



Erosamat Type 3 Turf Reinforcement Mat

A guide to Erosamat Type 3
Turf Reinforcement Mat (TRM)

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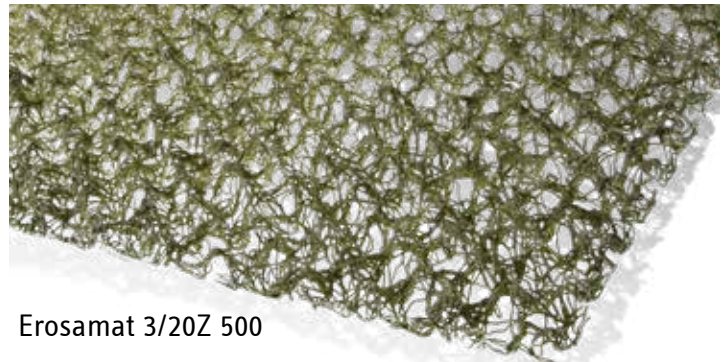
Turf Reinforcement

Met Office climate projections indicate significant temperature rises in the decades ahead, with extreme weather and flooding events becoming more frequent. Summer rain is forecast to become more intense, leading to a greater risk of flash flooding. The trend for wetter winters is also likely to continue, placing greater pressure on existing flood defences.

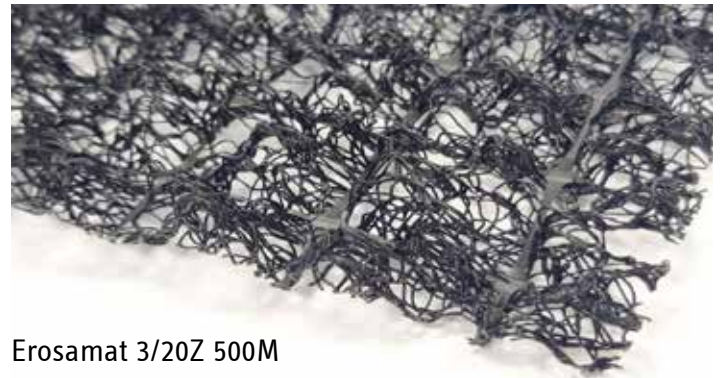
Bare soil gives rise to soil erosion by wind, rain and water and more frequent and intense rainfall increases the risk, with studies such as CIRIA Report 116 finding that well established grass can only withstand flows of 4.5m/s for up to one hour. In addition, with steeper slopes there is a risk of landslip where subsurface flows can cause blow out further down the slope.

Permanent turf reinforcement erosion control consists of mats and webs that provide immediate protection to bare soil for the lifetime of the project, protecting the soil even if there is die-back of the vegetation.

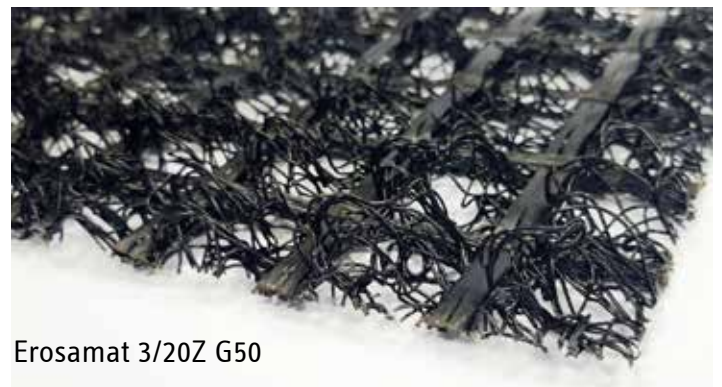
Articulated concrete blocks and poured concrete were once the only suitable choices for erosion protection. Erosamat Type 3 mats, manufactured in the UK by ABG, provide an alternative for erosion control surface and root reinforcement, enabling vegetation to be used to protect newly laid topsoil. In addition to the proven technical performance, using a light-weight turf reinforcement product greatly reduces a project's carbon footprint.



Erosamat 3/20Z 500



Erosamat 3/20Z 500M



Erosamat 3/20Z G50



Erosamat Type 3

Erosamat Type 3 is manufactured in the UK and consists of a dense matrix of UV stabilised polypropylene or HDPE polymer fibres thermally bonded together to create a tough and flexible, long-lasting erosion control mat.

Erosamat Type 3, available in three grades

Erosamat 3/20Z 500	Three dimensional open matrix TRM
Erosamat 3/20Z 500M	Three dimensional open matrix with integral mesh TRM
Erosamat 3/20Z G50	Three dimensional, multifilament open matrix with polymer coated reinforcement grid HPTRM

The Erosamat 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 fibre matrix. This provides the anchorage for the vegetation to resist high shear stress situations (e.g. overflow channels) and work by CIRIA has shown that turf reinforcement mats (TRM) can double the permitted channel velocity.

Erosamat Type 3 is to be laid directly onto compacted ground (free of existing vegetation, roots and stones) before filling with friable topsoil, from bottom to the top of the embankment to a depth of 10mm. Alternatively, the bare mat may be hydroseeded. Existing vegetation growth should not inhibit the contact between the ground and the Erosamat.

The excellent surface protection is a result of the product being manufactured significantly heavier and denser than the industry norm. The permanent erosion control mat provides reinforcement to grass roots in the lining of waterways, flood relief channels and spillways.

Applications

- River Embankments
- Spillways
- Reservoirs
- Canals
- Highways
- Railways

Client profile

- Environment Agency
- Utilities Companies
- Highways England
- Local Authority Planners

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

Large Scale Erosion Protection Testing Allermoor Spillway, Somerset Levels



Abpin 400/8 U-pins used for spillway conditions.

Reinforced Grassed Spillway

The Allermoor Spillway is situated between the Rivers Parrett and Sowy in the Somerset Levels. The site is around three metres above sea level, and has historically been prone to flooding from both fresh water and occasional salt water inundations.

The Environment Agency monitors high tides on the tidal section of the River Parrett and operates the main inlet structures controlling the water levels and flows. The River Parrett is 3-4 metres above the River Sowy, and in flood conditions the Parrett overtops both its embankments and flows to the Sowy over a grassy bank, resulting in severe erosion.

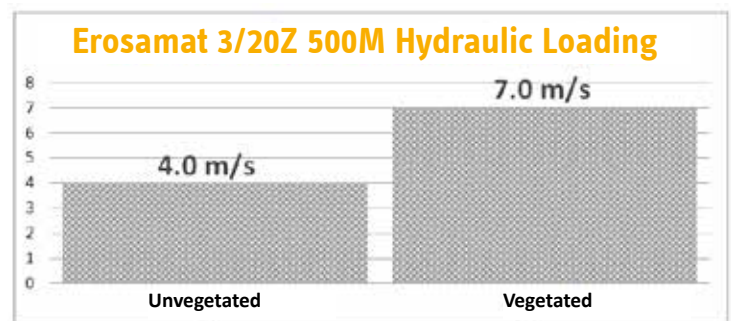
Flood management improvements included the raising of the external embankment and the design of a new spillway to take the increased flow between the two rivers when the Parrett overtops. The challenge was to design a spillway that would withstand prolonged high velocity flood water flows with a natural vegetated appearance, avoiding concrete or hard armour options if possible.

Following the re-profiling of sections of the riverbank and spillway, it was determined that a correctly installed Turf Reinforcement Mat (TRM) system was required to withstand specified hydraulic loadings during flood events.

Defined as an open mat under CIRIA Report 116, 'Design of Reinforced Grass Spillways', Erosamat Type 3/20Z 500M was selected for the permanent and effective surface erosion control and vegetative root reinforcement layer.

Following construction of the spillway, vegetation was not fully established before the winter of 2013/14. Subsequent prolonged heavy rainfall led to extensive flooding, where the new flood defence measures worked well - with no significant loss of soil due to erosion.

Independent data collected by Black and Veatch during the 62 day flood reported the spillway and TRM functioned as intended. This data demonstrated that unvegetated Erosamat Type 3/20Z 500M provided sufficient protection to the spillway for velocities exceeding 4 m/s over prolonged periods and fully vegetated Erosamat 3/20Z 500M provides protection for flow velocities of 7 m/s.





Erosamat 3/20Z 500M on Allermoor Spillway during 62 day over-topping event, with flow velocities exceeding 4 m/s

Large Scale & Long Duration Field Trial: Conclusion

Unlike typical lab simulation results from short duration tests (10-50 hours), the Erosamat 3/20Z 500M performance parameters were demonstrated during active flood conditions, over an extremely long duration of 62 days. Erosamat is therefore a proven TRM system that provides a high level of protection for vegetation and the underlying soil during high flow/long duration events.



Erosamat 3/20Z 500M installation on Allermoor Spillway

62 days of flow velocity data following January 2014 floods

Depth on crest (m)	Discharge intensity (m ³ /s)	Velocities (m/s)					
		On crest	7m from crest	9m from crest	10m from crest	20m from crest	30m from crest
0.10	0.10	0.99	1.4	1.79	1.88	1.91	1.91
0.20	0.28	1.40	2.09	2.38	2.56	2.88	2.89
0.30	0.51	1.72	2.54	2.83	3.01	3.62	3.68
0.40	0.79	1.98	2.88	3.17	3.36	4.17	4.33

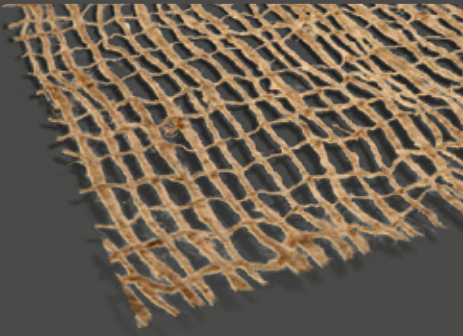


River Parrett, Allermoor

- Flow depth and velocities were recorded on Allermoor spillway during flooding on 23 January 2014.
- Erosamat protection system. Installation was installed in September 2013.
- There was only minor grass coverage in January 2014.
- The un-vegetated Erosamat system provided the required level of spillway protection for the velocities exceeding 4m/s.

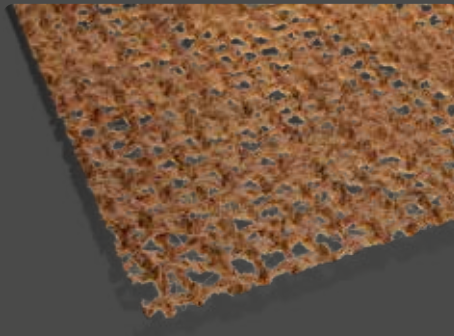
Data collected by Black and Veatch during the overtopping floods in January 2014

Related Products



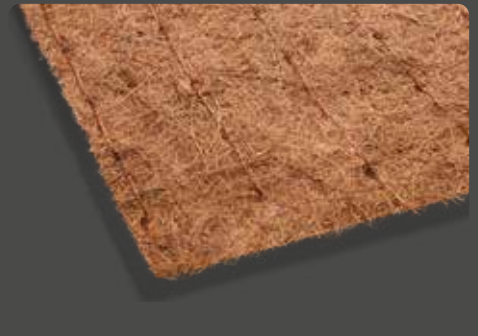
Erosamat Type 1

Biodegradable woven jute erosion control mats for short-term protection, available in two low-cost versions. 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 2

A heavy duty, long life coir biodegradable erosion mat to prevent soil erosion and help establish new vegetation on areas of loose soil and in situations of high run-off and flooding.

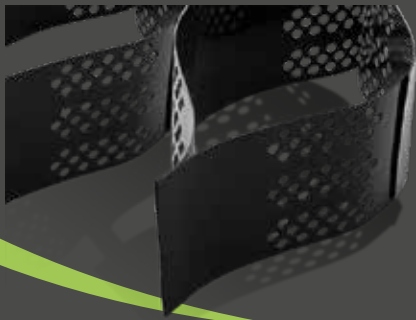


Erosamat Type 4

A natural biodegradable mat for immediate surface protection and erosion control until vegetation is established.

Erosaweb

Erosaweb geocell is designed for the reinforcement of weak soils and has many applications including retention of soils on steep slopes and highway and rail embankments. The cells of the geocell retain the fill material, while allowing water through.



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