EROSION & SEDIMENT CONTROL ON CONSTRUCTION SITES

Doug McCluskey
Assistant Erosion Control & Geoproduct Manager, EJ Prescott
SEDIMENT CONTROL
Why do I have to install a sediment control device?

1. There is a legal requirement to practice sediment & erosion control on most construction sites.

2. Proper sediment & erosion controls will prevent expensive, time consuming rework.

3. Keeping soil on the construction site will prevent polluted runoff from entering local streams, rivers, and lakes.
IT’S THE LAW

Cuyahoga River, Ohio: 1969
City pump station discharges sewage into Cuyahoga River
History Lesson

1948 – Federal Water Pollution Control Act

• Major Amendments to the FWPCA in 61’, 66’, 70’, 72’, 77’, & 87’

1972 – Clean Water Act

• Made it unlawful to discharge any pollutant from a point source into navigable waters without a permit
• Established the National Pollutant Discharge Elimination System (NPDES)
• Enforced Nationally by the Environmental Protection Agency (EPA)

1987 – CWA Amended

• To address pollutants from a non-point source
Arab terrorists take Israeli hostages at Munich Olympics, 11 athletes are killed

Nixon launches the Space Shuttle program
Goodyear Blimp flies for the 1st time

Air stewardess Vesna Vulovic survives a 33,340’ fall without a parachute after a bomb was detonated on her flight
KISS is formed
History Lesson

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• To address pollutants from a non-point source
Spuds Mackenzie 1st appeared in Bud Light advertisements

The Cosby Show was #1 on TV
Bomb blamed on the Unabomber explodes by a computer store in Salt Lake City

Ben & Jerry’s announce new Cherry Garcia ice cream flavor
Spaceballs released June 24th
What pollutant is currently the most significant threat to clean water in the United States?

SEDIMENT
Each year in the United States, about 8 billion metric tons of sediment reaches our ponds, rivers, and lakes.

Roughly 2/3 comes from agriculture and forestry practices.

1/3 comes from active construction or land development.
First things First

Sediment results from erosion. Therefore, if you **effectively** apply erosion controls as a top priority on any project, you will eliminate the need to have to deal with sediment control.

**EROSION = SEDIMENT**
SEDIMENT CONTROL DEVICES

- Source: US EPA

  68% of Installations are INCORRECT
  86% of Installations are NOT maintained
Silt Fence used in Concentrated Flows
Fabric NOT in Trench
NOT enough Stakes
Trench NOT Compacted
Repairs NOT Completed
Compost Filter Sock

- Mesh tubular sediment control & and stormwater filtration device that is filled onsite, or is palletized with a compost or composted media. Manufactured by Filtrexx

- SiltSoxx can be a continuous length, or cut into pieces to fit the application

- Remove turbidity through ponding and filtering
Material Characteristics

5 MIL HDPE

Material: Hi Density Polyethylene

Material Characteristics: Photodegradable

Mesh Opening: 3/8"

Tensile Strength: 26 psi

Functional Longevity: 9 months to 3 years

Designed for optimum filtration and Hydraulic flow
### Test Material

<table>
<thead>
<tr>
<th>Berm Diameter (&quot;)</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berm Material:</td>
<td>Filtrexx FilterSoxx</td>
</tr>
<tr>
<td>Slope (1:X)</td>
<td>3</td>
</tr>
<tr>
<td>Flow (gal/min/linear ft)</td>
<td>2.0</td>
</tr>
<tr>
<td>Time Duration (min)</td>
<td>10</td>
</tr>
<tr>
<td>Run Number:</td>
<td>1</td>
</tr>
<tr>
<td>Void Space (% vol.)</td>
<td>23</td>
</tr>
<tr>
<td>Moisture (% wt)</td>
<td>55.2</td>
</tr>
<tr>
<td>Tap Water start (EC umhos/cm)</td>
<td>450</td>
</tr>
<tr>
<td>Tap Water after 10 min. run</td>
<td>462</td>
</tr>
</tbody>
</table>

Test Conditions:
- Method: ASTM 3977c - 2002

### Results

<table>
<thead>
<tr>
<th>Test Material</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk Density (lb/cu ft-wet wt)</td>
<td></td>
</tr>
<tr>
<td>Bulk Density (lb/cu ft-dry wt)</td>
<td></td>
</tr>
<tr>
<td>MM inches</td>
<td></td>
</tr>
<tr>
<td>Peri</td>
<td></td>
</tr>
<tr>
<td>16 to 25</td>
<td>0.63 to 1.0</td>
</tr>
<tr>
<td>&gt; 25</td>
<td>&gt; 1.0</td>
</tr>
<tr>
<td>9.5 to 16</td>
<td>0.37 to 0.63</td>
</tr>
<tr>
<td>6.3 to 9.5</td>
<td>0.25 to 0.37</td>
</tr>
<tr>
<td>4 to 6.3</td>
<td>0.16 to 0.25</td>
</tr>
<tr>
<td>2 to 4</td>
<td>0.079 to 0.16</td>
</tr>
<tr>
<td>&lt; 2</td>
<td>&lt; 0.079</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>
US EPA GreenScapes Cost Calculator

Available from the US EPA at:
http://www.epa.gov/greenscapes/tools
ADAVANTAGES

1. 8X Less Maintenance than Silt Fence
2. NO Trenching-NO Soil Disturbance
3. Easily Installed Easily Removed Easily Maintained
4. Installed Anytime of Year
5. Available in 8”, 12”, 18”, & 24” Diameters
6. Additives to remove Oils, Heavy Metals, Nutrients, & Bacteria
Applications

SEDIMENT CONTROL

INLET PROTECTION

CHECK DAMS

CONCRETE WASHOUTS
SLOPE PROTECTION
SEDIMENT TRAPS
SLOPE INTERRUPTION
BIOFILTRATION

CHANNEL PROTECTION
VEGETATED WALLS
BANK STABILIZATION
RUNOFF DIVERSION
BIOSWALES
Fiber Filtration Tubes

Fiber Filtration Tubes, Terra-Tubes, are engineered composites of wood fibers, man made fibers, and performance enhancing polymers, encased in heavy duty cylindrical tubes. Manufactured by Profile Products

Designed to trap, filter, and treat sediment laden runoff while reducing hydraulic energy

3 Primary Functions: Flow  Filtration  Flocculation
99% Reduction in Turbidity!

Upstream

Downstream

99% Reduction in Turbidity!
ADVANTAGES

1. 15X More Effective at Reducing Turbidity
2. 15X More Effective at Controlling Sediment Loss
3. Lightweight, Easy to Handle & Install
4. Available in 6”, & 9” Diameters
5. Easily Installed Easily Removed Easily Maintained
Applications

DITCH CHECKS

PERIMETER/SEDIMENT CONTROL

SLOPE INTERRUPTION

BIOSWALES

STORMWATER TREATMENT SYSTEMS
EROSION
CONTROL
Biodegradable Erosion Control Blankets
BioNet

Little to no risk of wildlife entrapment
Easy to sprig or plant through

Increased water absorption with jute netting vs. polypropylene netting

Improved blanket conformance and adherence to soil vs. polypropylene netting

Enhanced erosion protection and mulching capabilities vs. polypropylene netting

Durable, flexible and 100% biodegradable
Lightweight jute netting requires no direct sunlight exposure to initiate degradation
BioNet

*Leno woven nets feature double twisted strands in the machine direction that provide higher strength and integrity to the BioNet blankets than that of cross-lay nets.*

**LENO WOVEN**  **CROSS-LAY**
Cumberland River, Tennessee: C125BN
**Short Term**

**S75BN**
Single Net Straw Blanket
100% Straw
12 Month Longevity

**Typical Applications:**
- 4:1 – 3:1 Slopes
- Low Flow Channels
- Permissible Shear: 1.6 lbs./Sq.Ft

**S150BN**
Double Net Straw Blanket
100% Straw
12 Month Longevity

**Typical Applications:**
- 3:1 – 2:1 Slopes
- Moderate Flow Channels
- Permissible Shear: 1.85 lbs./Sq.Ft
Extended Term

**SC150BN**
Double Natural Fiber Net Blanket
70% Straw 30% Coconut
18 Month Longevity

*Typical Applications:*
2:1 – 1:1 Slopes
Medium Flow Channels
Permissible Shear: 2.10 lbs./Sq.Ft

**C125BN**
Double Jute Net Blanket
100% Coconut
24 Month Longevity

*Typical Applications:*
1:1 & Greater Slopes
High Flow Channels
PS: 2.35 lbs./Sq.Ft
Shorelines
C700BN

100% Coconut

Woven Coir Fiber Netting—Top Net

Woven Natural Fiber Jute Netting—Bottom Net

36 Months Longevity
Installation

Correct installation is CRITICAL for ultimate performance.
Applications

Short Term

Extended Term
Hydromulches
Types of Hydraulic Mulches

- Paper (Cellulose)
- Paper (Cellulose) w/Tackifier
  - Wood
  - Wood w/Tackifier
  - Wood w/ Synthetic Fibers
- Paper and Wood Combination or Blends
  - Blends w/Tackifier
  - Straw
- Straw and Reclaimed Cotton
# Advantages

<table>
<thead>
<tr>
<th>Product Comparison:</th>
<th>Flexterra® FGM™</th>
<th>Blankets</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Effective without special site preparation</td>
<td>✔️</td>
<td>NO</td>
</tr>
<tr>
<td>• Can be applied without direct access to site</td>
<td>✔️</td>
<td>NO</td>
</tr>
<tr>
<td>• Eliminates costly, labor-intensive staking</td>
<td>✔️</td>
<td>NO</td>
</tr>
<tr>
<td>• Bonds directly to the soil</td>
<td>✔️</td>
<td>NO</td>
</tr>
<tr>
<td>• Rids site of messy, leftover netting</td>
<td>✔️</td>
<td>NO</td>
</tr>
</tbody>
</table>
Better Intimate Contact with Soil

Spray on Blankets

Rolled EC Blankets
Application is Critical

PROPER APPLICATION  IMPROPER APPLICATION

3000 lbs/acre application rate
Adhesion to Soil

FRM unique combination of mechanical and chemical bonding creates an erosion control blanket with unequaled structure and adhesion to soil.
Extrapolation of Soil Loss on a per Acre Basis

Utah State University
Water Research Lab data

Estimating soil loss using the RUSLE (or MUSLE for single storm event) equation and published “C” factors
INSTALLATION GUIDELINES

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.

INSTALL PRODUCT AT THE FOLLOWING TYPICAL APPLICATION RATES:

<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>

Strictly comply with equipment manufacturer’s installation instructions and recommendations. Use approved hydro-seeding machines with fan-type nozzle (90-degree tip). To achieve optimum soil surface coverage apply FGM™ from opposing directions to soil surface. Rough surfaces (rocky terrain, cat tracks and ripped sod) may require higher application rates to achieve 100% covers. 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.

AVERAGE ANALYSIS:

<table>
<thead>
<tr>
<th>Component</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Organic Matter</td>
<td>73% ± 3%</td>
<td></td>
</tr>
<tr>
<td>Moisture Content</td>
<td>12% ± 3%</td>
<td></td>
</tr>
<tr>
<td>Cross-Linked Tackifier</td>
<td>10% ± 1%</td>
<td></td>
</tr>
<tr>
<td>Crimped Synthetic Fibers</td>
<td>5% ± 1%</td>
<td></td>
</tr>
</tbody>
</table>
The Best Pellet to Quickly and Easily Establish Vegetation
• Advanced technology improves performance and ease of application

• Easily applied via
  • Hydroseeders
  • Spreader
  • By Hand

• Our 40# bag covers the same area as other 50# bags and outperforms them
Covergrow Through Spreader or by Hand

- Increased swelling, dispersion and coverage compared to leading applied pellets
- Smoother flowing for easy spreader application
- Stays in place due to advanced tackifier technology
- 25% greater coverage for fast and easy application!
CoverGrow Mulching Granules give you 50 lbs. of coverage in a 40-lb. bag

**Granules (Actual Size)**

**Hydrated Granules illustrate greater expansion**

Each sample is 10 grams of dry granules

Dispersion 60 seconds after receiving 40 mls of water
Inlet Protection
Storm drain inlet protection is designed to increase the time it takes for sediment-laden water to enter the storm sewer system, through the use of short-term ponding, and ponding and filtration.

Designed to prevent sediment from entering drainage systems

**MUST be maintained!!**
Poorly installed & Poorly maintained BMP’s can result in significant quantities of sediment being discharged to storm drains.
Inlet Protection Types

EXTERNAL

Designed to intercept stormwater before it enters the storm drain structure

INTERNAL

Designed to filter stormwater after it enters the storm drain structure
External Inlet Protection

Blocksom & Company

Wood/Fiber Logs
Silt Fence

Compost
Filter
Sock
“SiltSoxx”
Internal Inlet Protection

Inlet Filter: *Metal frame & Geotextile Filter*

Silt Bag: *Internal filter device*
Dandy Sack

Sack/Log Combo
Maintenance

Inspect Inlet Protection Devices Routinely & After Each Rain Event

1. Check for tears that can result in sediment entering the inlet
2. Check for improper installation
3. Look for displaced BMP’s that are no longer protection the inlet
4. Monitor sediment accumulation
Assessment of Learning

1. Considering soil loss, which product performs best on construction sites
   a. Rip Rap
   b. High performance hydromulches
   c. Straw Erosion Control Blankets

2. True or False: Sediment is the most significant threat to clean water in the U.S.

3. Which perimeter control product is easier to install, maintain, and remove?
   a. Silt Fence
   b. Compost Filter Sock

4. What was significant about 1972?
   a. Kiss is formed
   b. Goodyear Blimp flew for the 1st time
   c. Clean Water Act is established
   d. All of the above

5. What was significant about 1987?
   a. CWA Amended to include non point source pollutants
   b. Spuds Mackenzie appears is bud light commercials
   c. Spaceballs was released
   d. All of the above
Assessment of Learning Cont.

6. True or False: Because of the durable yet flexible nature of a biodegradable erosion control blanket, it is very difficult to install.

7. True or False: Compost Filter Socks are designed to perform one function on a construction site............perimeter control

8. True or False: When installing Biodegradable ERB’s the installation is NOT very critical. A couple of staples is all you need!

9. True or False: When considering inlet protection devices the choice is easy because silt fence is your only option
QUESTIONS

Compost Filter
Terra Tubes
Bionet
Hydromulch
Inlet Protection
This is my Thank You dance!