



Erosion Control

A guide to ABG
surface erosion
protection methods

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engineering

The need for erosion control

Soil erosion most often results from human intervention on the environment. Designers and managers of construction projects of all sizes have a responsibility to control soil erosion.

Bare soil will give rise to soil erosion by wind, rain and water. This could be as a result of cut and fill slopes, stockpiles, agriculture, river re-alignment, etc. The issue is not only the potential instability of the slope but also that the resulting silt laden run-off is deemed to be a pollutant. Legislation in many countries is either prescriptive that bare soil must be protected or that heavy fines are imposed on those responsible for the pollution. In the UK, for example, environmental legislation imposes fines up to £3million and there have been numerous prosecutions. Some soils are more prone to erosion than others but climate change is leading to more frequent and intense rainfall, so whatever the soil type, the risk of soil erosion is increasing.



Either way, there is an easy solution in the form of erosion control systems. These range from low cost simple soil cover, through permanent surface reinforcement mats, to highly engineered slope stability webs. The benefit is not only soil protection but also the ability to engineer steeper slopes and thus maximise the area of flat land available for development. Surface erosion control systems, however, cannot be used to solve deep seated instability within the slope. Further information, technical advice, installation instructions, pinning patterns and datasheets are available from ABG.

Temporary erosion control

Temporary erosion control will give immediate protection to the bare soil and continue until the natural vegetation is established. These are low cost biodegradable straw, jute or coir woven textiles or blankets that are pinned onto the soil surface. The mats absorb the rain impact and create a warm micro-climate to speed seed germination. The heavy coir mats are also able to protect soil from flowing water. The material gradually decays into soil nutrients as the vegetation cover progressively gets stronger. Sometimes the works themselves may be temporary and the erosion mat is used instead of vegetation.



Permanent erosion control

Permanent erosion control consists of mats and webs that provide immediate protection to bare soil and also continue for the lifetime of the project. They are manufactured from UV stabilised PP or HDPE polymer and are pinned onto the soil surface or tied onto a geogrid laid over lagoon linings. An advantage of permanent over temporary is that it continues to protect the soil if there is die-back of the vegetation.



Permanent erosion control mats provide long term reinforcement to the roots of the grass in the lining of waterways, flood relief channels, spillways, etc. As the vegetation establishes, the root structure intertwines with the erosion mat and the maximum water velocity/shear strength is dependent upon the fibre density and strength of the mat, the grass roots and the pinning.

Permanent erosion control webs retain soil on steep slopes or on geomembrane liners where the soil would otherwise be at risk of slipping. Revetments are also constructed with erosion control webs filled with crushed stone or low slump concrete.

Related products

- **Sudspave** - Paving system for grass/gravel access roads
- **Advanced Turf** - root zone reinforcement for grass access roads
- **Abweb TRP** -No dig solution for trafficked areas around tree roots
- **Webwall** - Vegetated retaining wall systems
- **Trigrid** - Geogrid reinforcement

Erosamat Type 1

Biodegradable Jute erosion control mats for short-term protection

Erosamat Type 1 offers two low-cost biodegradable mats made from woven jute. They are an economic and environmentally friendly erosion control material for use on surfaces that have the ability to support growth in a relatively short period of time.

Erosamat Type 1 consists of a dense mesh of jute fibres that absorb the impact of rain and reduce run-off velocity. The mat protects the soil until the seeds have germinated and a root system is established. Thereafter the Erosamat slowly biodegrades releasing nutrients and improving soil quality.

During installation, seed is placed on to

the surface of the soil before the mat is overlaid. In some installations seeding may take place after installation through a hydroseeding process.

Type 1 is available in two grades:

Type 1

An open weave of thick jute yarn with a mass of 500g/m² in bales 1.22m wide.

Type 1a

A dense weave of fine jute yarn with a mass of 186g/m² and giving an extremely high degree of surface cover at very low cost. Type 1a is available in rolls approximately 4m wide for rapid coverage.



Erosamat Type 2

Biodegradable coir erosion control mats for medium-term protection

Erosamat Type 2 is a range of heavy duty, long life coir biodegradable erosion mats. They prevent soil erosion and help establish new vegetation on areas of loose soil and in situations of high run-off and flooding.

Erosamat Type 2 is ideal for use where plant development could be slow such

as late season planting or in poor fertility soil. They are suited to extremes of temperature, enabling them to be used to control erosion in conditions from tundra to desert.

Coir is a 100% biodegradable, natural and sustainable product produced from coconut husk. It is one of nature's strongest fibres and maintains its tensile strength even under water. It is also highly UV resistant.

In manufacturing Erosamat Type 2 only

high-quality Anjengo yarn is used. This has a high lignin content which helps the fibres resist mould and rot, making the product suitable for use underwater. Coir biodegrades very slowly over a 3-5 year period providing plenty of time for plants to establish, even on very poor soils.

There are six grades in the Erosamat Type 2 ranging from 600 to 1400g/m²



Erosamat Type 3

Permanent polymer erosion control mats for lifetime protection

Erosamat Type 3 is for all situations where an element of erosion control is permanently required in conjunction with natural vegetation or where there is risk of die-back requiring protection while the vegetation re-grows

Erosamat Type 3 consists of a dense matrix of polypropylene fibres, thermally bonded together to create a tough and flexible, long-lasting erosion control mat. The mat is non-corroding, hydrophobic and is both chemically and microbiologically inert.

The system provides the root reinforcement necessary for natural vegetation to resist the extreme effects of wind, rain and water erosion. As the vegetation grows into the mat the roots become entwined within the Erosamat matrix. This provides the anchorage for the vegetation to resist high shear stress situations (e.g. Overflow channels).

Work by CIRIA has shown that such turf reinforcement mats (TRM) can double the permitted channel velocity.

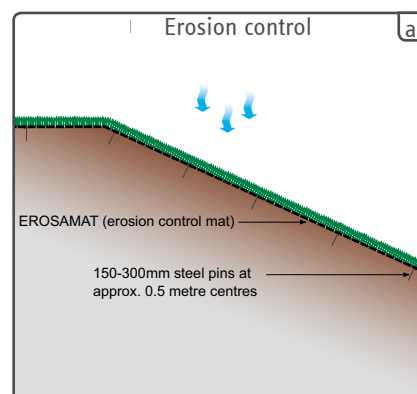
Erosamat Type 3 is laid over the seeded ground and immediately protects both soil and seed from excess wind and rain. The excellent surface protection is as a result of the product being manufactured significantly heavier and denser than the industry norm.

Erosamat Type 3 is coloured black for general use but specific colours can be manufactured including green and brown.



Erosamat Type 3 is available in three grades

Erosamat 3/20Z 500	Three dimensional open matrix TRM	↑ Low CBR & Tensile strength ↓ High
Erosamat 3/20Z 500M	Three dimensional open matrix with integral mesh TRM	
Erosamat 3/20Z G50	Three dimensional open matrix with multifilament polymer coated reinforcement grid HPTRM	



Erosamat Type 4

Biodegradable composite erosion control mats

Erosamat Type 4 offers a range of natural biodegradable mats for immediate surface protection and erosion control until the natural vegetation is established. All variants of Type 4 are available either plain or pre-seeded with a wide variety of seed types.

Erosamat Type 4 products consist of coir, straw or a mixture of the two stitched together between two binding layers of either photodegradable polymer mesh or biodegradable jute mesh.

For effective protection and successful germination, it is essential that the

Erosamat is pinned into totally close contact with the underlying soil.

Erosamat Type 4 products have applications in the initial protection of water channels, highway embankment slopes, landfill caps, restorations and landscaping schemes subject to surface erosion prior to the establishment of vegetation cover.

Erosamat Type 4 is available in three grades, all three grades are available pre-seeded:

4S 100% straw

4SK 50% straw/50% coir

4K 100% coir



Erosalog & Erosaplat

Biodegradable protection of river banks

Erosalog & Erosaplat are designed to provide protection to the toe of river banks, to retain backfill material and to aid plant development. They are primarily for use in areas where water scour or boat wash may cause erosion issues along the waterline.

Erosalog is a large diameter densely packed flexible log of coir fibre whilst Erosaplat is a thick quilted mattress of coir fibre. They are usually used in combination to reform water margins and wetland areas.

Typically the Erosalog is fixed at the

water edge whilst Erosaplat is placed and fixed in the flood plane behind.

Manufactured from coir they are capable of absorbing many times their own weight of water helping create an ideal protected habitat for reeds and other water margin plants.

As with all ABG products advice on specific applications is available from the ABG Technical Team.

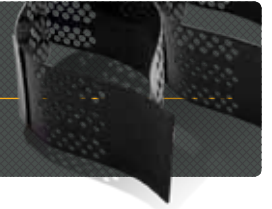
Erosalog Flexible log comprising densely packed coir fibre

Erosaplat Thick quilted mattress of dense coir fibre



Erosaweb

Three dimensional geocell for top soil/stone retention on steep slopes



Erosaweb is a three dimensional geocell system developed to retain imported fill, particularly on steep slopes. Once installed it forms a blanket of shallow pockets across the slope face into which fill is placed. Once filled it protects the slope and fill from erosion forces whilst allowing vegetation to establish for long-term protection.

Erosaweb comprises interconnecting polymer strips that form a honeycomb of pockets which confines and strengthens the infill material. The polymer strips grip the infill material and provide a tensile force, effectively increasing the shear strength and cohesion of the infill material. For revetments, the Erosaweb is filled with crushed stone or alternatively, low slump concrete is poured into the Erosaweb.

When Erosaweb is installed over geomembrane liners typically at the edge of lagoons, it is tied onto a geogrid that is anchored at the crest of the slope.

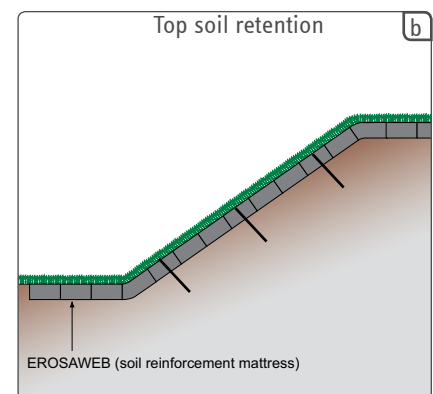
The strips are manufactured from strong HDPE polymer, designed to offer long term protection through extended life. The strips are securely bonded at the joints with a strength at least equal to the strip material. The strips are perforated to allow water within the fill to move freely down the slope. The Erosaweb is supplied in zig-zag coils and then expanded to form the full panel size on site.

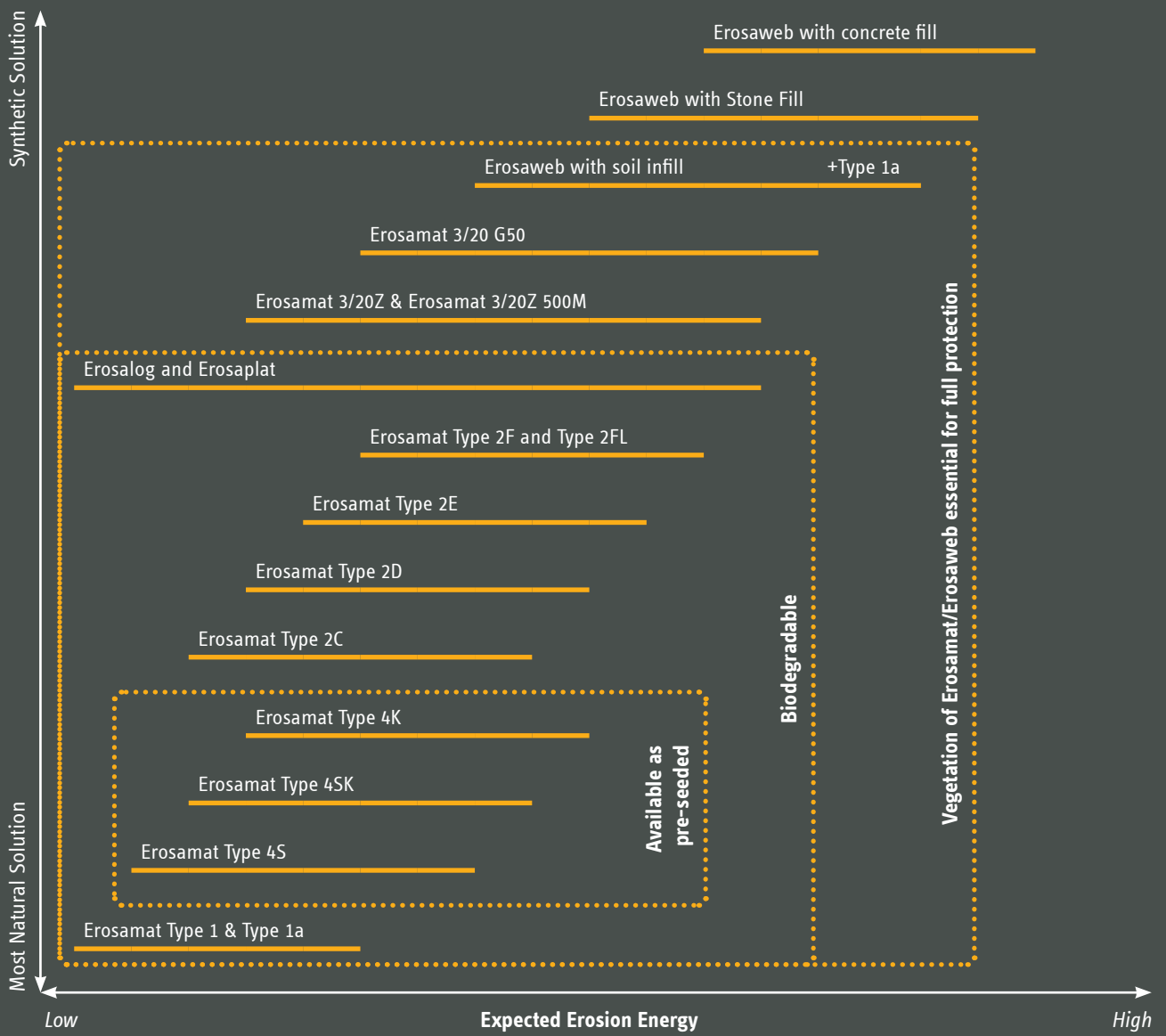
Erosaweb is available in standard heights of 100, 150 and 200mm (50 and 300mm are available as special orders). The standard panel size is 4m x 6m.



Erosaweb available in six grades

	GWX 100/300 UVAO	GWX 100/500 UVAO	GWX 150/300 UVAO	GWX 150/500 UVAO	GWX 200/500 UVAO	GWX 200/300 UVAO
Depth	100mm	100mm	150mm	150mm	200mm	200mm
Cell Diameter	300mm	500mm	300mm	500mm	500mm	300mm
Perforated	Yes	Yes	Yes	Yes	Yes	Yes





	Material (Note 1)	Max slope angle (Note 2)	Protection grade (Note 3)	Life span (years)	Colour	Suitable submerged	Surface cover	Factory pre-seeded (note 4)
Erosamat Type 1	Jute	45°	Medium	1-3	Brown	No	35%	No
Erosamat Type 1a	Jute	45°	Medium	1-2	Brown	No	55%	No
Erosamat Type 2	Coir	65°	High	3-5	Brown	Yes	30-75%	No
Erosamat Type 3	PP	65°	High	>25	Black*	Yes	75%	No
Erosamat Type 4S	Straw	45°	Medium	1-2	Brown	No	100%	Option
Erosamat Type 4SK	Straw/coir	65°	High	1-3	Brown	Yes	100%	Option
Erosamat Type 4K	Coir	65°	High	2-5	Brown	Yes	100%	Option
Erosaweb	HDPE	65°	High	>25	Black	Yes	n/a	No
Erosalog/Erosaplat	Coir	n/a	High	4-10	Brown	Yes	n/a	No

Note 1 Flat areas may need erosion control
 Note 2 In certain situations the mat may be used on steeper slopes, limited only by the ability of the vegetation to obtain moisture for growth
 Note 3 The slope angle for Erosaweb is dependent upon the internal friction angle of the fill intended to be placed into the web
 Note 4 Mats and webs may be used in conjunction to offer greater protection
 Note 5 Pre-seeded mats are warranted to be free from defects in manufacture. Due to the many variables on any particular site (including soil conditions, weather etc) no warranty can be given that the products will perform under unlimited circumstances. Adequate and timely moisture may not be available to guarantee germination and subsequent seed growth under, on or incorporated in Erosamat materials. Accordingly, no liability can be accepted for any type of damage or loss, direct, indirect or consequential arising from any failure of these products.
 Note 5 * Green and brown available

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