



Triton® Filter Mattress Successfully Tested for Hydraulic Stability

System Withstands 4 ft Overtopping at Hydraulics Laboratory

Triton® Marine Mattresses and Filter Mattresses have been successfully used for inland applications, as well as in challenging coastal environments, where salt water corrosion or erosion restricts the choice of available materials. These systems are typically considered when site conditions exceed the capabilities of other manufactured revetment products.

Despite its excellent reputation in the industry and documented performance in the field, the Triton Mattresses had never been laboratory tested for hydraulic stability. In response, Tensar International Corporation (Tensar) contracted with the Engineering Research Center at Colorado State University to conduct hydraulic stability testing on a 6 in. Triton Filter Mattress. Testing was conducted at the Center's Hydraulics Laboratory in November 2008, with a full report issued in June 2009.

TEST PROTOCOL

Testing was conducted according to current protocols. A 4 ft x 40 ft Triton Filter Mattress section, constructed of Tensar® Biaxial (BX) Geogrid and filled with stone, was installed in a rectangular channel featuring a 2H:1V slope and 6 ft maximum overtopping depth. The channel's bedding material included 12 in. of compacted soil along with graded

aggregate at the toe of the slope, extending 5 ft up, to relieve pore pressure at the downstream end. The bedding layer was then covered with an 8 oz non-woven geotextile fabric, and the mattress was then placed into the channel. A special edge treatment was installed along the channel's side walls to prevent water from seeping underneath the mattress.

Tests were conducted with overtopping depths ranging from 1 to 5 ft. Each test was designed for a continuous 4 hr flow at a uniform discharge. The performance threshold was defined as the point at which deformation, soil loss or loss of intimate contact with the embankment subgrade occurred. Test results are as follows:

Test Date	Embankment Slope	Overtopping Depth (ft)	Measured Discharge (cfs)	Test Duration (hrs)
11/20/08	2:1	1	11	4
11/20/08	2:1	2	28	4
11/21/08	2:1	3	50	4
11/21/08	2:1	4	78	4
11/24/08	2:1	5	109	2

Test flume at 4 ft overtopping



Measuring performance



Test flume



As test data indicates, there was no observable contact loss or deformation through the first four tests. However, after two hours of 5 ft overtopping, the Triton Filter Mattress separated from the subgrade. Performance data is as follows:

Overtopping Depth (ft)	Flow Velocity (fps)	Shear Stress (psf)	Manning's 'n' Value
1	*	*	*
2	17.2	6.8	*
3	19.3	16.1	.039
4	22.6	21.5	.040
5**	26.2	24.9	.038

* Values not calculable due to aerated water over the majority of the revetment system.

** Revetment system considered unstable at 5 ft overtopping.

The values up through the 4 ft overtopping test results are considered stable for the Triton Filter Mattress.



6 in. Triton® Filter Mattress section

AN INNOVATIVE AND COST-EFFECTIVE ALTERNATIVE

For years, rock riprap has been the standard for channel lining and overtopping applications. But Tensar's Triton Marine Mattress and Filter



Test flume at 4 ft overtopping

Mattress Systems provide an innovative and cost-effective alternative with:

- ▶ **Superior Performance:** The 6 in. Triton Filter Mattress tested is the approximate equivalent of 36 in. of riprap.
- ▶ **Lower Cost:** There are many cost advantages to reducing the thickness of a revetment section. Reduced excavation and disposal costs, less time for installation and smaller channel top width all contribute to significant cost savings.
- ▶ **Aesthetic Improvement:** With the ability of soil to fill voids in a mattress system and establish a vegetative cover, environmentally friendly Triton Filter Mattresses offer both protection and preservation.

EXPERIENCE YOU CAN RELY ON

Triton Coastal and Waterway Systems are used for a wide range of construction and protection applications in and around water, including foundations and linings, erosion control, scour protection and more. Triton Systems are highly adaptable, economical, durable and easy to install. For more information on these or other Tensar Systems, call **800-TENSAR-1**, visit **www.tensarcorp.com**, or e-mail **info@tensarcorp.com**.

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