



## Anchored Reinforced Vegetation System

ArmorMax® Anchored Reinforced Vegetation System is the most advanced flexible armoring technology available for severe erosion challenges. The ArmorMax® system can be used in **non-structural applications** where additional factors of safety are required, including protecting earthen levees from storm surge and wave overtopping and stream, river and canal banks from scour and erosion. In addition, this system is ideally suited to protect storm water channels in arid and semi-arid environments where vegetation densities of less than 30% coverage are anticipated. For **structural applications**, the system can be engineered to provide surficial slope stabilization to resist shallow plane failures. Consisting of our woven three-dimensional High Performance Turf Reinforcement Mat (HPTRM) with X3® fiber technology and earth percussion anchors, you can count on the ArmorMax® system to hold its ground.



### DURABLE FLEXIBLE ARMORING SYSTEM

Lightweight protection layer securely anchored to the subgrade for long-term design life

### WITHSTANDS EXTREME HYDRAULIC STRESSES

The HPTRM component of ArmorMax has been tested at CSU comparable to traditional armoring methods

### RESISTS NON-HYDRAULIC EVENT DAMAGE

High strength survivability woven monolithic surface resists non-hydraulic stresses like debris flows and maintenance operations

### SECURES NON-STRUCTURAL APPLICATIONS

In non-structural applications, the earth percussion anchors act as a tie-down mechanism securing the HPTRM firmly to the ground for additional factors of safety

### STABILIZES STRUCTURAL APPLICATIONS

Engineered to provide surficial slope stabilization to resist shallow plane failures

## OTHER FEATURES & BENEFITS

- ▶ Supports the EPA's Green Infrastructure initiative and is a recognized storm water Best Management Practice (BMP) and is proven to reduce erosion and reinforce vegetation for low-impact, sustainable design
- ▶ Easy to handle, lightweight components for rapid installation
- ▶ Use of lightweight equipment and unskilled labor facilitates installation with limited site access
- ▶ Aesthetically pleasing and more cost effective than conventional methods such as rock riprap and concrete paving

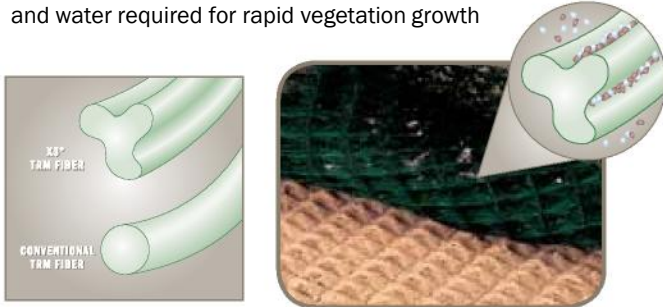
Outperforms and is more cost effective than conventional methods, including:

- ▶ Rock riprap
- ▶ Rock slope protection
- ▶ Gabions
- ▶ Concrete blocks or paving
- ▶ Fabric formed revetments



### WOVEN THREE-DIMENSIONAL HPTRM PROTECTION LAYER FEATURING X3® FIBER TECHNOLOGY

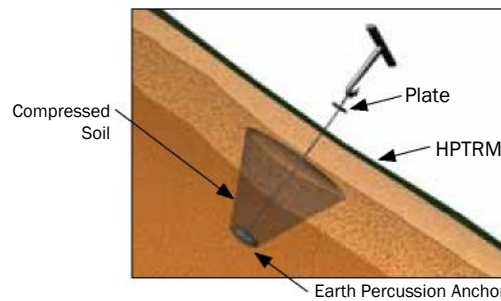
- ▶ Unique X3 fiber shape provides over 40% more surface area than conventional fibers to capture the moisture, soil and water required for rapid vegetation growth



- ▶ Exhibits extremely high tensile strength as well as superior interlock and reinforcement capacity with both soil and root systems
- ▶ Maximum ultraviolet protection for long-term design life.
- ▶ Netless, rugged material construction stands up to the toughest erosion applications where high loading and/or high survivability conditions are required

### EARTH PERCUSSION ANCHORS TO SECURE THE MAT TO THE GROUND

- ▶ Made of corrosion resistant aluminum alloy, gravity die cast and heat treated to give considerable increase in mechanical strength and curability both during installation and in service
- ▶ Connected to a threaded rod or stainless tendon to fully enhance corrosion resistance particularly at the soil/air interface

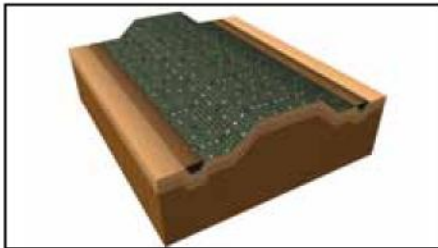


- ▶ As the load exerted on the soil by the ArmorMax® system increases, a body of soil above the

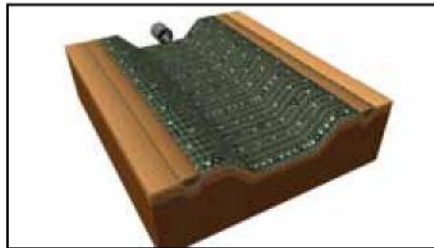
anchor is compressed and provides resistance to any further anchor movement – permanently securing the mat to the ground

### ARMORMAX® NON-STRUCTURAL APPLICATIONS

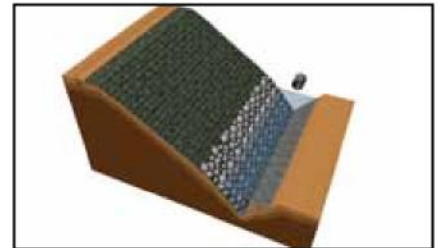
The figures below illustrate the ArmorMax® system for non-structural applications. The system is comprised of the HPTRM and typically Type B1 earth percussion anchors.



LEVEE ARMORING



ARID/SEMI-ARID STORM  
WATER CHANNELS



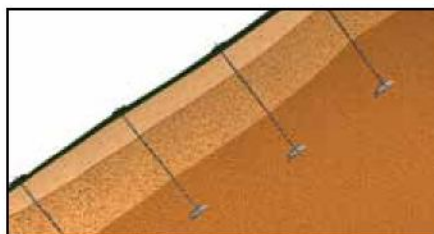
CANAL, STREAM AND RIVER  
BANK PROTECTION

### ARMORMAX STRUCTURAL APPLICATION

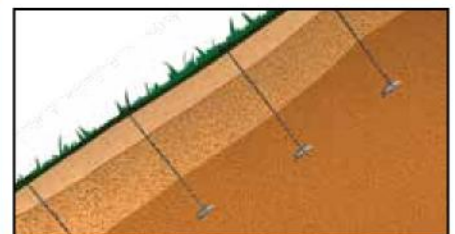
The figures below illustrate the use of ArmorMax® in a structural application for surficial slope stabilization. The system is comprised of the HPTRM and Type B2 or B3 earth percussion anchors as specified by the project engineer.



SHALLOW PLANE FAILURE



APPLY ARMORMAX® SYSTEM



VEGETATION GROWTH



**KEY PHYSICAL PROPERTIES OF ARMORMAX®**

- **Material Composition:** Patented ultraviolet protection package in HPTRM, stainless steel tendons and galvanized threaded rods provide long-term design assurance.
- **Tensile Strength:** HPTRM boasts 4000 x 3000 lb/ft (58.4 x 43.8 kN/m) of tensile strength, which exceeds the U.S. EPA's definition of a High Performance Turf Reinforcement Mat.
- **Seedling Emergence:** HPTRM features X3® fiber technology, which offers 40% more fiber surface area to capture the critical sediment and moisture needed to increase seed germination within the first 21 days.
- **Flexibility:** Allows the system to conform and maintain intimate contact with the prepared subgrade.
- **Anchor Loading Capacity:** Based on anchor size, rod depth and on-site soil parameters the anchor provides pull-out resistance up to 4,000 lbs (17.80 kN).

**ARMORMAX PROPERTY TABLES ENGLISH & METRIC VALUES**

**PYRAMAT PROPERTIES**

		MARV <sup>2</sup>	
PROPERTY	TEST METHOD	ENGLISH	METRIC
<b>ORIGIN OF MATERIALS</b>			
% U.S. Manufactured Inputs		100%	100%
% U.S. Manufactured		100%	100%
<b>PHYSICAL</b>			
Mass/Unit Area	ASTM D-6566	13.5 oz/yd <sup>2</sup>	457.7 g/m <sup>2</sup>
Thickness	ASTM D-6525	0.4 in	10.2 mm
Light Penetration (% Passing)	ASTM D-6567	15% (Max)	15% (Max)
Color	Visual	Green or Tan	
<b>MECHANICAL</b>			
Tensile Strength	ASTM D-6818	4000 x 3000 lb/ft	58.4 x 43.8 kN/m
Elongation	ASTM D-6818	40 x 35%	40 x 35%
Resiliency	ASTM D-6524	80%	80%
Flexibility	ASTM D-6575	0.534 in-lb (avg)	615,000 mg-cm (avg)
<b>ENDURANCE</b>			
UV Resistance % Retained 6000 hrs	ASTM D-4355	90%	90%
UV Resistance % Retained 10000 hrs	ASTM D-4355	85%	85%
<b>PERFORMANCE</b>			
Velocity <sup>3</sup> (Fully Vegetated)	Large Scale	25 ft/sec	7.6 m/sec
Shear Stress <sup>3</sup> (Fully Vegetated)	Large Scale	16lb/ft <sup>2</sup>	766 Pa
Manning's "n" <sup>4</sup> (Unvegetated)	Calculated	0.028	0.028
Seedling Emergence <sup>4</sup>	ECTC Draft Method #4	296%	296%
<b>ROLL SIZES</b>		8.5 ft x 90 ft	2.6 m x 27.4 m

**TYPE B1 ANCHOR PROPERTIES**

<b>PHYSICAL</b>		<b>ENDURANCE/ COMPONENT MATERIALS</b>	
Anchor Head Length	3.4 in	Anchor Head	Die cast aluminum
Anchor Head Width	1.0 in	Cable Tendon	Zinc-aluminum carbon steel
Anchor Head Bearing Area	2.5 in <sup>2</sup>	Load Bearing Plate	Die cast zinc
Anchor Head Weight	0.1 lbs	Load-Lock Mechanism	Die cast zinc w/ceramic roller
<b>PERFORMANCE</b>		Crimped Ferrule	Aluminum
Load Range (Cohesive through Non Cohesive Soils)	Up to 500 lbs	<b>MECHANICAL</b>	
		Ultimate Strength	1,100 lbs
Embedment Depth	Up to 5 ft	Working Load	800 lbs

**NOTES:**

1. The property values listed are effective 04/2011 and are subject to change without notice.
2. MARV indicates minimum average roll value calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will exceed the value reported.
3. Maximum permissible velocity and shear stress has been obtained through vegetated testing programs featuring specific soil types, vegetation classes, flow conditions, and failure criteria. These conditions may not be relevant to every project nor are they replicated by other manufacturers. Please contact Propex for further information.
4. Calculated as typical values from large-scale flexible channel lining test programs with a flow depth of 6 to 12 inches.



MODERATE			SEVERE
<p><b>LANDLOK<sup>®</sup> STITCH-BONDED TRMS</b></p>	<p><b>LANDLOK<sup>®</sup> WOVEN TRMS</b></p>	<p><b>PYRAMAT<sup>®</sup> WOVEN HPTRMS</b></p>	<p><b>ARMORMAX<sup>®</sup> SYSTEM</b></p>
<ul style="list-style-type: none"> <li>▶ 1st generation turf reinforcement mats (TRMs)</li> <li>▶ Moderate-flow channels, bank protection and steep soil slopes</li> <li>▶ Up to 10 years*</li> </ul>	<ul style="list-style-type: none"> <li>▶ 2nd generation turf reinforcement mats (TRMs)</li> <li>▶ Moderate-flow channels, bank protection, and steep soil slopes where greater loading and/ or survivability is required</li> <li>▶ Up to 25 years*</li> </ul>	<ul style="list-style-type: none"> <li>▶ High performance turf reinforcement mat (HPTRM)</li> <li>▶ High-flow channels, extreme slopes, pipe inlets &amp; outlets and other arid/semi-arid applications</li> <li>▶ Up to 50 years*</li> </ul>	<ul style="list-style-type: none"> <li>▶ Anchored reinforced vegetation system consisting of HPTRM and earth percussion anchors</li> <li>▶ Earthen levees and stream, river and canal banks</li> <li>▶ Storm water channels in arid and semi/arid environments</li> <li>▶ Surficial slope stabilization</li> <li>▶ Up to 50 years or greater*</li> </ul>

\*Design life performance may vary depending upon field conditions and applications.

For downloadable documents like construction specifications, installation guidelines, case studies and other technical information, please visit our web site at [www.propexglobal.com](http://www.propexglobal.com). These documents are available in an easy-to-use customizable format.



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