

land loss. landlok.



The most effective storm water solutions on earth



REINFORCED VEGETATION vs. HARD ARMOR		
Applications	Installed Cost Per Square Yard	Sediment Capturing Effectiveness
Turf Reinforcement and Vegetation	\$5 - \$20	200%
Riprap	\$25 - \$60	75%
Concrete	\$40 - \$80	50%

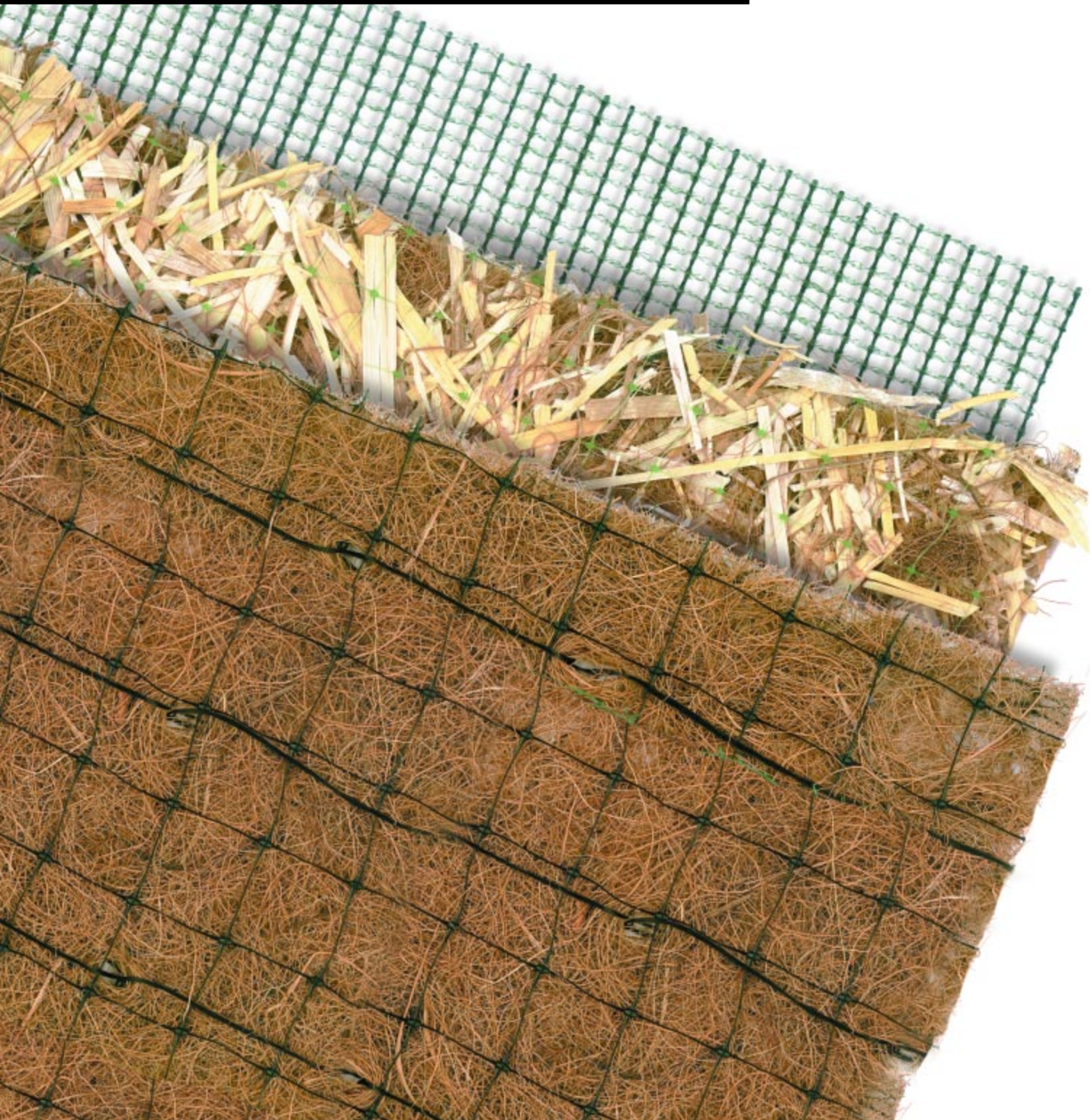
EROSION. It's the most devastating effect of storm water runoff. But EPA studies prove there's one defense you can count on more than any other—**vegetation**. And today, the fastest way to establish and anchor vegetation is with Landlok® erosion control mats and their patented X3™ technology.

It's just what you'd expect from SI Geosolutions. Since 1969, we've produced more turf reinforcement mats than any other geosynthetic manufacturer in North America. In fact, we're the only geosynthetic company with production facilities in the eastern and western U.S. Not to mention the fact that we've earned internal test lab accreditation from the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP), and ISO-9002 certification for our manufacturing practices. With all this and hundreds of millions of square yards installed, it's easy to see why we've become the leader in erosion control technology.

And it's easy to see why we offer the broadest, most innovative line of erosion control products on earth—Landlok.



Erosion Control Blankets (ECBs)



LANDLOK® ECBs

Unlike loose fiber mulches, Landlok ECBs give your projects more dimensionally stable erosion protection that locks seed and soil in place. That stability encourages faster vegetation growth, allowing the root system to establish solid ground support. And we make all our ECBs available with a rapidly degrading net (RD), or a more environmentally friendly jute netting (EN).



Landlok® 407

- Specially designed for low-flow channels and moderate slopes
- Natural-looking, high-strength polypropylene mesh
- Functional longevity: Short-term photodegradable (plus/minus 1 year)



Polypropylene

Landlok® S1

- Specially designed for low-flow channels and moderate slopes
- Straw fibers stitch-bonded to a single net
- Photodegradable netting on top side
- Functional longevity: Short-term degradable (plus/minus 1 year)



Straw

Landlok® S2

- Specially designed for low-flow channels and moderate slopes
- Straw fibers stitch-bonded to two nets
- Photodegradable netting on top and bottom sides
- Functional longevity: Short-term degradable (plus/minus 1 year)



Straw

Landlok® CS2

- Specially designed for steeper slopes and moderate-flow channels
- Coconut/straw blend
- Functional longevity: Extended-term degradable (plus/minus 2 years)



Straw & Coconut

Landlok® C2

- Specially designed for moderate-flow channels and very steep slopes (1.5:1 slope ratio)
- Coconut fiber
- Functional longevity: Long-term degradable (plus/minus 3 years)



Coconut

APPLICATIONS



Slopes



Channels



before after

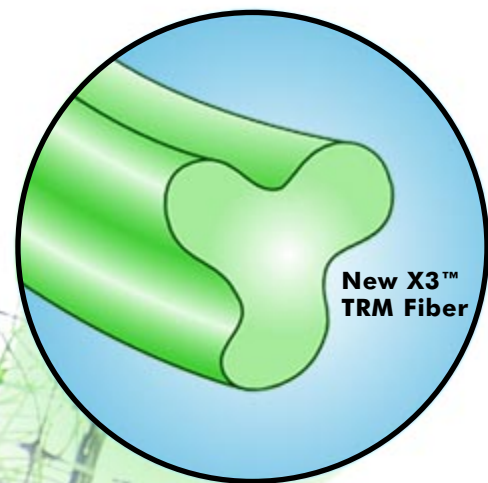


before after



Turf Reinforcement Mats (TRMs)

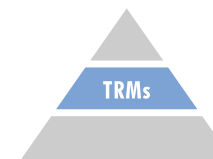
The Fastest Way to See Green.



Landlok TRMs are available in tan or green.

LANDLOK® TRMs

Reinforcement is the only way vegetated channels and slopes can stand up to storm water. And Landlok TRMs with advanced X3™ fiber technology give you two key advantages over traditional hard armor products like rock riprap and concrete. First, their unique fiber shape and 3-D pattern create a thick matrix of voids that trap seed, soil and water in place for quicker, thicker vegetation growth. Then, they provide additional reinforcement that *doubles* your vegetation's natural erosion protection abilities. Unlike ECBs, these flexible, three-dimensional reinforcement systems remain a permanent part of your application, anchoring mature plants to the soil for superior, long-term erosion resistance.



Landlok® TRM 435

- Uniquely designed for moderate-flow channels
- Made of a dense matrix of polypropylene fibers (8 oz./yd²) created to limit stretching in saturated conditions
- Available with a lightweight nonwoven geotextile backing



Green

Landlok® TRM 450

- Uniquely designed for sites that require pleasing aesthetics in a hurry
- Synthetic construction for long-term ground cover and erosion protection
- Installs on the top of soil and seed for an immediate, natural appearance
- The industry standard in TRMs



Green

Landlok® TRM 1060

- Uniquely designed for demanding conditions in which soil-filling is specified for maximum performance
- Heavier weight for long-term ground cover and erosion protection
- May be filled with soil for maximum stability and even quicker vegetation growth



Tan & Green

Landlok® TRM 1051

- Uniquely designed for channels and shorelines susceptible to heavy water runoff
- Made of a lofty web of polypropylene fibers (14 oz./yd²), one high-strength net and nonwoven geotextile fabric backing
- Possesses strength and elongation properties that limit stretching in saturated conditions



Tan

APPLICATIONS



Slopes



Channels



Banks



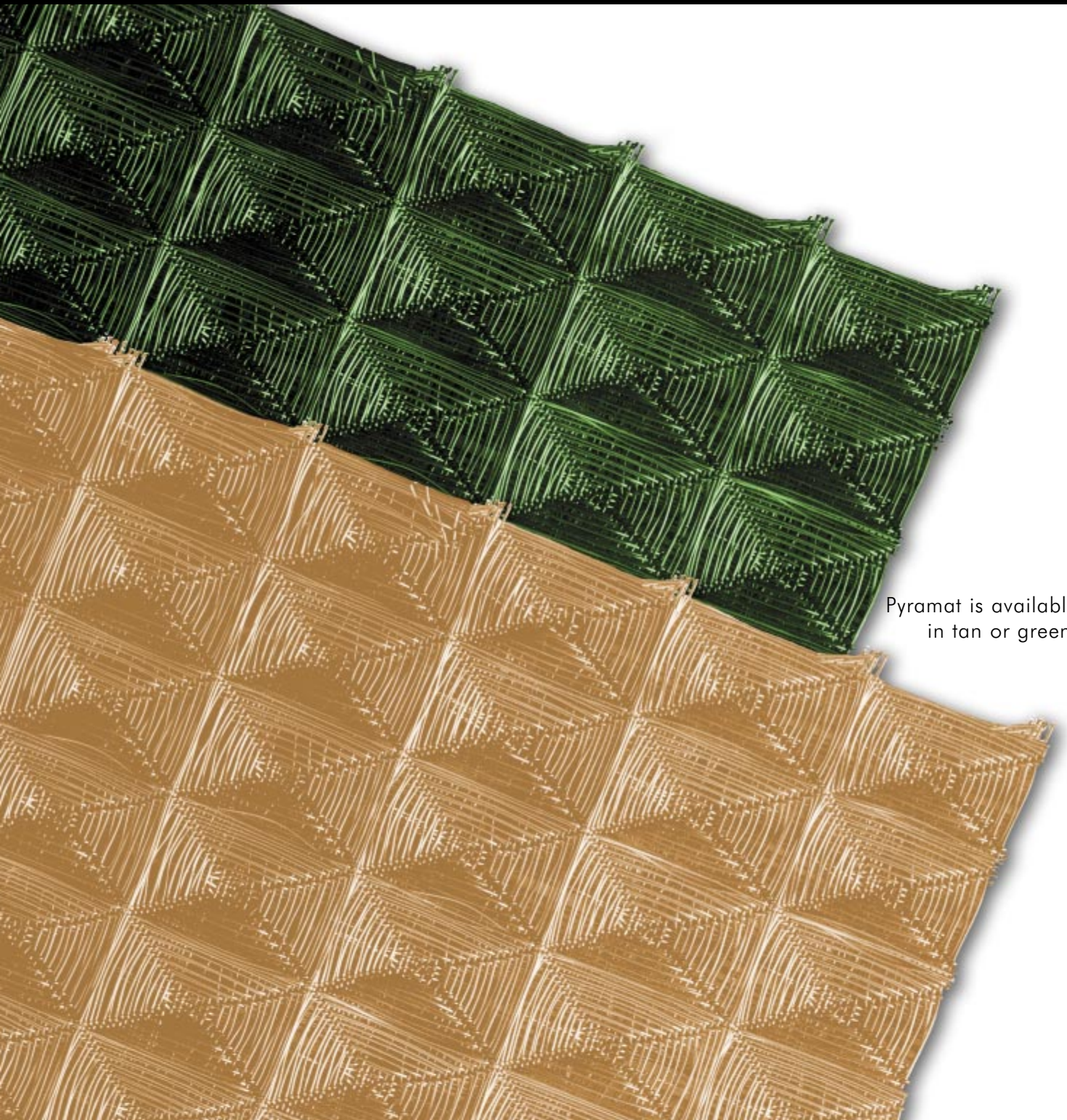
before after



before after



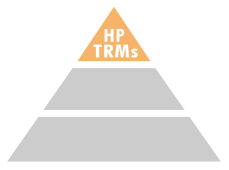
Pyramat® High Performance Turf Reinforcement Mats (HPTRMs)



Pyramat is available in tan or green.

PYRAMAT® HPTRMs

With more than 10 times the strength of standard TRMs, our Pyramat HPTRM tames even the steepest slope and aggressive storm water channel applications. And that makes it the perfect alternative to rock riprap and other hard armor products—especially when you’re faced with sandy soils, UV-exposed sites, utility cuts and areas with maintenance equipment and other large vehicles. Plus, we designed Pyramat with a patented 3-D woven geotextile construction that gives you the durability, dimensional stability and functional longevity you won’t find in other permanent or degradable erosion control products. All of which is why it’s considered the most sophisticated vegetation-enhancing mat on earth. Pyramat’s exceptional UV resistance makes it the preferred TRM in arid and other applications with limited vegetated cover.



Landlok® Pyramat® HPTRM

- Uniquely designed for severe applications that require outstanding strength and superior vegetation growth
- Provides long-term, non-degradable stability
- Meets the definition of HPTRM as defined in the U.S. EPA Storm Water Fact Sheet, "Turf Reinforcement Mats," and FHWA FP-03 Specifications, Section 713.18



Tan or Green

APPLICATIONS



X3™ Fiber Technology

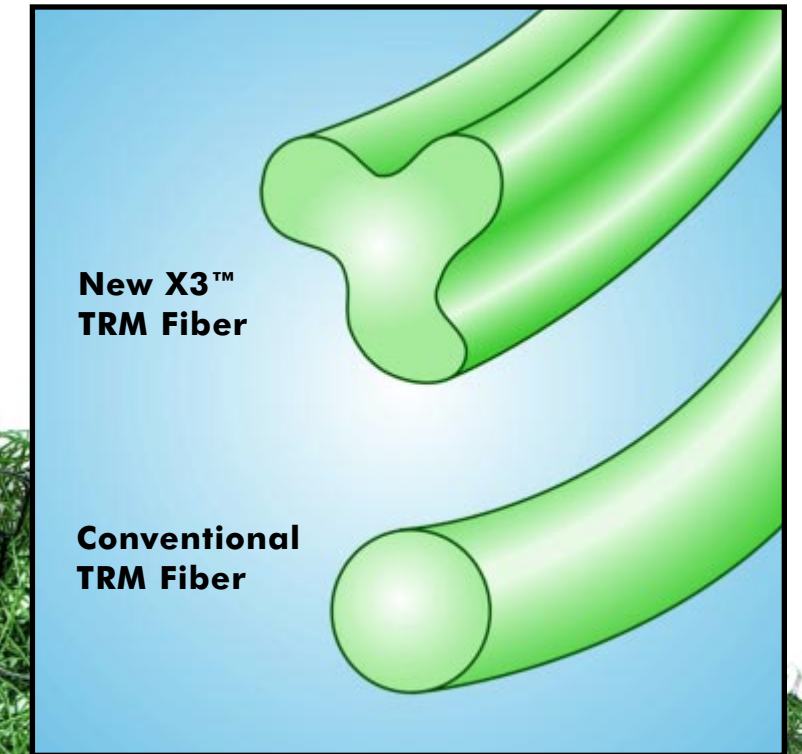
All of our turf reinforcement mats (TRMs) now come with our newest development—X3. This advanced fiber technology is designed to capture more seed, soil and water for the fastest seedling emergence of all TRMs in the industry.

The secret is its shape and construction. We extrude X3 fibers through a unique process that gives them over 40% more surface area. Then, we construct interlocking crimped fibers in a 3-D pattern that creates a thick matrix of voids. That design—coupled with their unique shape—allows X3 fibers to trap and house more soil and water required for rapid growth in steep slopes and moderate- to high-flow channels.

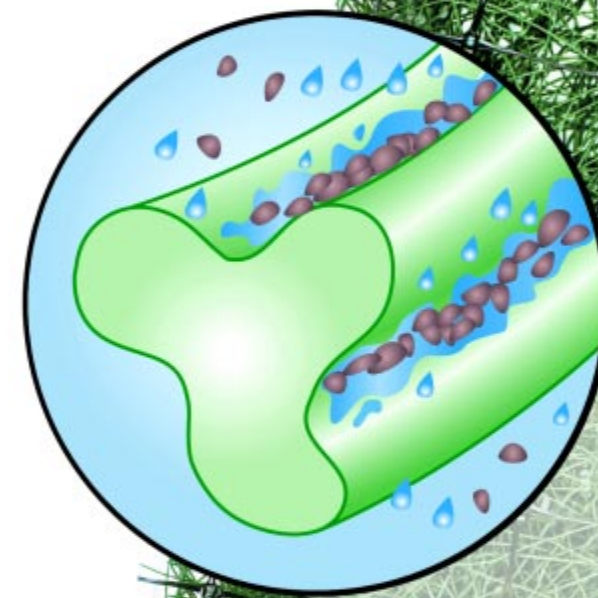
Better TRM Performance

Compared to conventional stitch-bonded TRMs, Landlok with X3 fiber technology interlocking crimped fibers provide:

- **A 40% increase** in seed germination and plant growth during the first 21 days. (Tested in accordance with ECTC Draft Test Method #4)
- **60% greater** tensile strength to ensure structural integrity during and after installation. (Tested in accordance with ASTM D-6818)
- **10% better** resiliency that provides a crush-proof environment during the germination period, when seedlings are most vulnerable. (Tested in accordance with ASTM D-6524)



The Fastest Way to See Green.



WHAT X3™ FIBER TECHNOLOGY MEANS FOR YOU		
Contractor	Specifier	Owner/Agency
■ Get paid quicker	■ Improved performance	■ Reduced risk
■ Fewer callbacks	■ Increased value for owner	■ Reduced costs
■ Less maintenance	■ Improved aesthetics	■ Less maintenance

INDEX PROPERTIES

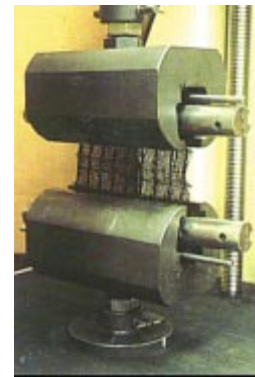
Construction

Turf reinforcement mats can be produced in a variety of manners. While the most popular used by manufacturers is stitch-bonding polypropylene fibers between two biaxially oriented nets, the stitching thread is the weakest link in the composite. A more robust and homogeneous TRM is desired when long-term durability is a primary concern or when affixing the TRM to a rigid material. In this case, a woven high performance TRM is desired to secure the connection for the long haul. *This property is determined through sample observation.*



Tensile Strength

The most popular method to describe an engineering material is its tensile strength. And TRMs are no exception to that rule. The tensile strength of a TRM is mobilized when subjected to high flows in channels, gravitational forces on steep slopes and wheel loading from construction, operational (as with roadside shoulders) or maintenance (such as mowing) traffic. A high-strength, low-strain TRM minimizes seed and root damage under load. As a matter of fact, the US EPA and the Federal Highway Administration recommend that a high performance TRM with a tensile strength of 3,000 lbs/ft (44 kN/m) or greater be used whenever, "field conditions with high loading and high survivability requirements..." exist. *This property is tested in accordance with ASTM D6818, but test methods D5035 and D4595 have also been used.*



Flexibility

Establishing and maintaining intimate contact with the subgrade is crucial to a successful TRM installation. Regardless of how well prepared the subgrade is, there are always irregularities. A flexible TRM such as Landlok or Pyramat will drape over the subgrade and maintain intimate contact. Products with lower values are more flexible and can easily conform to the subgrade. *This property is tested in accordance with ASTM D6575, but test method D1388 has also been used.*



(Retained) Mass Per Unit Area

While most are constructed from 100% UV stabilized synthetic fibers or yarns, some less expensive TRMs substitute natural fibers which degrade over time. Therefore, the mass per unit area measured before installation will decrease as the fibers degrade. This decrease in mass per unit area changes both the index and long-term performance characteristics of the TRM. Therefore, it is important to demand a TRM whose mass per unit area does not change over time. *This property is tested in accordance with ASTM D6566, but test method ASTM D5261 has also been used.*



PERFORMANCE PROPERTIES

Seedling Emergence

Landlok TRMs with new X3™ technology feature polypropylene fibers with 42% greater surface area, which capture critical moisture required for plant growth. Rapid seedling emergence enhances project aesthetics while the vegetation begins to capture sediment from storm water runoff. When using Landlok with X3™ technology, seedling development increases by 40%. As a result, contractors can rely on timely payment and fewer callbacks for re-seeding. This measures the number of seeds germinated, the plant height and the plant mass during the first 21 days of germination while under the protection of a TRM (tested in accordance with ECTC Draft Method #4).



UV Resistance

The long-term durability of a TRM largely depends on its UV resistance, especially as you move farther west. In arid and semi-arid applications, the TRM must withstand UV exposure for prolonged periods of time. All components of Landlok TRMs are stabilized against UV degradation by a special additive (called hindered amine light stabilizers (HALS)) blended with the resin during processing. This produces a TRM capable of resisting degradation until vegetation is established. Pyramat high performance TRM is stabilized against UV degradation using a unique HALS similar to the additive used in vinyl siding. As a result, Pyramat has demonstrated UV resistance even when exposed to direct sunlight for extended periods of time. As a matter of fact, Landlok TRM 450 and Pyramat samples were removed from an installation in Southern California that had been exposed for over five (5) years. The Landlok sample retained more than 70% of its original tensile strength while Pyramat held over 90% of its tensile strength over that period of time. *This property is tested in accordance with ASTM D4355, with samples removed after 500, 1,000 and 3,000 hours of exposure to an artificial xenon light source.*



Hydraulic Performance

SI Geosolutions publishes maximum permissible design values based on test results obtained from over ten (10) years of channel lining performance evaluations at various independent laboratories. Large-scale testing has been performed by Utah State, Colorado State and Texas Transportation Institute in which a test plot is placed in a large flume and subjected to channelized flows. The laboratory and SI Geosolutions determined the procedure, and the test can be performed unvegetated or vegetated for various flow durations. The test set-up also simulates actual field conditions. The results are reported as maximum permissible shear stress and velocities under ideal conditions, which must be factored in the design.



How Landlok® can improve your applications



Superior erosion control

From moderate to extreme slopes, low- to high-flow channels and high-velocity needs of any kind, our complete line of ECB, TRM and Pyramat® HPTRM solutions provide faster, thicker vegetation growth for the most stable erosion control found anywhere.



Enhanced water quality

With Landlok, you get vegetated systems proven to remove water pollutants such as metals, hydrocarbons and suspended solids. Vegetated systems promote infiltration and reduce runoff. Plus, vegetated swales and slopes provide reduced thermal pollution compared to riprap and concrete-lined channels, which absorb and transfer much more heat energy.



Lower costs and labor savings

Landlok erosion control mats not only cost less than hard armor, they're easier to install and require less maintenance over the long term. So you save in product, labor and upkeep costs.



More attractive aesthetics

One of the major drawbacks of concrete and riprap is their unpleasant appearance. But vegetation can turn a potentially unattractive area into a beautiful, natural environment that supports outdoor activities like fishing and hunting.



Create your own storm water plan

The most important step in any erosion control program is deciding to take action. And a good place to start is the SI Geosolutions Web site, www.fixsoil.com. There you can find details on storm water management and register to receive EC-DESIGN® software, which will help you determine which storm water solutions are right for you and which SI Geosolutions products are right for the task.



Speak with an SI Geosolutions expert to pinpoint your needs by calling 1-800-FIX-SOIL or visit www.fixsoil.com.



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GEOSYNTHETIC RESEARCH INSTITUTE



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