

# TriAx<sup>®</sup>

## CF Industries Port Neal Nitrogen Complex Plant Expansion

### Sergeant Bluff, Iowa

**APPLICATION:** Located on 1,700 acres fronting the Missouri River, approximately 15 miles south of Sioux City, CF Industries' Port Neal Nitrogen Complex is undergoing a \$2 billion, 325-acre expansion, the largest economic development project in state history. Scheduled for completion in 2016, the expansion will triple the facility's ammonia production capacity and launch its production of granular urea.

**THE CHALLENGE:** Massive excavation loads, oversized plant components and tens of thousands of truck passes required an all-weather haul road, heavy haul road, laydown/staging areas and parking areas capable of sustaining more than two years of ongoing construction traffic.



Pressure vessels and other plant components were transported from river barges to the heavy laydown area along a heavy haul road stabilized with Tensar TriAx TX160 Geogrid.

**SITE CONDITIONS:** Soil analysis completed by Certified Testing Services revealed poor soils (CBR 1.0%) at the river exhibiting low shear strengths. Coupled with a fluctuating water table, soil conditions suggested excessive rutting in the absence of any stabilization measures.

**ALTERNATIVE SOLUTIONS:** An additional system was investigated but found not to provide an adequate and cost-effective remedy.

**THE SOLUTION:** "We used three methodologies to develop solutions for the project," said Nick Nuttbrock, Tensar International Corporation regional manager. Pavement-Transportation Computer Assisted Structural Engineering (PCASE) software was used to design the all-weather construction access haul road, the laydown areas, and the heavy haul road, built to transport pressure vessels (see photo) and other plant components from river barges to the heavy laydown area. Giroud-Han Design Methodology was used to design the parking areas. AASHTO Flexible Pavement Design standards (AASHTO 1993) were used for spot-paved areas on the site.

The heavy haul road incorporated two layers of Tensar<sup>®</sup> TriAx<sup>®</sup> TX160 Geogrid. Both the all-weather haul road and laydown areas utilized one layer of TriAx TX160 Geogrid, while Tensar TriAx TX140 Geogrid was installed in the parking areas.

### PROJECT HIGHLIGHTS

**Project:**

CF Industries Plant Expansion

**Location:**

Sergeant Bluff, Iowa

**Installation:**

Sept. 2013 – Sept. 2015

**Product/System:**

Tensar TriAx TX160 Geogrid  
Tensar TriAx TX140 Geogrid

**Quantity:**

1,250,100 square yards

**Owner/Developer:**

CF Industries

**Geotechnical Engineer:**

Certified Testing Services, Inc.

**Design Engineer:**

Tensar International Corporation

**General Contractor:**

Performance Contractors, Inc.

**Installation Subcontractor:**

Lieber Construction, Inc.

**Materials Supplier:**

Coleman Moore Company



*Tensor TriAx Geogrid stabilized the laydown area and ensured the site could sustain and support massive plant components and ongoing construction traffic.*

In total, 1.2 million square yards of TriAx Geogrid were installed. Every inch of reduced aggregate depth saved approximately \$1 million in construction costs.

In addition to the cost savings, there was also an installation advantage by using Tensor Geogrids. "Being so close to the river and with fluctuating water tables, I was literally able to go over swamp with the TX160," said Jerry King, Lieber Construction Site Supervisor.

"I'm confident that we required less aggregate, simplified logistics and lowered costs on this project because of the geogrid," remarked Tony Moeller, CF Industries senior project engineer.

#### **THE TRIAX® GEOGRID ADVANTAGE:**

More owners, engineers and contractors are selecting Tensor TriAx Geogrid to:

- Simplify and speed construction while increasing the performance of unpaved and pavement structures
- Lower labor and equipment costs
- Reduce aggregate fill thickness
- Decrease undercut, overexcavation and removal requirements
- Conquer the most challenging site conditions and turn previously unusable tracts into productive acreage

#### **ADDITIONAL INFORMATION AND SERVICES:**

Tensor International Corporation, the leader in geosynthetic soil stabilization, offers systems for improving structures such as roadways, rail yards, construction platforms and parking lots. 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 three decades.



*TriAx Geogrid enabled the heavy haul road to withstand continuous large loads.*

**For more information on Tensor TriAx Geogrid or any Tensor System, visit [www.tensarcorp.com](http://www.tensarcorp.com), email [info@tensarcorp.com](mailto:info@tensarcorp.com), or call 800-TENSAR-1.**

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