

CASE HISTORY

ECP HELICAL TORQUE ANCHORS™



Supplemental Foundation Support for Beach Front House

Newburyport, MA

Earth Contact Products' Helical Torque Anchors™ were selected to provide supplemental support along with anchorage against scouring of the sand and wind

uplift on this beach front home. Atlas Systems of New England contacted the engineering department of Earth Contact Products to design attachments to connect to the existing twelve inch diameter concrete foundation columns and to the girder beams under the structure. The system was required to support a 30,000 pound service load even if eight to ten feet of sand was displaced from below the structure.



This photo shows the configuration of the helical pile and custom bracket designed by ECP.

The pile system was required by the engineer to embed into coarse to fine cemented sand with a trace of gravel that was located approximately 20 feet below existing grade. Standard Penetration Test values for this stratum ranged from 50 to 75 blows per foot.

The helical Torque Anchor® pile selected for this project consisted of a 4-1/2 inch diameter tubular shaft that would provide maximum buckling strength through



This is a view of the Model 450-WM (12) Bracket connecting the 4-1/2 inch tubular pile shaft to the 12 inch diameter concrete column.

the anticipated eight to ten feet of unsupported column height should scouring occur around and under the structure. Attachment of the helical pile would be to the twelve inch diameter concrete columns that were supporting the structure off of concrete spread footing buried just under the surface. Two types of brackets were used for load transfer. One was specially designed bracket that surrounded and clamped to the concrete column supports; while under the structure, timber brackets were fastened between the laminated girder beams and the piles.

Project Summary

Installer:	Atlas Systems of New England - 781-551-0263 Norwood, MA - atlassystemsnewengland.com
Products Installed:	TAF-450D-60 8s – 10 Torque Anchor™ Model 450-WM (12) Custom Column Bracket TAB-450 TB Custom Timber Bracket
Number of Placements:	17 Columns 6 Timber Brackets
Average Depth:	19 ft
Install Torque on Exterior:	12,700 – 13,500 ft-lb
Ultimate Pile Capacity Rating:	160,000 lb
Estimated Buckling Load:	81,600 lb
Average Working Load:	30,000 lb
Factor of Safety	2.7 : 1 Shaft Buckling at 10 ft to Working Load

Installation of the piles under the structure was a challenge for Atlas Systems of New England technicians. They had to work with low overhead clearance, but were able to install the piles using portable equipment and short shaft extensions. Once the interior piles were installed and trimmed to proper length they were fastened to the girder beam using a custom timber bracket.

All of the piles were driven until refusal into the stratum of cemented sand located approximately 20 feet below grade. The average installation torsion on the perimeter placements was 13,000 ft-lbs, which empirically calculates to an ultimate compressive capacity of 80,000 pounds, which provides a factor of safety of 2.7. This value corresponds to the buckling load estimate of 81,600 pounds.

Once the piles were installed, they were attached to the structure with either the custom column bracket or the timber support bracket. A portion of the structural load was transferred to each pile as directed by the engineer on site.

In the upper left photo we see the technicians completing a pile installation by cutting the tube to proper length. At left are photographs of completed helical pile and bracket assemblies. The load has been transferred to the piles in these views.



The photographs above show the pile installations in the tight conditions under the structure.

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