

NuStar Storage Tanks

Texas City, Texas

Controlled Modulus Columns

Menard installed Controlled Modulus Columns™ (CMCs) to support seven storage tanks and two access ramps on soft ground.



Menard installed over 1,800 CMCs, to maximum depths of 45 feet, for a total of 77,048 linear feet.

Client / Owner: NuStar Energy LP
Owner's Foundation Engineer: CH2M Hill
Ground Improvement Contractor: Menard

Project Summary

This project called for support of seven storage tanks and two access ramps using Controlled Modulus Columns (CMCs). The Texas City site is a crude oil refinery plant with an existing above-ground storage tank farm. The site was expanded by adding a total of seven new tanks. Four tanks were 115 feet in diameter, one was 62 feet in diameter, and the two largest for the project were 150 feet in diameter. The product heights for the tanks are 56 feet. The ramps were constructed to allow access into and out of the tank area, which was surrounded by containment walls. If the tanks and ramps were to be constructed on unimproved ground, significant settlement would have occurred. Menard was selected to design and implement a ground improvement solution for the storage tanks and access ramps.

Ground Conditions

The site soils consisted of a layer of clayey fill with varying thickness over soft to stiff clay with increasing stiffness to a depth of 40 feet.

Ground Improvement Solution

Menard designed the spacing, depth, and layout of CMC elements as well as the required granular load transfer platform. The installation included over 1,800 CMCs, to maximum depths of 45 feet, for a total of 77,048 linear feet. The CMCs were 12.5 inches in diameter. CMCs were an economical solution for the client to prevent the tanks from settling beyond the allowable tolerances.



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Ground Improvement Specialists

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