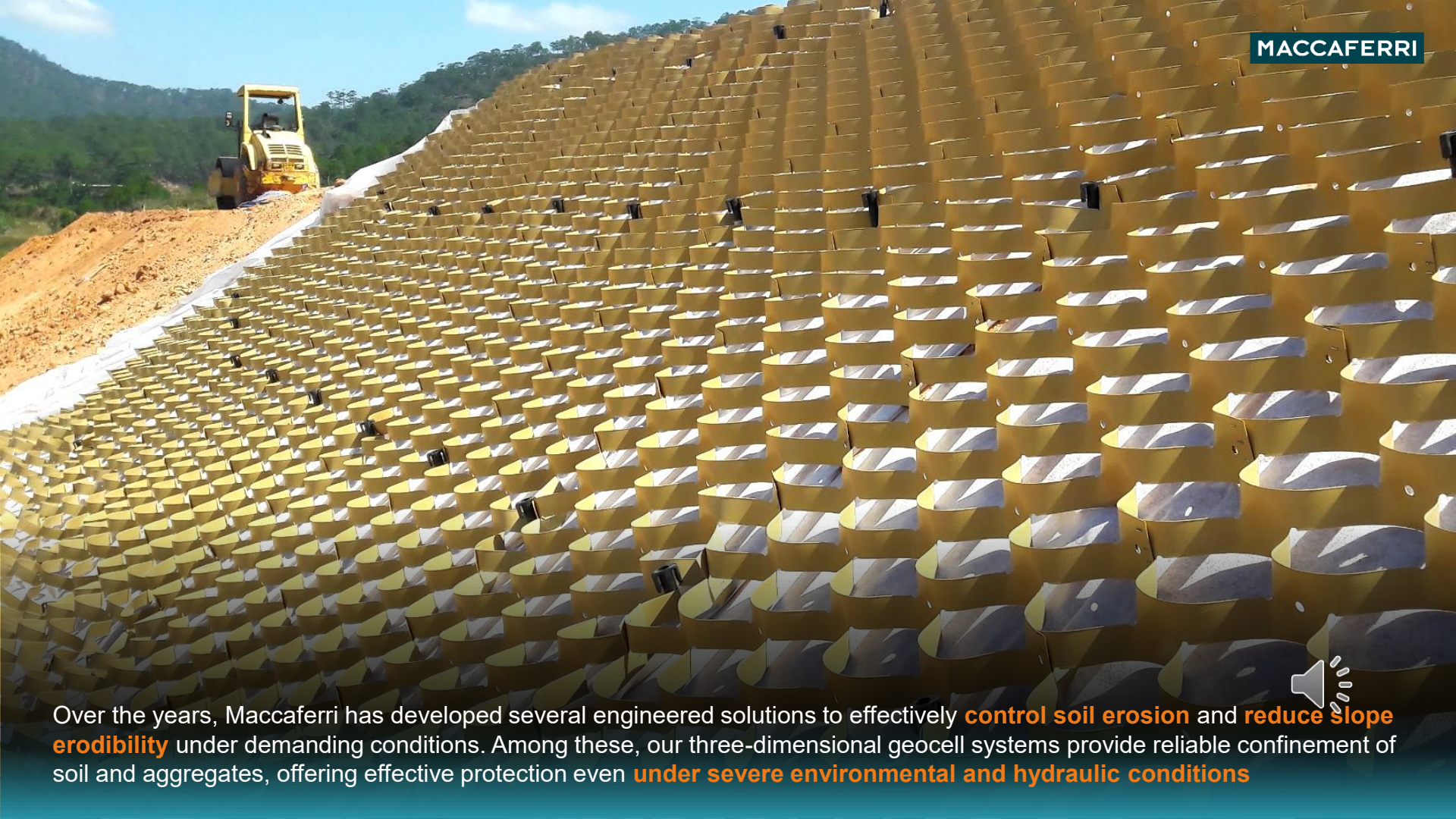
We protect people, infrastructure and ecosystems through future-ready innovation

At a global scale, we support the planet's urgent need for climate change adaptation, with a presence in over 130 countries and more than 145 years of engineering excellence.

Our **integrated**, **sustainable**, **and resilient solutions** put us at the forefront of climate adaptation engineering: long before the industry moved beyond mass-produced materials, we already envisioned a new way to build Sustainable Infrastructure.



Soil erosion refers to the wearing away of the field's **topsoil,** in which the high organic matter is contained. Wind and stormwater runoff, especially on **steep slopes or arid surfaces**, are among the most common causes of soil erosion.



Over the years, Maccaferri has developed several engineered solutions to effectively **control soil erosion** and **reduce slope erodibility** under demanding conditions. Among these, our three-dimensional geocell systems provide reliable confinement of soil and aggregates, offering effective protection even **under severe environmental and hydraulic conditions**

WHAT ARE GEOCELLS?

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Honeycomb-Structured Confinement Systems

Made from high-density polymer sheet (smooth/textured, perforated/solid)

Joined to form a three-dimensional honeycomb structure

Filled with soil or aggregates to create a stabilized, confined layer

HOW TRADITIONAL GEOCELLS WORK

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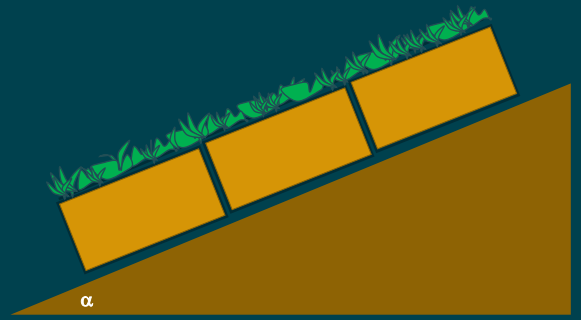
- Provide lateral confinement of infill material
- Reduce erosion on moderate inclinations
- Often require welding and small cell structures

TRADITIONAL GEOCELLS



Slope inclination α lower than infill angle of repose Φ

$\alpha < \Phi$

TRADITIONAL SOLUTIONS

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Revolutionary solution for slope protection

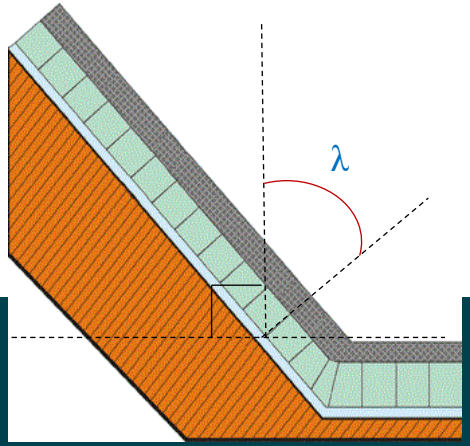
FILLING MATERIAL WASHOUT

WELD TEARING

TRADITIONAL SOLUTIONS

MACCAFERRI

Revolutionary solution for slope protection



FILLING MATERIAL FALLS OUT / IS WASHED OUT FROM THE CELLS

Because the open cavities of standard 3D geocells are inclined, the soil or aggregate infill is often susceptible to washout under intense water flow. After each rainy season, displaced material tends to accumulate at the toe of the slope, leaving voids within the cells.
As a result, maintenance or corrective works are required on a yearly basis.

TRADITIONAL SOLUTIONS

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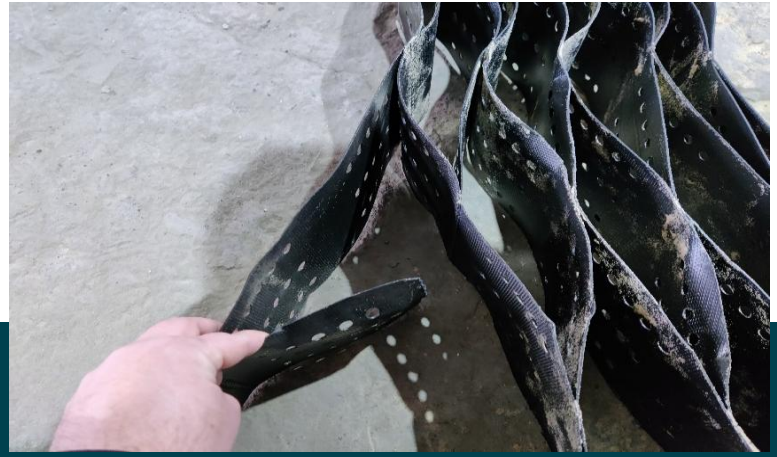
Revolutionary solution for slope protection



TEARING OF WELDS DURING BACKFILLING

In standard 3D geocells, the welded joints constitute the most vulnerable areas.
Under aggregate backfilling and service loads, localized stresses can cause seam rupture, resulting in the gradual deterioration of the cellular structure.

INTRODUCING THE NEW GENERATION GEOCELL SYSTEM

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A Technological Evolution in Soil Confinement

INTRODUCING THE NEW GENERATION GEOCELL SYSTEM

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A Technological Evolution in Soil Confinement

Made from **continuous** polyethylene sheets

INTRODUCING THE NEW GENERATION GEOCELL SYSTEM

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A Technological Evolution in Soil Confinement

No welding

zero weak points

INTRODUCING THE NEW GENERATION GEOCELL SYSTEM

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A Technological Evolution in Soil Confinement

Expands on-site into a
large-scale honeycomb

INTRODUCING THE NEW GENERATION GEOCELL SYSTEM

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A Technological Evolution in Soil Confinement

Vertically oriented cell structure improves aggregate retention

INTRODUCING THE NEW GENERATION GEOCELL SYSTEM

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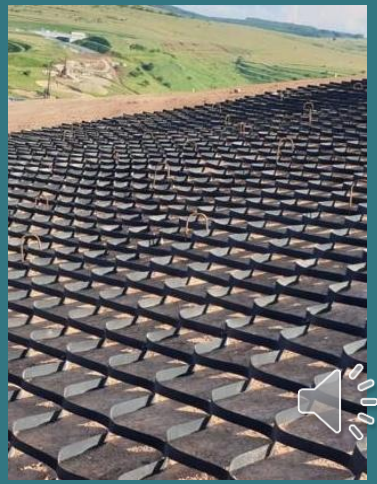
A Technological Evolution in Soil Confinement

Designed for **minimal maintenance**, even under heavy rainfall



KEY ADVANTAGES OF OUR GEOCELLS

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A modern and more efficient 3D geocell

When **GEOCELLS** are stretched, a three-dimensional cellular structure is formed on the slope to be filled with soil or aggregate materials

GEOCELLS stretched out

Slope protection with **GEOCELLS** after backfilling

KEY ADVANTAGES OF OUR GEOCELLS

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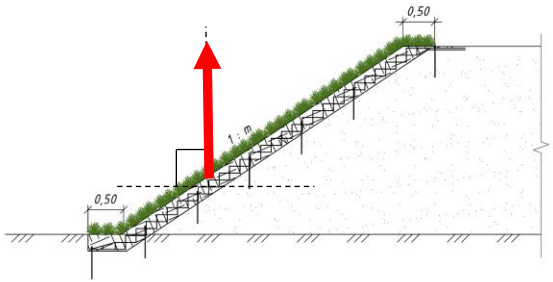
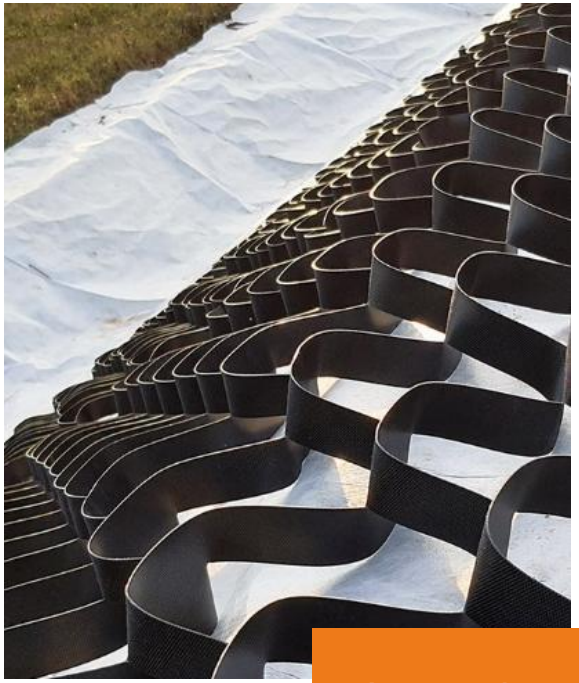
A modern and more efficient 3D geocell

The facings of the **GEOCELLS** cells are installed vertically



This allows site maintenance savings **up to 10%.**



Aggregate is not washed out of cells

CERTIFICATION

MACCAFERRI

Our solution is internationally certified for construction

CERTIFICATE

DAkkS Deutsche Akkreditierungsstelle D-ZE-11217-01-00

kiwa

- List of product(s) -
Appendix to the certificate
of the factory production control
0799-CPR-124

Officine Maccaferri S.p.A.
Via Albricci Alberico 9
20122 Milano (MI)
ITALY

Manufacturing plant(s):
OM-2012-06

Product(s) within the factory production control:

GEOSTEP A 2275.3, GEOSTEP A 2375.3, GEOSTEP A 2475.3, GEOSTEP A 3075.3, GEOSTEP A 4475.3, GEOSTEP A 4875.3, GEOSTEP A 2210.3, GEOSTEP A 2310.3, GEOSTEP A 2410.3, GEOSTEP A 3010.3, GEOSTEP A 4410.3, GEOSTEP A 4810.3, GEOSTEP A 2212.3, GEOSTEP A 2312.3, GEOSTEP A 2412.3, GEOSTEP A 3012.3, GEOSTEP A 4412.3, GEOSTEP A 4812.3, GEOSTEP A 2215.3, GEOSTEP A 2315.3, GEOSTEP A 2415.3, GEOSTEP A 3015.3, GEOSTEP A 4415.3, GEOSTEP A 4815.3

GEOSTEP C 2275.3, GEOSTEP C 2375.3, GEOSTEP C 2475.3, GEOSTEP C 3075.3, GEOSTEP C 4475.3, GEOSTEP C 4875.3, GEOSTEP C 2210.3, GEOSTEP C 2310.3, GEOSTEP C 2410.3, GEOSTEP C 3010.3, GEOSTEP C 4410.3, GEOSTEP C 4810.3, GEOSTEP C 2212.3, GEOSTEP C 2312.3, GEOSTEP C 2412.3, GEOSTEP C 3012.3, GEOSTEP C 4412.3, GEOSTEP C 4812.3, GEOSTEP C 2215.3, GEOSTEP C 2315.3, GEOSTEP C 2415.3, GEOSTEP C 3015.3, GEOSTEP C 4415.3, GEOSTEP C 4815.3

The relevant standard(s) and function(s) are listed on the Declaration(s) of Performance of the product(s) for which the certificate holder is responsible.

This appendix is not valid without page 1 of the certificate.

Greven, 25.09.2025

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QMF Z A 101e-2/R 2

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The valid certificate is published on our homepage: http://www.kiwa.de/zertifikatssuche.aspx

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BUREAU VERITAS 1828

ISO 9001:2015

CE

International Geosynthetics Society

DESIGN METHODOLOGY FOR GEOCELLS

A modern and more efficient 3D geocell

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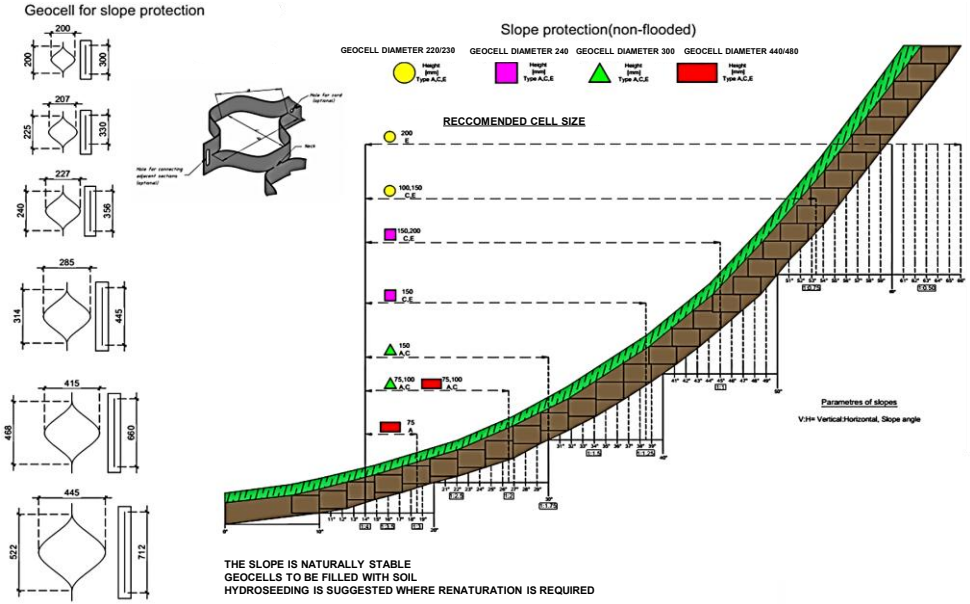
SELECTION OF GEOCELL DEPENDING ON SLOPE ANGLE



FILLING MATERIAL

vegetative soil

granular material: gravel

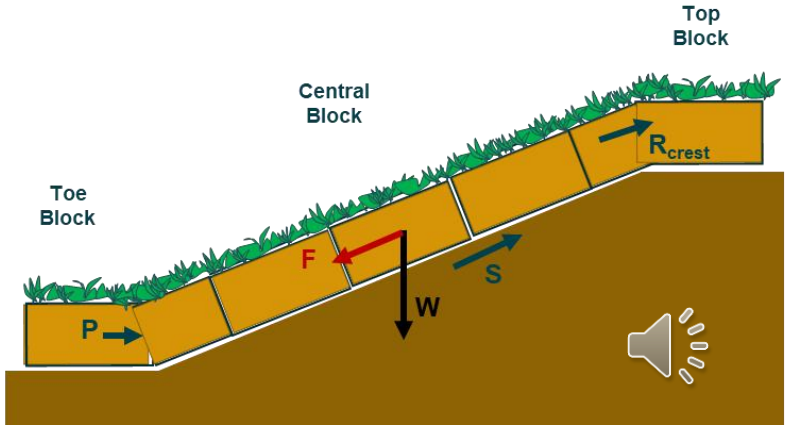
concrete

GEOCELL Type	Application
Standard conditions (type A)	Used for low loads and gentle installation conditions; typically filled with sand or vegetative soil.
Challening conditions (type C)	Suitable from moderate to steep slopes; compatible with various types of infill.
Extreme conditions (type E)	Designed for severe applications and specific requirements for high strength and durability.

VERIFICATION OF THE STABILITY OF THE GEOCELL WALL

- Segmentation of the geocell wall into three blocks: central, top and toe;
- Evaluation of the stability by comparing the sliding force F with the total resisting forces: friction S, Neck strength J, n. anchors, and Passive toe resistance P;
- Calculation of Minimum resistance required for the geocells;

If the Required resistance for the geocell > Geocell capacity, a **Geogrid** is required and designed based on T2% strain



CONCLUSION

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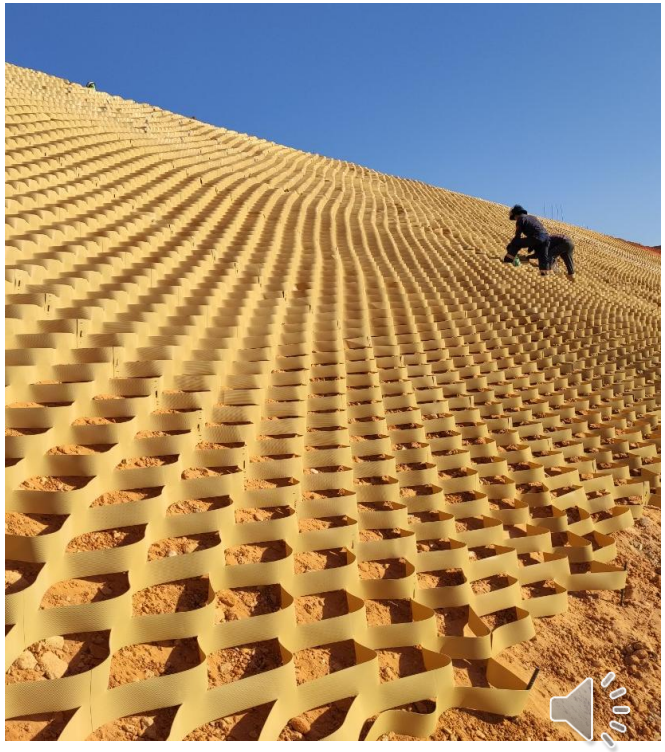
A modern and more efficient 3D geocell

OUR GEOCELLS ARE A REVOLUTIONARY SOLUTION FOR SLOPE PROTECTION THANKS TO:

- reliable retention of the aggregate in the cells;
- lower total cost solution;
- greater coverage area;
- improved drainage properties;
- simplified and economic laying process.



360° SUPPORT

Do you need technical assistance?

Our engineers are always here to support you in designing and selecting the most suitable solutions for every type of project.

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Q&A