






Erosion Control Technologies & Solutions



New Solutions For An Age Old Problem










Our Focus Today

- What is Erosion?
- Why should we care?
 - Regulations controlling site development and water quality
- What can we do?
 - Conventional Erosion Control Solutions
 - Engineered Solutions for Erosion Control

Providing solutions for every site










Federal Regulations

- Environmental Protection Agency (EPA)
 - N P D E S (National Pollution Discharge Elimination System)
 - Permit Regulations have mandated improving...

WATER QUALITY

Pollution of waterways is the real issue

What is Soil Erosion

When the flow velocities and shear stresses exceed the limits of the natural **CONDITION**...the soil erosion process begins

Stress from the flow of water is the cause of soil erosion









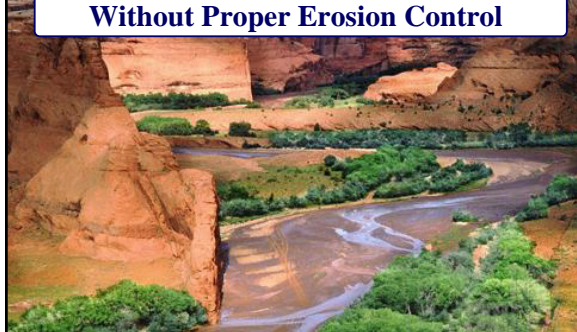

Without Proper Erosion Control



Sediment migrates down waterways over time

Without Proper Erosion Control



Erosion carves away at the earth's surface

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Without Proper Erosion Control

Untreated, the results of erosion can be extensive!!!

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With Proper Erosion Control

Water free of sediment

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Traditional Erosion Control Solutions

Rip-Rap Soil Cement & Concrete Slabs
More Rip-Rap Concrete & Fabraform

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Less Traditional E. C. Solutions

Old Tires Cars???

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The Performance Pyramid

Articulated Concrete Blocks
Supports vegetative growth

Traditional (Hard Armor)
Does Not support vegetation

Permanent TRM's
Increase performance limits of vegetation

Natural Vegetation

Erosion Control Product Hierarchy

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Tier One of the Performance Pyramid



Temporary Erosion Control Products: The 1st line of defense

Velocity Up to 5-6 ft/sec. 1.5 lbs/ft² Shear stress

Straw & Hydraulic Mulching Techniques
Erosion Control Blankets
Open weave Geo-textiles

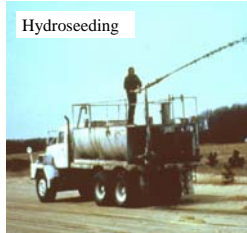
TEMPORARY EROSION CONTROL PRODUCTS

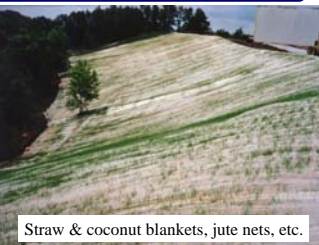
Temporary measures help establish vegetation

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Temporary Erosion Control Measures



Hydroseeding





Straw & coconut blankets, jute nets, etc.

Only used during vegetation establishment

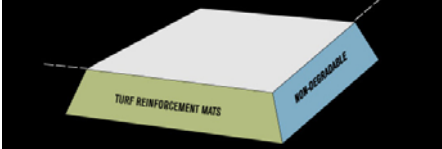
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Tier Two of the Performance Pyramid



Non-Degradable Erosion Control – extend the performance limits of natural vegetation

Velocity Up to
8 ft/sec. 6 lbs/ft²
Shear stress

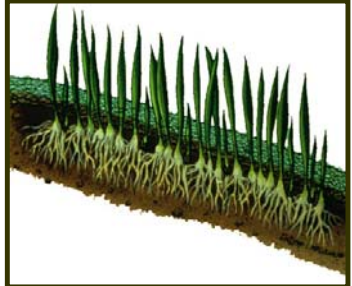
Non-Degradable Mats
durability, performance and
functional longevity





Turf Reinforcement Mats increase the level of protection

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Turf Reinforcement Mats (TRM's)



TRM's provide root and stem reinforcement

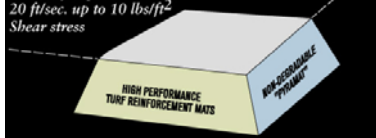
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Tier Three of Performance Pyramid

High Performance Non-Degradable Erosion Control

Non-Degradable 3-D
High Performance Trm's
(Pyramat®)

Velocity Up to
20 ft/sec. up to 10 lbs/ft²
Shear stress



HP TRM's will also perform (long term) without vegetation

The highest level of synthetic reinforcement available

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Before Vegetation is Established



TRM's & HP TRM's provide a stabilization element

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After Vegetation is Established



TRM's & HP TRM's reinforce the vegetation

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Outperforms Non-Reinforced Turf

After a significant storm event

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Water Quality is Still the Issue

EPA Storm Water Technology Fact Sheet Turf Reinforcement Mats

Turf Reinforcement Mat (TRM) technology is recognized and accepted as a Best Management Practice (BMP) to improve water quality

TRM's and HP TRM's accepted by EPA

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- What if the forces exceed the limits of an HP TRM?
 - Concrete
 - Soil Cement
 - Large Rip-Rap
 - Grouted Rip-Rap
- What if you want vegetation?
 - Articulated Concrete Blocks

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The Top of the Performance Pyramid

The Highest Performance that will still support vegetation growth

Articulated Concrete Blocks...the highest level of protection

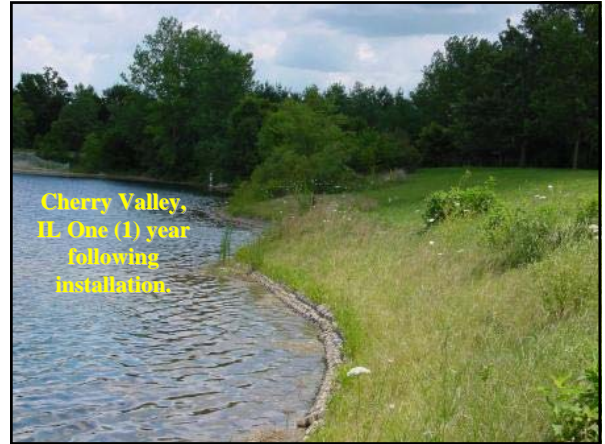
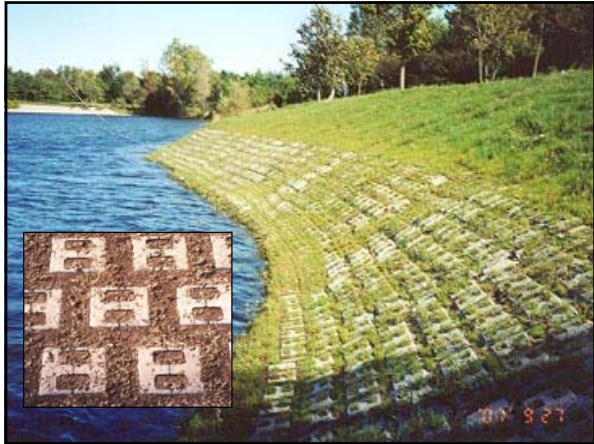
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ACB's – For the Most Critical Applications

Open Cell Block – 20% Closed Cell Block – 10%

Choose the best block for any site












Pipe Outlets

Boat Ramps

Can also be used in smaller applications






Gabion Systems

Welded Wire Gabions – Hard armor solution where rock is cheap



Another Hard Armor Solution






Gabion Systems

- BANK PROTECTION
- CHANNEL LININGS
- SLOPE PROTECTION
- RETAINING WALLS
- SHORELINE PROTECTION
- WIERS AND DROP STRUCTURES

Gabion Applications



Stream Banks...

...Channels...Walls






Other Solutions

- **What about:**
 - Stream bank stabilization?
 - Bridge scour?
 - Grade control structures?

Providing solutions for every site








A-Jacks Armor Units


High performance energy dissipation...results in sediment deposition





Stream bed, bank, and toe stabilization

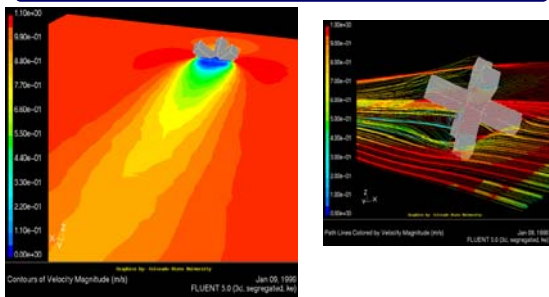
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Size (ft)	Weight (lbs)
2	78
4	629
6	2,120
8	5,022
10	9,699
12	16,880



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A-Jacks Armor Units




Energy Dissipation

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Stream Bank Stabilization

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Breakwaters

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Kentucky D.O.T.







Pier Scour

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A-Jacks Armor Units







Grade Control Structures

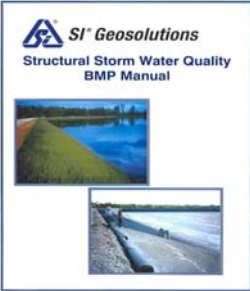
Erosion Control Product Selection

- **Important Factors:**
 - Type/amount of vegetation
 - Design life
 - Aesthetic requirements
 - Soil type
 - Budget





Choosing the correct solutions for your site

Erosion Control Product Selection



Many BMP manuals available

SUMMARY

- Erosion Control Solutions Should:
 - Improve **Water Quality**
 - Provide great aesthetics
 - Meet government regulations
 - Be cost effective
 - Be easy to install

CONTECH will help choose the best solution for every site