American Excelsior Company®

TriNet® Recyclex® TRM Soil Fill Installation

Case Study – Vegetated Channel Solutions

Introduction

In situations where the existing or resultant vegetation alone cannot withstand design hydraulic forces, effective erosion control is often achieved through utilizing a properly installed turf reinforcement mat (TRM). Many elements factor into a TRM's success, including:

- Quantified capability to withstand shear stresses that vegetation alone cannot withstand.
- Ability to provide intimate contact with the subgrade and encourage vegetation establishment.
- Proper installation and anchoring to the subgrade.

As the name implies, "turf" is key to the success of any project using TRMs. Quick vegetation establishment should be a top priority on these projects.

The two most common ways of installing TRMs and establishing vegetation are the standalone and the soil fill methods. Standalone installations place the seed and soil amendments below the TRM, allowing the vegetation to grow up through the TRM to provide stem reinforcement.

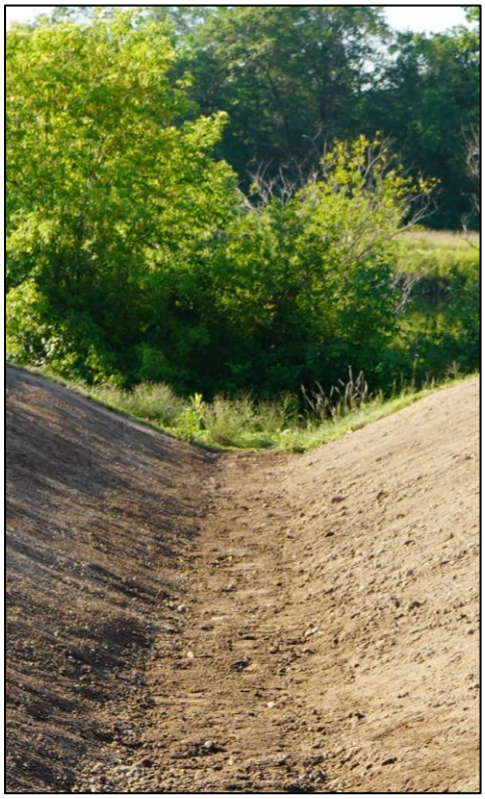

Figure 1: South-facing view of the channel at the project site before revegetation.

On the other hand, soil fill installations place additional soil on top of the TRM after it is installed. Then, seed and soil amendments are applied. Finally, a degradable erosion control blanket (ECB) is installed over the seedbed to provide protection and encourage the vegetation's roots to grow down through the TRM. This method reinforces the root mass and is termed root reinforcement.

In addition to reinforcing the root mass, soil fill installations are sometimes chosen because they bury the TRM's synthetic netting under soil, thus eliminating any wildlife entrapment concerns.

Project Scope

An early fall project in Wisconsin involved revegetating a channel primarily composed of sandy loam soil (see Figure 1). The channel needed to be able to withstand design shear stresses of at least 6 lb/ft^2 once fully vegetated. A soil fill TRM installation was selected to minimize the risk of erosion while also imparting a clean, finished look.

The Plan

TriNet® Recyclex® (see Figure 2), a three-netted TRM manufactured by American Excelsior Company®, was selected for this installation. It has a vegetated permissible shear stress rating of 14.0 lb/ft^2 according to ASTM D6460 and provided velocity and shear stress stability factors over 2. Recyclex® is made from recycled soda bottle (poly) fibers that have a specific gravity of greater than 1, meaning they do not float in water. Recyclex fibers also interlock with one another and to the soil once installed, creating an intimate connection with the subgrade and allowing for ease of vegetation establishment and root reinforcement through the TRM.

TriNet Recyclex was anchored to the subgrade utilizing 12" Gripple® Terra-Lock® twist anchors (product name: Gripple® TLTA1-12in). These twist anchors feature a top coil that provides enhanced interaction with the TRM's surface and an extended tip that imparts superior pullout resistance compared to other commonly used anchoring devices. Such features make the TLTA1-12in ideal for TRM installations.

Curlex® II FibreNet™ (see Figure 3), a 100% natural and wildlife/environmentally friendly ECB also manufactured by American Excelsior Company, was selected as the cover for this soil fill installation. Its Curlex® fibers are sourced directly from Great Lakes aspen trees and are backed by decades of proven performance in the field and through industry-standard testing.

Curlex fibers are engineered to be curled and barbed, forming a "Velcro-like" connection that conforms to irregularities in the soil once installed. The curls and barbs also give the fibers a high Manning's *n* (hydraulic roughness) value relative to other ECB fibers, which helps slow water flow, increase water infiltration, and keep the underlying seed and soil in place.

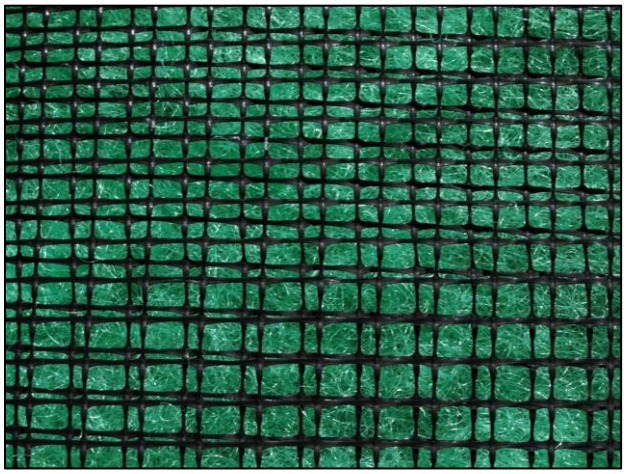

Figure 2: Close-up of TriNet Recyclex.

Figure 3: Close-up of Curlex II FibreNet.

Executing the Plan

Proper installation of specified BMPs is key to the success of any project. The following images (Figures 4 through 7) highlight some of the key installation processes specific to this project.

Figure 4: Gripple TLTA1-12in anchors being inserted into the TriNet Recyclex upon completion of initial grading.

Figure 5: Soil filling and raking the approximately 1-inch soil veneer on top of the TriNet Recyclex.

Figure 6: Channel after soil, seed, and amendments were added on top of the TriNet Recyclex.

Figure 7: Completed installation of Curlex II FibreNet over soil filled TriNet Recyclex.

Results Over Time

Figure 8: Results after 1 month.

Figure 9: Results after 6 months. This photo was taken in March when snow was still on the ground in Wisconsin.

Figure 10: Results after 9 months.

Conclusions

The soil fill TRM installation was a success. The vegetation established quickly through the TRM, giving the channel a clean, finished look (see Figures 8 through 10). The TRM allowed the vegetation to withstand all the hydraulic forces that the channel encountered.

Contact American Excelsior Company regarding questions about this article or for more information at: ccs@americanexcelsior.com.