



Introduction



It is generally accepted that a good stand of vegetation can withstand shear stresses of approximately 3.5 lb/ft². Situations where vegetation requires long-term protection from erosive forces and/or might not be able to withstand design hydraulic events necessitate using a turf reinforcement mat (TRM).

As the name implies, “turf” is the key to success of any project using TRMs. The most effective TRMs have several important characteristics. First, they are made of materials that are strong, durable and flexible. Their matrix must also be dense enough to provide complete coverage yet open enough to allow for full and complete vegetation establishment.

Project Scope



In 2000, a long-term channel installation was needed to demonstrate the effectiveness of a vegetated TRM solution at American Excelsior Company’s ErosionLab®. The TRM solution would be installed in an 80’-long trapezoidal channel with a 2’ bottom, 2H:1V sides slopes, and a 10% bed slope. It would be required to withstand regular high-stress hydraulic events each year and effectively reinforce the channel’s vegetation for decades.

The Plan



Recyclex® TRM (see Figure 1) was selected to line the channel and protect the subgrade and emerging vegetation against erosive forces. It is rated for slopes up to 0.5H:1V and has a permissible shear stress rating of 10+ lb/ft² according to ASTM D6460.

Recyclex TRM features a Recyclex® matrix composed of fibers made from 100% recycled materials (see Figure 2) that are tightly crimped and curled, allowing them to interlock when stitched between an extra heavy-duty top net and a heavy-duty bottom net. Unlike TRMs with tighter matrices, Recyclex TRM’s strong, interlocking, yet open matrix allows vegetation to easily grow through it. Crimping also allows the fibers to conform to terrain details and train water to follow the fiber matrix, slowing flow velocity in the process.

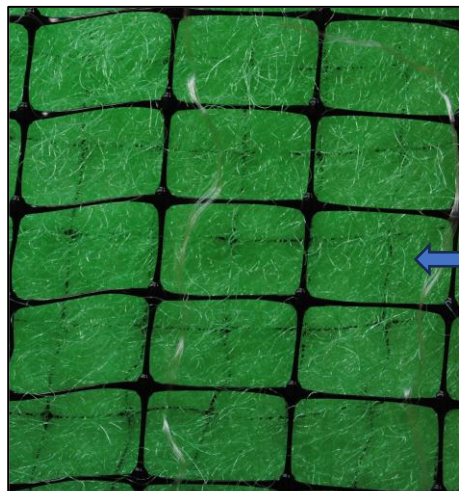


Figure 1: Close-up image of Recyclex TRM.



Figure 2: Example of recycled material used to make Recyclex fibers.

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Executing the Plan



First, the channel was properly graded, and any large roots and rocks in the subgrade were removed (see Figure 3). Next, Wisconsin DOT No. 10 seed mix and soil amendments were applied before trenching in (see Figure 4) and anchoring Recyclex TRM according to its respective Installation Guidelines, Staple Pattern Guides, and CAD Details that are available on www.Curlex.com.



Figure 3: Example of removing roots and rocks from the subgrade.



Figure 4: Digging a trench in which to install the Recyclex TRM at the head of the channel.

Results Over Time



The summer of 2025 marked 25 years since the product was installed (see Figures 5 through 7).



Figure 5: Recyclex TRM installation results after 22 days.



Figure 6: Recyclex TRM installation results after 33 days.

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Results Over Time (Continued)



Figure 7: Recycllex TRM installation results after 2 years.



Figure 8: Flow over vegetated Recycllex TRM channel.


 The installation has fully vegetated and maintained its integrity throughout the years, and there is no visible evidence of erosion within the channel. It continues to be one of the most recognizable features to any ErosionLab visitor, regularly enduring flows producing varying shear stress forces on the TRM-reinforced channel (see Figures 8 and 9).



Figure 9: Flow over Recycllex TRM channel 20+ years after installation.

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