Buildings

NASA John H. Glenn Research Center

UNITED STATES

Cleveland, OH

An aerial view of the NASA John H. Glenn Research Center at Lewis Field (GRC). GRC is a leading NASA center for the research and development of jet engines, and technology developed at GRC has significantly contributed to both aeronautics and space exploration.
Credit: NASA

Owner
NASA

Engineer
PSI (Geotechnical); Burt Hill/Pollock Krieg Architects, Inc.

General contractor
Marous Brothers Construction

Dates of work
November 2010 December 2010

Main figures

Controlled Modulus Columns
870 EA.

Description

In its continued pursuit of designing and developing innovative technology in aeronautics and space exploration, NASA began the construction of a laboratory facility at the John Glenn Research Center in 2010. Located near Cleveland Hopkins International Airport, the facility's main campus features wind tunnels, drop towers, vacuum chambers and a research aircraft hangar.

Included in the project is a proposed three-story framed laboratory and research building in conjunction with the Ares Rocket program. Due to the highly compressible nature of soils at the site, Menard USA was contracted to provide ground improvement – the selected technique was Controlled Modulus Column (CMC)® rigid inclusions. Menard's solution would support all spread footings (interior and perimeter) and all slabs on grade.

Ground conditions

The soil consisted of up to 20 ft of loose fill and highly compressible organic peat.

Solution

Aggregate piers were originally recommended by the geotechnical engineer for the project, but after multiple meetings, all parties agreed on the installation of CMCs.

Menard's CMC solution proved to be more economical and time-saving than driven piles or aggregate piers in supporting the building's footings due to the required high bearing capacity. A total of 870 CMCs were installed to an average depth of 15 ft and a maximum depth of 22 ft. Menard designed a layout of CMCs at each footing to support the building's column loads. The design provided for 1 in of post-construction settlement with a differential settlement of less than a 1/2 in, meeting the performance criteria of the building.

This project was among the first in which Menard used a more portable mast attachment supported by an excavator as opposed to the conventional crawler rig set up. The mast attachment allows for a more nimble set up and brought savings in mobilization costs to the project

Menard completed the work for this three-story building on schedule, while meeting all requirements with respect to quality and safety.