Articulating Concrete Block Mats:

A Solution to Severe Erosion Control Applications

2018 TEAM Conference
March 8, 2018
# Shear Strength

## Erosion Control Product

<table>
<thead>
<tr>
<th>Product / Type</th>
<th>Approx Shear Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blown Straw</td>
<td>0 lbs/sf</td>
</tr>
<tr>
<td>ECBs</td>
<td>&lt;2 lbs/sf</td>
</tr>
<tr>
<td>Sod</td>
<td>1-3 lbs/sf</td>
</tr>
<tr>
<td>TRMs:</td>
<td></td>
</tr>
<tr>
<td>NAG P300 (vegetated / unvegetated)</td>
<td>8 lbs/sf / 3 lbs/sf</td>
</tr>
<tr>
<td>American Excelsion Recyclex (vegetated)</td>
<td>8 lbs/sf</td>
</tr>
<tr>
<td>NAG SC250 (vegetated / unvegetated)</td>
<td>10 lbs/sf / 3 lbs/sf</td>
</tr>
<tr>
<td>Propex LL450 (vegetated / unvegetated)</td>
<td>10 lbs/sf / 5 lbs/sf</td>
</tr>
<tr>
<td>NAG C350 (vegetated / unvegetated)</td>
<td>12 lbs/sf / 3.2 lbs/sf</td>
</tr>
<tr>
<td>Propex LL300 (vegetated / unvegetated)</td>
<td>12 lbs/sf / 5.5 lbs/sf</td>
</tr>
<tr>
<td>NAG C550 (vegetated / unvegetated)</td>
<td>14 lbs/sf / 4 lbs/sf</td>
</tr>
<tr>
<td>Propex Pyramat-HP (vegetated / unvegetated)</td>
<td>16 lbs/sf / 6 lbs/sf</td>
</tr>
<tr>
<td>Flexamat</td>
<td>19 lbs/sf</td>
</tr>
</tbody>
</table>

## Hard Armoring:

<table>
<thead>
<tr>
<th>Type</th>
<th>Approx Shear Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>6” Riprap</td>
<td>2.5 lbs/sf</td>
</tr>
<tr>
<td>12” riprap</td>
<td>4 lbs/sf</td>
</tr>
<tr>
<td>24” riprap</td>
<td>8 lbs/sf</td>
</tr>
<tr>
<td>Tri-Lock (6” block)</td>
<td>10 lbs/sf</td>
</tr>
<tr>
<td>Cable Concrete (2.5” block)</td>
<td>10 lbs/sf</td>
</tr>
<tr>
<td>36” Riprap</td>
<td>12 lbs/sf</td>
</tr>
<tr>
<td>Armorflex (4.5” block)</td>
<td>15 lbs/sf</td>
</tr>
<tr>
<td>Armorlock/Geolink (4” block)</td>
<td>16 lbs/sf</td>
</tr>
<tr>
<td>48” Riprap</td>
<td>16 lbs/sf</td>
</tr>
<tr>
<td>Cable Concrete (4.5” block)</td>
<td>20 lbs/sf</td>
</tr>
<tr>
<td>Cable Concrete (5.5” block)</td>
<td>25 lbs/sf</td>
</tr>
<tr>
<td>Armorflex (9” block)</td>
<td>30+ lbs/sf</td>
</tr>
<tr>
<td>Cable Concrete (8.5” block)</td>
<td>30+ lbs/sf</td>
</tr>
<tr>
<td>Cable Concrete (8.5” oversize block)</td>
<td>35+ lbs/sf</td>
</tr>
</tbody>
</table>
Drawbacks to Rip-Rap

- Durability
- Aesthetics
- Maintenance
- Undermining
- Safety issues
- Availability
- Accessibility issues
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‘North Dakota Riprap’
Which do you prefer?
Concrete + Vegetation

= Permanent Erosion Protection!
Bioengineering at it’s best!
There’s Concrete Under There?
Types of Concrete Armament

- Cable-tied Block
Types of Concrete Armament

- Cable – tied Block
Types of Concrete Armament

- Interlocking Block
Types of Concrete Armament

- Interlocking Block
Types of Concrete Armament

- Interlocking Block
Types of Concrete Armament

- Geogrid-tied Modules
Types of Concrete Armament

- Grout-filled Blanket
Cable-tied Mat Installation

small mat
Cable-tied Mat Installation
large mat
Cable-tied Mat Installation
Supersize Me!
Typical Block Installation
Typical Block Installation
Unique Mat-on-a-Roll
Where does this stuff work best?

Concrete Armoring can handle a wide variety of erosion control applications.
Lakeshore Protection
Lakeshore Protection
Shoulder Protection
Shoulder Protection
Shoulder Protection
Shoulder Protection
Box Culvert Protection
Apron Protection / Stilling Basin
Culvert Outlet at Pond
Small Apron Outlet Protection
Large Apron Outlet Protection
Apron Outlet Protection
Bridge Protection
Bridge Protection
Bridge Protection
Bridge Protection
Bridge Protection
Drainage Channel
Drainage Channel
Drainage Channel
Spillway Protection
Spillway Protection
Streambank Protection
Streambank Protection
Riverbank Protection
Riverbank Protection
Access Road/Low Water Xing
Pond Access Road
Access Road
Access Road
Submerged Access Road
Access Road
Heavy Duty Access Road
Tire Wash
Boat Ramp
Boat Ramp
Boat Ramp
Benefits of Concrete Armament

- Durability – engineered to handle 100 yr event
- Aesthetics – can be vegetated or unvegetated
- Maintenance – none; if vegetated, can be mowed
- Accessibility – pedestrian and vehicle friendly
- Safety – no rocks for kids to throw or climb on
- Simple installation – with geotextile fabric