

GEOPIER®



CLIENT'S CHALLENGE

The project consisted of one grain storage bin with a diameter of 135 feet and an eave height of 73 feet. The bin has an above-grade reclaim tunnel.

SUBSURFACE CONDITIONS

The subsurface conditions consisted of up to 4 ½ feet of undocumented lean clay EXISTING FILL overlying firm lean clay (fine alluvium) and dense clayey sand (outwash) soils, underlain by firm to very stiff sandy lean clay (glacial till). GeoTek measured groundwater at depths between 9 feet and 28 feet in the borings.

GEOPIER® SOLUTION

The owner and general contractor selected the Geopier® ground improvement solution to reinforce the soft native soils over the more costly deep foundation system of auger-cast piles. The Rammed Aggregate Pier® (RAP) solution provided an allowable soil bearing pressure of 6,000 psf to support the ringwall loads of 39 klf and grain floor pressures of up to 5,320 psf. Over 750 RAP elements were installed in 17 working days to depths of about 18 feet in a clay / mixed profile using the Geopier X1® system.

The completed bin was filled in 25% intervals and elevation readings were taken at several locations on the bin foundation to determine the settlement at each of the respective locations. The settlement monitoring results indicate 1.9" of total settlement at the center of the bin and 1.3 inch to 1.7 inch of total settlement around the perimeter of the bin after the bin was loaded to 100% full capacity, which are less than the predicted settlement amounts. The performance of the RAP-reinforced soils exceeded the design requirements (designed for 3 to 4 inches of total settlement).



Dakota Ethanol Grain Bin

Wentworth, South Dakota

Dakota Ethanol

Owner

J & D Construction

General Contractor

GeoTek Engineering & Testing Services, Inc.

Geotechnical Engineer

KC Engineering

Structural Engineer

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