



UNITED STATES

Kutztown University Kutztown, PA



Owner
Kutztown University

Engineer
Geo Science Engineering Group, Inc.

General contractor
The Quandel Group

Dates of work
2005/03 2005/03

Main figures

Controlled Modulus Columns (CMC)TM
250 EA.



Description

The proposed Kutztown University dormitory building was to be built on a site with soils that were unsuitable for the construction of such a structure. The building is a three-story masonry shear wall dormitory on two foot wide strip footings and slab-on-grade.

The loads imposed by the dormitory would have created unacceptable settlement of the uncontrolled fill soils at depth. Although several ground improvement options were available to the client, Menard was able to develop an alternative approach of Controlled Modulus Column (CMC)TM rigid inclusions that saved the client both time and money.

The footing elevations were below the proposed working surface and set at varying elevations. Accordingly, the ground improvement design and installation would need to accommodate the low cutoff of ground improvement elements or inclusions.

Ground conditions

This site is underlain by very loose fill material of variable thickness and silty sand with gravel. The fill material consisted of a very loose sand and gravel and ranged from 2 to 14 ft in thickness. Based upon the geotechnical analysis, the native soils and fill material were not suitable for direct bearing due to the likelihood of unacceptable total and differential settlement.

Solution

The CMC rigid inclusion elements were designed using proprietary software developed by Menard, creating a solution that reduced settlement to within design specifications.

Menard installed 256 CMC rigid inclusions to depths ranging from 11 to 14 ft using a specially-designed auger that displaces the soil laterally, with very minimal spoils created. Menard was able to accommodate the client's requirement to cut the elements off at depths up to 5 ft below working surface. This was accomplished by employing specially developed tools and auguring techniques that left the top of each element at the client's desired elevation.

In summary, the loads imposed by a new dormitory for Kutztown University would have created significant settlement due to the loose soil and fill beneath the surface. Based on Menard's assessment of the ground conditions, CMC rigid inclusions offered the client an alternative technology that provided an economical solution, met performance criteria, and met scheduling requirement for the project.