



Where the soil or ground is not inherently stable it will be prone to failure; the performance of existing soils needs to be improved. There are many ways to achieve but increasingly geogrids are used to reinforce the soils within embankments.

- Soils are good in compression and poor in tension.
- Geogrid reinforcement is good in tension and poor in compression.

A composite of these materials offers the benefits of both; Geogrid reinforcement, used in conjunction with the soil enable that soil to perform better than it would in its unreinforced state, accommodating greater loads or standing at steeper angles for example.

With our specialist knowledge and comprehensive product range, Maccaferri can offer cost-effective solutions to your slope reinforcement problem, whether on a **steep, shallow or soil nailed** slope.

Our unsurpassed range of geogrid reinforcements maximises the opportunity to **reuse site won materials** as backfill to a reinforced slope. This saves on the export and import of materials from site, embracing sustainability and reducing polluting truck movements. Cost savings through the reuse of site won material with geogrids can be substantial on a project.

Vegetation of the finished reinforced slope is important. Our soil bioengineering expertise can assist in the selection of appropriate seed mixes, top soil and erosion protection products.

Our reinforced slopes are trusted to support motorways, railway embankments and property around the UK and Ireland. Try us on your next project.

### Shallow Slopes 45°

Shallow slopes may require a geogrids wrapped faced structure, where the angle of the slope exceeds the natural internal angle of friction of the soil. If the slope is structurally stable without geogrids, surface reinforcement may be required



### Steep Slopes 45-70°

These solutions are usually geogrid 'wrapped face' structures. Geogrids are compacted within the backfill material, reinforcing it. The geogrids are wrapped up the face of the structure, encapsulating the material behind, before returning into the slope above. Combinations of types and strengths of geogrids can be considered to optimise designs.



### Soil Nailed Slopes

Where there is not enough space on a project to construct a reinforced soil slope, it may be possible to use Soil Nailing. With soil nailing providing the overall slope stability, Maccaferri can offer flexible surface reinforcement and protection options for use between soil nails.





### Products used for Slope Reinforcement

Products	Benefits	Shallow Slopes 45°	Steep Slope 45-70°	Soil Nailed Slopes
Armater	A synthetic cellular containment system for holding a depth of soil on slopes without slumping. It can be used on slopes up to 1:2 (h:v)	X		X
Biomac	A quilted biodegradable coir soil blanket to protect the soil for 2 or 3 seasons against surface erosion during the establishment phase of seeding and planting.	X	X	
Enkagrid PRO	An extruded polyester geogrid used for soil reinforcement. Enkagrid® PRO is BBA Roads & Bridges certified. It offers high strength at low strain, as well as excellent resistance to high pH soils.	X	X	
Enkamat	A 3-dimensional matrix of polymer filaments providing permanent erosion control, soil retention and plant root reinforcement.	X	X	
Geomac	A Reno mattress lined with filter fabric and filled with stone, soil and seeds offering a green finish to revetments when conventional soil cells are not suitable.	X		X
Green Terramesh	Vegetating, BBA Certified system consisting of steel mesh soil reinforcement with built-in formwork and erosion protection matting. A rapid to construct system that can be vegetated.		X	
Loopmat	A biodegradable mat of woven coir yarns offering tensile strength and soil retention capacity. It has a looped surface to trap and retain soil.	X		
Paradrain	Unique polyester geogrid with a polyethylene coating used in soil reinforcement applications. A built-in drainage channel on the surface of the grid is protecting by a geotextile filter, effectively filling the soil with hundreds of mini-drainage paths to rapidly reduce pore-water pressures in cohesive fills	X	X	
Paragrid	Versatile, BBA certified, polyester geogrids with a polyethylene coating used in a variety of soil reinforcement applications. Good with cohesive fills.	X	X	
MacMat-R	A unique 3-dimensional matrix of polymer filaments with an integral, flexible woven steel mesh reinforcement providing permanent erosion control, soil retention and plant root reinforcement. Can be used with as surface reinforcement with soil-nailed slopes.	X		X
Rockfall Netting	Woven steel mesh for use on steep or vertical locations to provide a containment system for loose rock fragments.			X
Steelgrid	High strength rock fall netting reinforced with high tensile steel cables offering unstable rock retention and fragment containment. Can also be used with soil nailing.			X
Terramesh	BBA Certified system consisting of steel mesh soil reinforcement with an integral gabion facing unit, to provide the look of gabions, with the strength and reassurance of soil reinforcement.		X	

#### Maccaferri Ltd - Head Office

7600 The Quorum,  
Oxford Business Park, North,  
Garsington Road, Oxford, OX4 2JZ  
Tel: 01865 770555  
Fax: 01865 774550  
Email: oxford@maccaferri.co.uk  
Web: [www.maccaferri.co.uk](http://www.maccaferri.co.uk)

#### Area offices

**Perth:**  
T: 01738 621317 F: 01738 442283 E: perth@maccaferri.co.uk  
**Belfast:**  
T: 028 9026 2830 F: 028 9026 2849 E: belfast@maccaferri.co.uk  
**Dublin:**  
T: 01 885 1662 F: 01 885 1601 E: dublin@maccaferri.ie  
Web: [www.maccaferri.ie](http://www.maccaferri.ie)



Oxford, Perth, Belfast