Erosion Prevention

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EROSION

- Erosion from construction sites is the **Number 1** cause of non-chemical pollution of waterways
- 1 acre/1 year = 60-100 tons of topsoil lost to storm events
- 1 acre/1 year = \( \frac{1}{4} \) inch of topsoil lost to wind erosion
  - 42 Tons

Source: US EPA
NPDES Phase I
Large Construction Activities
"Once erosion occurs, unless you have some great practices, particulate removal efficiencies are typically less than 50% for most BMPs."

Erosion Control Magazine, June ‘02
EROSION PREVENTION

- Hand / Drill Seeding
- Blown Straw / Straw with Tackifier
- Hydraulic Applied Seed and Mulch
  - Type 1 / Type 2 / Type 3 / Type 4 / Type 4
- Terra Seeding
- Hydro Sprigging
- Hydro Composting
- Chemical Stabilization (PAM)
- Rolled Erosion Control Products
VEGETATION IS YOUR PERMANENT EROSION PREVENTION
# Shear Stress Comparison

<table>
<thead>
<tr>
<th>Material</th>
<th>Shear Stress (lbs/ft²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Grasses</td>
<td>3.67</td>
</tr>
<tr>
<td>4” Riprap</td>
<td>1.33</td>
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</table>
Seedbed Preparation

- Loosen soils!!!!!!
  - 4-6 inches is optimum
- Remove major obstructions
- Add amendments in top 2-4 inches
  - Soil analysis
Seed to soil contact is vital to good germination.
2 TONS / ACRE
100 – 120 BALES
Keeping Straw in Place

- Tackifier
- Sheep's Footing
- Punching
- Cat Walking
CRIMPING
EPA Toxicity Testing

- Lab Testing Methodology: EPA-821-R-02-012

  - Ceriodaphnia Dubia (Water Flea)
    - 90% Survival Rate

  - Daphnia Magna (Water Flea)
    - 90% Survival Rate

  - Pimephales promelas (Fathead Minnow)
    - 90% Survival Rate
Erosion Control and Revegetation:

Step One: Apply seed, fertilizer and other soil amendments with small amount of Flexterra™ (FGM™) for visual metering.

Step Two: Mix 50 lbs of FGM™ per 125 gallons (23 kg/475 liters) of water; confirm loading rates with equipment manufacturer.

<table>
<thead>
<tr>
<th>Slope Gradient</th>
<th>English</th>
<th>SI</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 3H to 1V</td>
<td>3000 lb/ac</td>
<td>3400 kg/ha</td>
</tr>
<tr>
<td>&gt; 3H to 1V &amp; &lt;2H to 1V</td>
<td>3500 lb/ac</td>
<td>3900 kg/ha</td>
</tr>
<tr>
<td>&gt; 2H to 1V &amp; &lt;1H to 1V</td>
<td>4000 lb/ac</td>
<td>4500 kg/ha</td>
</tr>
<tr>
<td>&gt; 1H to 1V</td>
<td>4500 lb/ac</td>
<td>5100 kg/ha</td>
</tr>
<tr>
<td>Below ECB or TRM</td>
<td>1500 lb/ac</td>
<td>1700 kg/ha</td>
</tr>
<tr>
<td>As infill for TRM</td>
<td>3500 lb/ac</td>
<td>3900 kg/ha</td>
</tr>
</tbody>
</table>

Consult comprehensive CSI formatted specification for additional details.

Strictly comply with equipment manufacturer’s installation instructions and recommendations. Use approved hydro-spraying machines with fan-type nozzle (50-degree tip). To achieve optimum soil surface coverage apply FGM™ from opposing directions to soil surface. Rough surfaces (rocky terrain, cat tracks and ripped soils) may require higher application rates to achieve 100% cover. Recommended maximum slope length 100 feet (30 meters). Not recommended for channels or areas with concentrated water flow. This product may be applied on saturated soils and does not require a curing period to be effective.

<table>
<thead>
<tr>
<th>AVERAGE ANALYSIS</th>
<th></th>
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<tr>
<td>Dry Organic Matter</td>
<td>73% +/- 3%</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>12% +/- 3%</td>
</tr>
<tr>
<td>Cross-Linked Tackifier</td>
<td>10% +/- 1%</td>
</tr>
<tr>
<td>Crimped Synthetic Fibers</td>
<td>5% +/- 1%</td>
</tr>
</tbody>
</table>
ROLLED EROSION CONTROL PRODUCTS
RECP CONSTRUCTION

Matrix
- Straw (S)
- Straw/Coconut (SC)
- Coconut (C)
- Synthetic (P)

Netting/Threads
- Photodegradable (45 Days-3 Years)
- Biodegradable (1 Year-3 Years)
- Permanent
DEFINITIONS

- **RECP**
  - Rolled Erosion Control Product

- **ECB**
  - Erosion Control Blanket (Temporary)

- **TRM**
  - Turf Reinforcement Mat (Permanent)
  - C-TRM
DEFINITIONS

- Short Term Blanket
  - One Year Product (Straw)

- Extended Term
  - Two Year Product (Straw/Coconut)

- Long Term
  - Three Year Product (100% coconut)

- Permanent
  - Forever (All Synthetic)
How RECP’s Work

- RECP’s provide erosion protection prior to vegetation establishment
  - Reduce runoff velocity and volume (improve infiltration of water)
  - Reduce soil detachment and transportation
  - Absorb raindrop energy
  - Trap soil particles
RECP’s provide erosion protection prior to vegetation establishment

- Reduce runoff velocity and volume (improve infiltration of water)
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- Trap soil particles
Additional Benefits Of RECP’s

- Organic matrix materials provide mulching action to enhance vegetation establishment
- Moisture absorption and retention
- Reduces soil temperature fluctuation
- Physically supports young plants
Erosion Control Blankets
Single Net Short-Term ECB’s

• S75
• Single Net Straw
• 12 Month
• Photodegradable Net
Single Net Short-Term ECB’s

- DS75
- Rapid Photodegrading Net
- 45-60 Days
- Straw
Applications for Short-Term Quick Degrading ECB’s
BioNet™ Application
BIO-STAKES

- North American Green Bio-STAKE™
  - Made from a 100% biodegradable corn-based polymer
  - Safe and environmentally friendly alternative to metal staples for securing ECBs, bird netting, landscape fabrics, or sod
Double Net Short-Term ECB’s

- S150
  - Double Net Straw
  - 12 Month
- DS150
  - Rapid Degrading Net
  - 45-60 Days
- S150BN
  - Organic Nets
  - 12 Month
Short-term ECB’s
General Application Guide

Single Net
Double Net

SLOPE APPLICATIONS

4:1 - 3:1 Slopes
Low Flow Channels

3:1 - 2:1 Slopes
Moderate Flow Channels
Extended-Term ECB’s

• SC150
  • Double Net
  • 70% Straw
  • 30% Coconut
  • 24 Months

• SC150BN
  • Organic Nets
  • 18 Months
Double Net Long-Term ECB’s

• C125
  • Double Net
  • 100% Coconut
  • 36 Month
• C125BN
  • Organic Nets
  • 24 Months
General Application Guide

Extended-term

Long-term

SLOPE APPLICATIONS

2:1 - 1:1 Slopes
Medium Flow Channels

1:1 Slopes
High Flow Channels
ECB Applications
<table>
<thead>
<tr>
<th>Material</th>
<th>Shear Stress (lbs/ft²)</th>
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<tr>
<td>Blown Straw</td>
<td>0.00</td>
</tr>
<tr>
<td>Sod</td>
<td>1.00</td>
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<td>2.67</td>
</tr>
<tr>
<td>24” Riprap</td>
<td>8.00</td>
</tr>
<tr>
<td>36” Riprap</td>
<td>10.00</td>
</tr>
<tr>
<td>P550</td>
<td>14.00</td>
</tr>
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TRM Applications
Vegetated TRM and barely visible check dams

August 2008
What is ShoreMax?

ShoreMax™ is a patent-pending soft revetment scour protection mat designed as mechanical protection over highly erosive areas. ShoreMax provides protection against much higher shear stresses and velocities than turf reinforcement mats (TRMs) alone. The ShoreMax system is comparable to hard armor products such as rock rip rap and articulated concrete blocks in turbulent flow and wave attack applications.

ShoreMax is a unique, highly flexible UV stabilized rubber mat designed with voids to allow vegetation establishment through the mat, or natural infilling of sediment. ShoreMax is a versatile product that should be used in conjunction with other erosion control products such as turf reinforcement mats above water lines and geotextiles below normal water lines.
# Features and Benefits Chart

<table>
<thead>
<tr>
<th><strong>ShoreMax Soft Revetment and Scour Protection Mat</strong></th>
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<tbody>
<tr>
<td><strong>Features</strong></td>
<td><strong>Benefits</strong></td>
</tr>
<tr>
<td>Panel Size</td>
<td>Suitable for easy, one-person installations without heavy equipment</td>
</tr>
<tr>
<td>Composition</td>
<td>UV Stabilized Rubber</td>
</tr>
<tr>
<td>Color</td>
<td>Dark Green/Tan</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>Blends with vegetation or natural earth</td>
</tr>
<tr>
<td>Flexural Rigidity</td>
<td>Non-buoyant and remains submerged in turbulent flow. HDPE transition mats with specific gravities less than 1.0 are subject to floating in submerged conditions.</td>
</tr>
<tr>
<td>Unit Weight (kgs/SM)</td>
<td>More flexible than most TRMs to aid in conformance and allow for installation with standard staples, fabric pins or stakes (dependent upon soil type and application). Many HDPE mats are very rigid and require expensive earth anchors to conform to underlying surface.</td>
</tr>
<tr>
<td>Thickness (mm)</td>
<td>Relatively high unit weight in conjunction with excellent flexibility facilitates self conformance to underlying surface</td>
</tr>
<tr>
<td>Opening Size (cm)</td>
<td>3/4 inch deep cells provide greater separation between underlying surface and flow induced shear stress than 1/2 inch transition mats.</td>
</tr>
<tr>
<td>&quot;Gripper&quot; Lugs on Mat Bottom</td>
<td>Smaller diameter cell openings than other transition mats for reduced underlying surface exposure to flow induced shear stress.</td>
</tr>
<tr>
<td>Integrated Panel Interlock System</td>
<td>Unlike the smooth bottom surface of HDPE mats, 1/3 inch lugs extending from bottom of ShoreMax mat protrude into underlying material to prevent horizontal shifting and separation from TRM or geotextile.</td>
</tr>
<tr>
<td>Resilient, Anti-Slip Surface</td>
<td>Interlocking edges simplify seaming adjacent panels together and help prevent seam separation</td>
</tr>
<tr>
<td>Easy to Cut with Standard Equipment</td>
<td>Enables workers to safely walk on and install, even in wet conditions. Also allows for use along shorelines where boats may be docked on shore. Reduces the hazards of slipping compared to smooth HDPE mats.</td>
</tr>
</tbody>
</table>

**Performance Properties**

**Installation Properties**
QUESTIONS?
THANK YOU