REINFORCED EARTH

ArmaStone
ArmaGreen

REINFORCED EARTH® SLOPES

ArmaStone & ArmaGreen

Reinforced Soil Slopes

Alternative face-forming elements include geocells (ArmaWeb), as well as filled soil bags with wrapped geogrid reinforcement.

Reinforced soil slopes (RSS) are essentially an **extension of the Reinforced Earth® technique** which is the foundation of Terre Armée's success and global acclaim. RSS structures are designed and built to retain engineered reinforced soil fill with a face inclination of between 45° and 70°.

Building steep RSS structures requires a unique approach in design, material specifications and installation procedures for mechanically stabilized earth structures (MSE). Engineered materials for building Terre Armée RSS structures come in **a versatile range of selections for engineers and builders to choose from.**

Terre Armée will generally offer provisions for the finished facade to be either vegetated with **ArmaGreen**, or a mineral facade with **ArmaStone.**

ArmaStone

ArmaStone is an engineered solution for reinforced soil slopes which require an **attractive mineral look**, either to mimic the surrounding **natural environment** or simply to provide **pleasing æsthetics for urban and peri-urban infrastructure.**

ArmaGreen

ArmaGreen is an engineered solution for reinforced soil slopes that require **promotion of natural vegetation.** This sustainable solution provides optimized **"green" integration in natural or urban and peri-urban landscapes.**

Face-forming elements primarily consist of **an engineered welded wire mesh system** to which alternating layers of geosynthetic strips, geogrid, or metallic strips are attached to function within the engineered fill for tensile strength and pullout resistance.

Steel mesh facing

ArmaStone
mineral facing

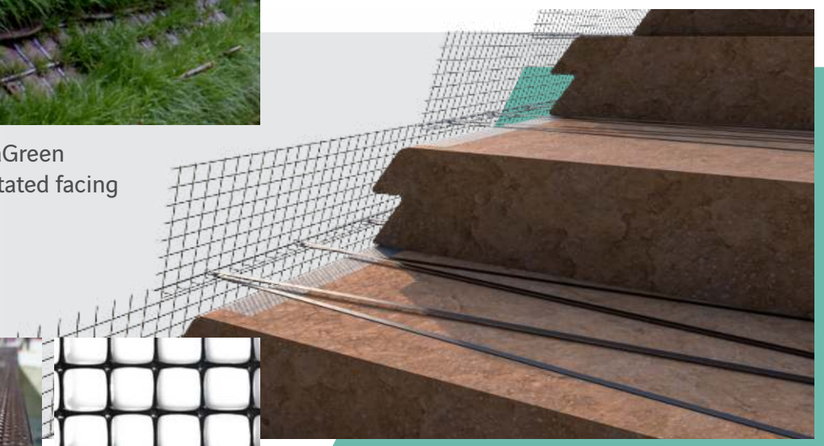
ArmaGreen
vegetated facing

Reinforcements

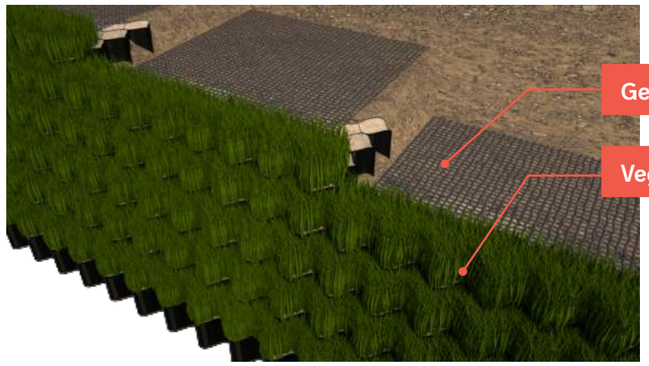
Steel
reinforcement

Geostrip
reinforcement

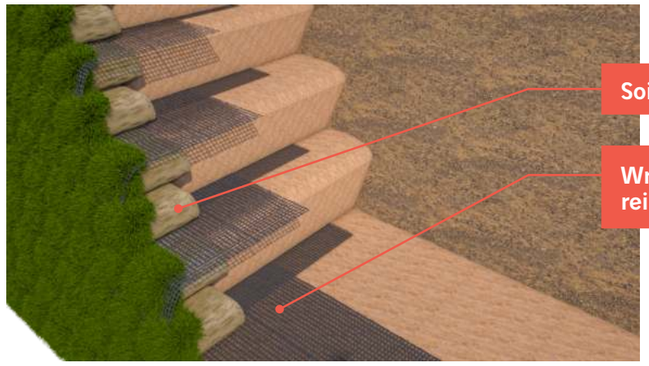
Geogrid
reinforcement



Steel mesh facing with geostrip



ArmaGreen – Geocell facing with geogrid reinforcement



ArmaGreen – Geotextile bag facing with wrapped geogrid reinforcement.

Possible combinations of facings and reinforcements:

Finishing	Facing	Reinforcement
ArmaStone Mineral finish	• Steel mesh	• Steel reinforcement • Geostrip • Geogrids
ArmaGreen Vegetated finish	• Steel mesh • Wrap-around geogrids • Geocells	• Steel reinforcement • Geostrip • Geogrids

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Applications

We differentiate ourselves from alternative RSS sources for services and supply. Our internal technical teams offer the combination of **60 years of soil-structure interaction expertise** with sophisticated numerical modeling design tools to analyze soil and terrain conditions for designing RSS structures that satisfy sustainable life service and enduring functional requirements.

We closely match our design expertise with a dependable internal supply chain for your RSS materials. This, together with our support throughout the installation process assures confidence in our comprehensive RSS solutions.

Terre Armée's RSS structures are widely built as functional structures to support transportation infrastructure, industrial sites, landscape development, protective structures, landfills and hydraulic structures.

Applications include:

- Retaining structures
- Platform support
- Slope rehabilitation
- Slopes
- Embankments
- Gravitational risk protection (rockfall, slides, avalanches)
- Industrial protection (blasts, noise, assault)
- Dikes, berms, levees
- Landfills

Riverbank protection - France

Tunnel head slopes - Italy

Avalanche barrier and deflectors - Iceland

Biathlon stadium - France

Benefits

Global experience and references

As the inventors of MSE technology, our enduring strength lies in designing and supplying materials for building RSS structures. Our references span the globe, and we are **technically equipped to address any RSS application challenge**, regardless of size, complexity, purpose or location.

Lower carbon footprint

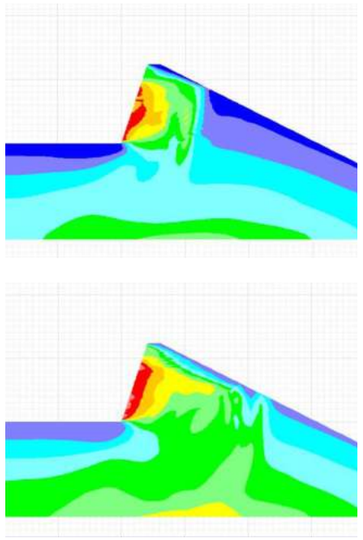
Our design approach always considers the **environmental impacts of our solutions**. Our teams are driven to offer **lighter, eco-friendly alternatives**. While these solutions are robust in terms of performance and durability, **our techniques minimize consumption of concrete, steel and aggregates**.

Engineering excellence

Each of our RSS solutions are designed with **safety and durability as a top priorities**.
Our project engineering workflow follows an established **step-by-step approach that verifies each structure layer and segment stability over the entire service life cycle.**

Whenever requested, Terre Armée's engineering team can perform specific modelling and analysis to anticipate the behavior of our structures under certain conditions. This capability demonstrates **the strong in-house engineering and design expertise developed over the years** and the ability to work with our partners from inception to completion to deliver durable and sustainable structures.

For recent RSS protective structures in Norway, Terre Armée was required to verify our **RSS internal stability** under the effects of avalanche impact through **dynamic calculation.** Our experience using **numerical modeling analysis** was was leveraged to best represent the **behavior of our RSS structures exposed to such extreme influences**. This allowed us to better anticipate the real behavior of the structure and to avoid over-dimensioning issues that traditional methods (pseudo-static) often imply.



Avalanche impact dynamic calculation

Avalanche barrier in Iceland

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References


Mont Blanc Tunnel, Italy


Saint Véran, France


Vegetated steep slope, Japan


Z-Morh tunnel, India


Parc de la Courneuve, France


Roma G.R.A. Quad.
North-Ouest, Italy


A4 Hörselgau, Germany

About us

1968
established since

300 M€
2020 revenue

80
countries

70 million m²
of Reinforced Earth® walls

+100.000
structures around the world

102.8 m
tallest structure

As global specialist we operate as **designer** and **supplier** of civil engineering solutions that **retain, cross, protect and strengthen**. As the **inventor of the Reinforced Earth® solution**, our strength is the result of an **unrivalled combination of expertise with over 60 years of experience** in the fields of **soil-structure interaction** and **engineered backfills**.

Terre Armée delivers **its leading technologies** to serve clients' projects, from the simplest to the most extraordinary. Guided by our focus on **innovation** and our **culture of excellence in client care**, we offer **suitable and durable solutions**. We build on our **global expertise**, which is applied by our **local companies** to develop new applications to address challenges that ensure sustainability of our offer.

www.terre-armee.com
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@terre_armee
Terre Armée Youtube

Watch our Retain, Cross, Protect, Strengthen video.

Engineering expertise, innovation and excellence in client care to deliver sustainable solutions.

REINFORCED EARTH

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