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Green Retaining Walls Unabridged

Usefulness of compost filter socks expands

The past few years have seen applications of compost filter socks extend from sediment control devices around site perimeters to "greenscape" facings for geosynthetic stabilized earth structures (e.g., retaining walls and over-steepened reinforced soil slopes).

These mesh tubes filled with compost or other organic mixtures provide a contained growth medium for new vegetation on the wall or slope, while serving as a protective facing that eliminates soil erosion. The compost socks can be pre-seeded with selected seed varieties mixed in with the compost during the tube-filling process (along with specified nutrients as desired), or the freshly constructed wall/slope can be hydroseeded directly on its exposed surface of compost socks. Live cuttings can be incorporated between subsequent vertical construction lifts as the earth structure is built.

Stability of these earth structures is achieved via geogrid sheets wrapped around the socks and embedded within a granular, compact backfill soil. Small, portable sock modules with integrated geogrid extensions provide an alternative to the wrapped-face system and can speed up the construction process, especially for remote sites or places with difficult access. Module tubes typically are 230 mm in diameter and 1.4 meters long; like traditional compost socks, these smaller modules can be filled on site or pre-filled and then palletized and shipped to the construction site.

The geogrid extensions typically are 1 meter long, but they can be longer if needed. For taller walls and slopes, supplemental geogrid layers can be added during compaction of the backfill to extend the length of the reinforced zone by sandwiching them between consecutive module geogrid extensions within the granular interlock zone.

The modules can form fairly tight curves in the wall face by cutting the geogrid extensions normal to the sock and spreading them to form a concave curve or overlapping them to form a convex curve. They also can be plumbed with drip irrigation tubing for controlled delivery of water, if needed, to establish vegetation.

In environmentally sensitive areas, such as those encountered in streambank stabilization projects, the module fabric can consist of a biodegradable organic material (e.g., coir). For socks to be submerged and installed below seasonal or permanent water levels along water bodies, the infill material can be mixed with coarse sand or gravel to provide sufficient density and longevity.

It should be noted that these green walls and slopes are engineered structures and must be designed and built by capable and qualified personnel. With proper planning and design, sock-faced mechanically stabilized earth structures provide green, sustainable options for owners and designers. Such structures are eligible for U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) points in four different categories when incorporated into new construction or major renovations.

The paper "Geosynthetic Stabilized Earth Using Compost Filter Socks for Sustainable Vegetated Walls and Slopes" details the geotechnical design of these green stabilized earth structures and includes examples and photos of construction methods and LEED certification credits. It is available to members of the International Erosion Control Assn. and can be downloaded at www.ieca.org/membersonly/cms/content/proceedings/object652pdfenglish.pdf. SWS

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