WPXI Channel 11

Pittsburgh, PA

Dynamic Compaction

To construct a new television studio on a reclaimed construction spoil dump site, the underlying fill needed to be improved to prevent future settlement. Menard proposed an economical solution to use Dynamic Compaction™ to densify the fill.

Compaction of the fill material across the building footprint was achieved using a 15-ton weight dropped from 70 feet.

Owner: *WPXI Channel 11*
General Contractor: *Mascaro Construction*
Owner's Geotechnical Engineer: *Geomechanics, Inc.*
Ground Improvement Contractor: *Menard*

Project Summary

This project was developed on a construction spoil fill site located in the northern part of Pittsburgh, PA, along I-279 and included a two-story building and satellite-dish farm totaling about 40,000 square feet. Maximum column loads ranged from 40 to 200 kips. The building was constructed using a slab-on-grade and spread footings approach. The fill at the site originated from the construction of I-279. Excavated rock and soil were dumped in a valley located at the current WPXI building location.

The initial design called for the building to be placed on concreted drilled shaft foundations. Removal and replacement of the fill was not practical due to the depth that the fill extended. A ground improvement approach — Dynamic Compaction — was ultimately suggested by the owner's engineer and was determined to be the most economical.

Ground Conditions

The proposed building site was underlain by up to 35 feet of loose soil and rock fill. The fill material was heterogeneous both in composition and in-situ density. It varied in composition from fine-grained silty clay with some rock fragments and construction debris to predominantly coarse-grained rock fragments in a matrix of silty sand and clay. Based on the standard penetration test resistance values (SPT-N values), the fill was medium-dense to dense. However, it was recognized that some of the higher blow counts may have been attributed to the presence of larger boulders and may erroneously have suggested higher densities. Accordingly, the fill had the potential for experiencing large differential settlements with time. The fill layer was deemed not suitable to support a slab-on-grade and spread footings structure.

Ground Improvement Solution

The Dynamic Compaction approach required 3,468 prints distributed across the building footprint. The compaction was achieved by using a 15-ton weight dropped from a height of 70 feet to densify the underlying fill and soils through the generation of high-energy waves.

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