Stormwater Best Management Practice

Geotextiles, Matting and Netting

Minimum Measure: Construction Site Stormwater Runoff Control
Subcategory: Erosion Control

Description

Geotextiles—also known as filter fabrics, synthetic fabrics, construction fabrics or fabrics—are porous fabrics used for erosion and sediment control purposes. Manufacturers create woven geotextiles by weaving fibers together and non-woven geotextiles by bonding fibers together. Non-woven geotextiles are more porous than woven geotextiles and typically break down faster. Geotextiles consist of synthetic materials such as polypropylene, polyester, polyethylene, nylon, polyvinyl chloride, glass and various mixtures of these materials.

Matting typically consists of jute, coir or other wood fibers that manufacturers have formed into sheets. Matting serves similar purposes as traditional loose mulch but is more stable. Netting typically consists of jute, wood fiber, plastic, paper or cotton and can hold mulching and matting to the ground. Netting alone can also stabilize soils and help establish vegetation.

Geotextiles, netting and matting come in a wide variety of materials and have specifications to match specific uses and site conditions.

Applicability

Geotextiles have multiple uses for erosion and sediment control on construction sites. Geotextiles can prevent erosion when construction staff apply them as liners to sediment traps and basins, post-construction stormwater control measures, and stone-lined stormwater conveyances—including spillways. Geotextiles can also serve as a separator between riprap and soil to prevent the soil from eroding beneath the riprap and maintain the riprap's base. When construction staff install geotextiles upright, geotextiles can serve as silt fences and inlet protection. Geotextiles may also serve as temporary protection for exposed soils—for example, as a cover for active piles of soil that construction staff have left overnight.

Design engineers should use woven geotextiles where impermeability is important, such as for silt fences or separation applications. They should use non-woven geotextiles where water passes through the device (e.g., storm drain inlet protection).

Geotextile matting protects bare soil from erosion caused by wind and stormwater.

Design engineers can use matting and netting to stabilize ground surfaces, including river and stream banks. Due to their porosity and biodegradability, matting and netting are particularly useful for temporarily holding seeds, fertilizers and topsoil in place while vegetation becomes established.

Siting and Design Considerations

Construction staff should consider site conditions and intended use before selecting a geotextile, netting or matting material. Due to the variety of material types and applications, construction staff should always consult and adhere to manufacturer specifications and local permitting authority specifications. A geotextile should have the appropriate tensile strength, tear strength, apparent opening size and other properties for its intended use. Many jurisdictions (e.g., the Maryland Department of the Environment and Washington State Department of Transportation) provide geotextile specifications for specific erosion and sediment control applications.

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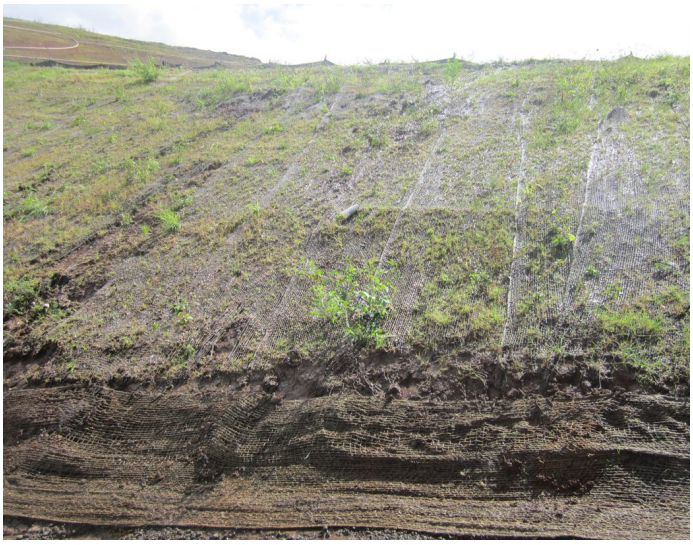
In addition to using the correct product for a given application, construction staff should properly install the geotextile, netting or matting to achieve maximum effectiveness. Proper installation depends on the type of material as well as the specific application. Typically, local jurisdictions provide guidance (e.g., Idaho Department of Environmental Quality stormwater best management practices) on installation requirements, such as material orientation, edge overlap, anchoring, and stake or staple spacing. In all cases, the material should maintain firm, continuous contact with the soil either through proper anchoring or use of sufficient cover material such as gravel or fill. If there is no contact, the material will not hold the soil, and erosion will occur underneath the material.



Geotextile matting can be used on slopes to help establish vegetation by protecting the soil surface and seedlings from erosion while still allowing vegetation to grow through the mat.
Credit: Anthony D'Angelo for USEPA, 2015

Limitations

Geotextiles are not biodegradable and are not appropriate for areas where their presence or appearance is aesthetically unacceptable. Many

geotextiles degrade rapidly when exposed to sunlight. The wind might blow geotextiles away or the geotextiles might increase discharges if construction staff do not install them properly. It may be necessary to dispose of geotextiles as well as synthetic matting and netting in a landfill, which makes them less desirable than vegetative stabilization. Improper selection, design or installation of geotextile fabric, matting or netting may drastically reduce its effectiveness.

Maintenance Considerations

Maintenance requirements vary depending on the type of material and specific application. Geotextiles should undergo regular inspection to determine if cracks, tears or breaches have formed in the fabric. Construction staff should address defects in geotextiles immediately. For silt fences, construction staff should remove sediment buildup after each storm event or when a significant amount of buildup has accumulated. Where geotextiles, matting or netting have separated from the ground, additional cover material or staking may be necessary to maintain contact and ensure long-term effectiveness.

Cost Considerations

Installation costs for geotextiles—including materials and labor—typically range from $1 to $3 per square yard (Maryland SHA, 2019; RSMeans, 2019) but can be as high as $10 per square yard or more for advanced materials. Netting and matting costs typically range from $1 to $4 per square yard (RSMeans, 2019). Costs depend on material, strength, thickness and durability.

Additional Resources

- Idaho Department of Environmental Quality. (2005). BMP 17: Geotextile. In *Catalog of stormwater best management practices for Idaho cities and counties* (Vol. 2). Water Quality Division, Idaho Department of Environmental Quality.
- Maryland Department of the Environment. (2011). 2011 Maryland standards and specifications for soil erosion and sediment control.
- Washington State Department of Transportation. (2019). *Standard specifications for road, bridge, and municipal construction 2022* (M 41-10).

Additional Information

Additional information on related practices and the Phase II MS4 program can be found at EPA's National Menu of Best Management Practices (BMPs) for Stormwater website

References

Maryland Department of Transportation State Highway Administration (Maryland SHA). (2019). *Price index July 2019*.

RSMeans. (2019). Earthwork data from Gordian [Online data file]. RSMeans data from Gordian.

Disclaimer

This fact sheet is intended to be used for informational purposes only. These examples and references are not intended to be comprehensive and do not preclude the use of other technically sound practices. State or local requirements may apply.