



## Kennedy Space Center

### Cape Canaveral, Florida

**APPLICATION:** A bridge scour project at the NASA Kennedy Space Center (KSC) in Cape Canaveral, Florida, required a remedial and protective solution.

**THE CHALLENGE:** Continuous scour protection was needed around each bascule pier for four bridges throughout the KSC's channel and fender system. Bridge scour protection is nothing new for the Triton® Marine Mattress System, but the product was to the owner, thus necessitating an extensive permit process through the USACE and local municipalities. Positioning and anchoring the mats were also significant challenges. "The Haulover Canal Bridge, in particular, has a narrow channel, which has high velocities and deep scour pockets," said Kim Rivera of Jones Edmunds & Associates, Inc., the design engineer for the project.



Marine mattresses installed on the banks of the Haulover Canal at Kennedy Space Center.

**SITE CONDITIONS:** The project involved installing the geosynthetic revetment system at depths of approximately 20 feet, amid high water velocities and with limited overhead clearance. Narrow channels, strong currents and deep scour pockets demanded dredge and fill maneuvers or anchoring systems for slopes greater than 2 to 1.

"There is extremely low visibility at all bridges and high velocities... These bridges provide the only access into KSC and were required to remain open to vehicle traffic," said Rivera, who added that there were strict requirements regarding vessel closure times and channels depths.

**ALTERNATIVE SOLUTIONS:** Bank & shore riprap presented an alternative solution, but its 3.6-foot thickness would have required excessive channel dredging to ensure proper, USACE-approved depth. Articulated concrete block mats had a much higher cost compared to Triton Mattresses and could not be custom fit around KSC's fender system.

**THE SOLUTION:** Triton Marine Mattresses were selected for their constructability, adaptability and durability in a challenging, submarine environment. Also, the coastal and waterway revetment system was much more cost-effective than the alternatives.

"We found that in high-flow conditions, the marine mattresses tend to be very stable," said Jeff Fiske, Industrial Manager – Coastal and Waterway at Tensar Corp. "Regarding constructability, trying to place material under water and get a specified thickness of material in adverse conditions is always difficult. Having a unit like Triton Marine Mattresses that goes in as a discreet size that can be positioned using GPS, actually gives the contractor and engineer assurances that what was specified is actually what was installed."

### PROJECT HIGHLIGHTS

**Project:**

Kennedy Space Center

**Location:**

Cape Canaveral, Florida

**Installation:**

July 2010 – July 2011

**Product/System:**

Triton® Marine Mattress System

**Quantity:**

1,281 Mattresses

**Owner/Developer:**

NASA

**Design Engineer:**

Jones Edmunds & Associates, Inc.

**General Contractor:**

Misener Marine

**Materials Supplier:**

Tensar International Corporation

## THE TRITON SYSTEM ADVANTAGE:

The owner and consulting engineer Jones Edmunds & Associates, Inc., selected Triton Marine Mattresses because:

- They incorporated Tensar® Uniaxial (UX) Geogrids, which have the strength and flexibility to armor the bridge piers without damaging them.
- The armor units could be locally constructed and customized on shore prior to installation.
- They could provide the most efficient bridge scour protection at less than half the thickness of riprap, an even bigger benefit for material-conscious NASA.
- They are much easier to remove than riprap, a factor the agency had to consider given the potential for future bridge replacement projects.
- They offered a one-foot profile that minimized transition from surrounding riprap grades.
- They were constructible even in difficult working conditions.

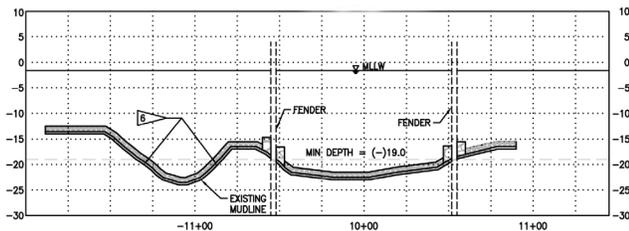


*Triton Marine Mattresses are installed at one of four bridge locations.*

## ADDITIONAL INFORMATION AND SERVICES:

Tensar International Corporation, the leader in geosynthetic soil reinforcement, offers a number of integrated marine systems. Our products and technologies, backed by the most thorough quality-assurance practices, are at the forefront of the industry. Highly adaptable, cost-effective and installation-friendly, they provide exceptional, long-term performance under the most demanding conditions. Our support services include site evaluation, design consulting and site construction assistance.

For innovative solutions to your engineering challenges, rely on the experience, resources and expertise that have set the industry standard for nearly three decades.



*Marine Mattress Scour Protection cross section for the Jay Jay Railroad Bridge, one of four bridges at KSC.*

For more information on the Triton System or other Tensar Systems, call 800-TENSAR-1, email [info@tensarcorp.com](mailto:info@tensarcorp.com) or visit [www.tensarcorp.com](http://www.tensarcorp.com).

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