GreenField Report™
January 2014

The Best in BMPs

When I first entered the Erosion Control industry I was fascinated with the terms used. They were mostly abbreviations for very long names; CWA, TMDL, CPESC, BMP, etc. I was especially curious about the last one, BMP—particularly the "B"—and frustrated that there was a real system out there that rates products, but no standard protocol for qualification. "Best Management Practice" indicates that someone, somewhere (or some governing body of erosion control Gods) has deemed the product worthy of making THE LIST; the municipal list, the state list, the federal list—THE LIST. Without being on THE LIST, engineers will not specify it, and most contractors will not want to use it. The list keepers have varying, simple or complicated ways to get on THE LIST. When I asked how to get Filtrexx® products listed on the EPA site for BMP's, the circular discussion that ensued was comical. There was no peer review process, no benchmarks, and really no industry standard as to how a company can earn its product's rightful place on THE LIST.

Flash forward fifteen years. In some jurisdictions, compost based BMPs are only now being put on THE LIST for the first time. When TMDL's were introduced in 2003, we thought we were in a good position to grow our market share because we knew then that Filtrexx® products performed better than all other products they replace. But regulators weren't really paying attention to the "B" in BMP. Somewhere along the way, regulators started paying closer attention. Persistence has allowed us to succeed in getting Filtrexx products included on THE LIST of most major federal, state, and local regulations, and many organizations have written their own specifications, validating the performance of the technology.

A recent study performed using ASTM test methods showed that off-spec compost socks produced more than 10 times the sediment load of a compost sock that meets specifications.

Recently, the state of Georgia revised their Green Book (the state LIST) and they enacted a new process whereby products would be listed in that book. The process involves using a recognized ASTM test method that treats all products the same. A series of tests were conducted with a number of leading products, including Filtrexx® SiltSoxx™. (It came as no surprise to us that Filtrexx® outperformed all other products by a wide margin.) Based on this test data, the state recently listed minimum performance criteria, establishing a benchmark that will be used as a model for other states to finally take control over *predicting performance* of BMP's in the field. This requires BMPs to meet the benchmarks established or they cannot be used. What a novel idea! It is great to see a state finally catch up with the sustainable companies using higher performing products.

Scientific testing confirms a dramatic difference in the performance of Filtrexx® Soxx™ (left) as compared to off-spec compost filter sock (right).

Filtrexx offers sustainable technologies that deliver the highest performance on the market for the best price. We continually strive to make sure that our claims and our designs are based on valid scientific research. Although competitors may claim to perform as well as Filtrexx, there is actually *no other company* offering similar products that have met all federal, state, and local specifications AND are backed by research. A recent study performed using ASTM test methods showed that off-spec compost socks produced more than 10 times the sediment load of a compost sock that meets specifications.

Be careful of imitators who claim to have tested their product. Accept only the results of tests performed using standard scientific protocol:

- Experiments performed in triplicate to evaluate statistical significance of results using ASTM Standard protocols
- Third party verification at university and federal agency research laboratories
- Monitoring by a neutral third party and STA Certified testing laboratory
- Research findings are peer reviewed and published in a leading scientific journal

I, for one, am very encouraged by the trend toward regulations that are based on empirical data. We can expect to see more of this in years to come, as regulators begin paying attention to the "B".

We look forward to announcing several new developments from Filtrexx in 2014. Thank you for your business! We hope you and yours have a healthy, happy and prosperous new year.

– **Rod Tyler**
CEO, Filtrexx International

Project Profiles

Mimic Nature®—Like a Fisherman 'Matching the Hatch'
Denham Springs, LA

Bass Pro Shops, established in 1971, is one of America's premier outdoor retailers, with dozens of "destination" stores across America and Canada. Each store is unique and offers a truly unforgettable shopping experience. In 1978, founder Johnny Morris introduced the first professionally rigged boat, motor and trailer fish-ready package. The Bass Tracker boat "package" revolutionized the marine industry, and today huge boat showrooms are featured in every Bass Pro Shops store.

Many of these stores also feature a large lake where the boats are test driven by customers or by technicians performing maintenance services. At the 163,000 square-foot Bass Pro Shop in Denham Springs, Louisiana all this boating activity caused severe undercutting along the shallow shores, as there was not enough deep rooted vegetation to dissipate the wave action.

Leaders at Bass Pro Shops corporate headquarters in Springfield, Missouri recognized the problem. Owner Johnny Morris wanted a fix that had a natural look when it was completed. The company chose to rebuild the bank using Filtrexx GroSoxx® because they are aesthetically pleasing and offer proven performance—at a fraction of the cost of hardscape. GroSoxx, filled with Filtrexx GrowingMedia™, provide a stable and fertile environment for optimum vegetation establishment.

GroSoxx are typically pre-seeded during production using species appropriate for the application and climate. Nurse crops, such as annual rye, may be used to establish a quick vegetative cover and root anchor until perennial grasses and/or live stakes can be established. GroSoxx begin to germinate within days of installation and soon establish an extensive root system that anchors them to the existing bank. Eventually the Soxx™ become obsolete, as mature vegetation provides permanent vegetative reinforcement.

Vegetated bank stabilization (VBS) is far superior to traditional rock and rip rap. VBS has a maximum shear stress of 12 lbs/ft^2, while rip rap only has a shear stress of 3-5 lbs/ft^2. Unlike rock and rip rap, VBS also provides the benefits of wildlife habitat, phytoremediation (the use of green plants to remove pollutants from the environment or render them harmless), and urban heat island mitigation.

Filtrexx GrowingMedia puts our bank stabilization technology head and shoulders above other vegetated solutions. Our GrowingMedia is a high-quality composted media with physical characteristics and performance parameters that have been refined through years of research. These parameters include: percent cover of vegetation, water holding capacity, pH, organic matter, soluble salts, moisture content, biological stability, maturity bioassay, percent inert material, bulk density, and particle size distribution. Filtrexx GrowingMedia can be third party tested and certified to meet minimum performance criteria.

GroSoxx can be installed on site using pneumatic blower equipment, or pre-manufactured in two-foot sections and installed manually. At the Denham Springs store, a nearby interstate made it logistically difficult to access the lake's perimeter with a blower truck. In addition, the lake featured a small island, so the GroSoxx had to be carried to the island using a barge and ropes. Therefore, the GroSoxx were manufactured on site using a Filtrexx® Mini-FX™ machine. They were pre-seeded with a 4-way turf grass. The banks were dug to create a smooth edge prior to placing 6600 square feet of GroSoxx along the bank.

After installation the GroSoxx were planted with Louisiana iris, dwarf calla lilies, horsetail reed, broadleaf arrowhead, bulrush, and other native species to create the natural look that owner Johnny Morris had hoped for.

Conservation Landscape
Bethany Beach, DE

Developers of the Bethany Woods Community contracted Envirotech Environmental Consulting, Inc. (EECI) to develop a Conservation Landscape Plan for a community entrance that was more cost effective than hardscapes, aesthetically pleasing, and used green technology. This was achieved utilizing native vegetation, drip irrigation, and Filtrexx low impact design products.

EECI installed GroSoxx to form a LivingWall™. The GroSoxx, filled with organic composted GrowingMedia, were pre-seeded with a custom blend of wildflowers and stabilization grasses. GroSoxx protect the embankment until it is permanently stabilized by vegetation. The nutrient-rich GrowingMedia requires no fertilization. A low pressure drip irrigation system was installed to provide water directly to the plant roots. EECI planted a variety of shrubs and herbaceous plants native to this microclimate to reflect the diverse flora of the surrounding maritime forest.

The vegetation established rapidly. The entrance is beautiful and the green practices used by EECI will, with proper maintenance and management, allow the project to be successful and sustainable well into the future.

Shoring Up the Shoreline
Milwaukee, WI

The Village of Shorewood, WI experienced a 7-inch/24 hour rain event that left a 100-foot, 2:1 shoreline bluff badly battered.

Milwaukee based Marek Landscaping, was hired for design and consulting services for the road reconstruction, beach restoration, and slope stabilization, as well as for construction services. They used a multi-BMP approach that included Filtrexx slope interruption and a biodegradable turf reinforcement mat. Marek installed 8" biodegradable SiltSoxx™ secured by hardwood stakes every six feet. They used laser levels to place them horizontally along the contours of the site every eight vertical feet. The media was a blend of FilterMedia™ and GrowingMedia designed to both slow the pass through rate and increase infiltration to the soil, thereby reducing runoff and encouraging plant growth. The entire slope was then seeded with a mix of mesic prairie plants, specifically selected for the site's slope aspect and soils.

Marek has long been using Filtrexx products. "Filtrexx holds back sediment, increases infiltration, and doesn't fall down," said Vice President and Project Manager Mike Marek. We had the right flow-through rate and sock longevity for the site because of their rigorous testing and research."

Good Ol' Perimeter Control
Dublin, OH

American Electric Power (AEP) Ohio and AEP Transmission Company are in the process of improving the transmission systems in various counties throughout Ohio. In doing so, some additional circuits, permanent access roads, structure replacements, and a widened right-of-way are required. Filtrexx SiltSoxx is being

used to manage stormwater runoff and prevent sediment from leaving the job site. Installers, contractors, and excavators use Filtrexx not only for its performance, but also for its ease of installation, use, and disposal. SiltSoxx require no trenching, and little to no maintenance. At the end of the project the Soxx can be sliced open and the compost left on site.

Pollutants Waste Away
Carlsbad, CA

An 11-acre waste transfer station had polluted runoff caused by a constant flow of commercial vehicles on the site—as many as 70 per day.

"I always try to be proactive and use the best BMPs available," said operations manager Rodrigo Huertero. He had tried gravel bags and even self-made devices to manage these pollutants, but their performance was not enough. Huertero installed EnviroSoxx® in a pyramid stack around his main inlet and in a single-tier around the smaller adjacent storm drains.

"I had reservations," he said. "I got good feedback from my employees about how easy they were to install, and again after their first cleaning. But a product has to be good to convince me—if the numbers don't show it, I move on."

Pollutant	Before EnviroSoxx	After EnviroSoxx
Iron	13.6 mg/l	8.6 mg/l
Specific Conductance	2410 umhos/cm	309 umhos/cm
Oil & Grease	8 mg/l	Non-detectable
TSS	400 mg/l	128 mg/l

Table 1

The numbers *did* show it. Samples taken during the first rain event showed indisputable results (see Table 1). "New regulations may require more frequent testing, but I'm ready."

Preparing for Winter Rain
San Jose, CA

The City of San Jose Department of Transportation wanted to proactively protect from erosion and contamination the roads and pedestrian walkways adjacent to the City's storm drains.

For installation the City hired Valley Crest, a landscape company with locations throughout California. To slow surface flow runoff coming down from the surrounding hillsides, they installed 48 check dams using six pallets of 12-inch by 10-foot SiltSoxx. A compost blanket was applied around the storm drains using Filtrexx® Lockdown™ Netting to hold ZBest Organic Compost. Then two pallets of 8-inch by 160-foot SiltSoxx were used to create a border around the compost blanket.

Performance Comparison

Performance of sediment control barriers is of increasing concern to designers, regulators, and contractors. Knowing how sediment control barriers perform and compare to one another has become of critical importance. In order to evaluate the sediment control performance between various sediment control barriers, these practices must be subject to the same standardized testing procedure or evaluated in controlled side-by-side testing. Recent testing conducted at TRI Laboratory does both.

The primary objective of the study was to evaluate the performance of several sediment control barriers. The secondary objective of the study was to determine any sediment removal performance differences between compost filter socks meeting all federal/state specifications (Filtrexx® SiltSoxx™) versus those that do not comply (Compost Tube). It has been hypothesized that compost filter socks/tubes containing predominantly fine particle-size filler material (> 50% passing 3/8-in) and/or a containment system with mesh apertures smaller than 1/8-in do not allow adequate hydraulic flow through, and thereby overtop faster, leading to increased sediment loss; or the increased hydraulic pressure behind the barrier leads to undermining and even greater loss of sediment. These same characteristics may also have a similar effect on performance of wattle/tube devices using filler material other than compost filter media.

Materials & Methods

The large-scale testing was performed in accordance with ASTM WI 11340 modified as necessary to accommodate the selected products, on 3:1 slopes using sandy clay test plots measuring 27-ft long x 8-ft wide. Three replicate test slopes with the perimeter sediment control barriers (SCBs) installed at the bottom were tested.

After careful and consistent preparation of the soil in the test plots, each erosion control product was installed using the technique acceptable to/recommended by the manufacturer. Target rainfall intensities (2, 4, and 6-in/hr) were applied in sequence for 20 minutes each. All runoff was collected during the testing. After allowing for sediments to settle, water was decanted from the collected runoff. The remaining sediments were collected and dried to determine total soil loss. The sediment retention provided by the product tested was obtained by comparing the protected slope results to control (bare soil) results.

The Practice Management (P) Factor from the Revised Universal Soil Loss Equation (RUSLE) of the USDA-ARS Agricultural Handbook 703 was the reported performance measure for slopes determined from this testing. Total sediment loss and the associated rainfall depth measured during the testing are the principle data used to determine the P-Factor. This performance value facilitates product-to-product comparison of test results at a common point of the storm event. The lower the P-Factor, the higher the performance.

Results

Results from measured design criteria and performance testing are reported in Table 2 for each individual sediment control barrier. Performance test results are based on means for all three tested replications.

Sediment Control Barrier (SCB)	Product Height	Removal Efficiency	P-Factor	Estimated Product Cost/lf	Estimated Project Cost/lf**
Filtrexx SiltSoxx	8-in	82%	0.18	$2.45	$2.67
Filtrexx SiltSoxx	12-in	97%	0.03	$3.50	$3.81
Straw wattle	20-in	70%	0.30	$1.65	$4.10
Compost tube	12-in	66%	0.34	$1.86	$4.52
Silt fence*	24-in	67%	no data	$2.00	$4.80
Tire-chip wattle	9.5-in	69%	.31	$5.30	$11.40

Table 2
Sources: SCB data from TRI-Environmental/GASWCC; see Filtrexx TechLink #3333 for more testing information.
*Data for silt fence from USDA, see Filtrexx TechLink #3308.
**Est. project costs: U.S. EPA http://www.epa.gov/greenscapes/tools.

Summary & Conclusions

The main objective of this study was to evaluate the sediment control performance of seven different sediment control barriers under a standardized testing procedure. The sediment control barrier characteristics that most affected sediment removal performance included staking, degree of level surface, and particle size of filler media. All sediment barriers experienced overtopping for all replicates due to the amount of runoff and sediment generated under this test method. Overtopping increased at low points in the sediment control barrier, due to depressions from staking or uneven fill material. Because of this phenomenon, practices with extremely level surfaces are able to maintain sheet flow during overtopping (rather than localized concentrated flow) thereby reducing sediment loads flowing over the practice. Those practices that utilize finer particle-size materials for filler media (straw wattles, off-spec compost tube) appeared to overtop or undermine faster, due to the increased rate of runoff accumulation (ponding) and/or hydraulic pressure behind the barrier. Additionally, these sediment control barriers were most likely to undermine, thereby releasing the most sediment. It should be noted that overtopping typically releases much less sediment relative to undermining, as the former still allows sediment deposition and filtration to continue, while the latter often results in mass failure if left unchecked.

In sum, those practices that could convey runoff through the barrier while preventing undermining were the best performing practices—these included SiltSoxx™. It should be noted that the tire-chip wattle has both high density and apparent high hydraulic flow through rate characteristics, but because the practice cannot be staked (secured to the ground), this practice experienced more undermining than any other.

The secondary objective of this study was to evaluate any sediment control performance difference between compost filter socks adhering to federal and state specifications versus those that do not meet these specifications. While the quantitative difference between these two practices is quite substantial, it is interesting to note that the 8-in SiltSoxx™ performed better than the 12-in off-spec compost tube, generating 43% less tons/acre of sediment, underscoring the importance of specification.

2014 Webinar Schedule

Webinars are from 11:00 a.m.–Noon EST/EDT and worth 1.0 PDH.

January 9: LID/Post-construction Water Quality Treatment
February 12: Sediment Control
March 12: LEED/Green Building
April 16: EnviroSoxx® for Targeted Pollutant Removal

For information and registration, visit www.filtrexx.com/.

In the News

***Environmental Connection*, October 2013**

This article is the second in a series of four written or coauthored by Rod Tyler and published by IECA, examining the role of compost as a practical erosion and sediment control solution. http://www.ieca.org/membersonly/resources/NewsToUse.asp (requires IECA member login).

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