AGI™
ADVANCED GEOSOLUTIONS INC
Ground Improvement and Specialty Piling Contractors

Project Summary

Project Basie
Woodburn, OR

The Premier Design-Build Geotechnical Contractor™

Cement Deep Soil Mixing (DSM) and Displacement Grouted Columns (DGC)

Hybrid ground improvement system design and build

On-site grout batch plant for DSM

Data acquisition systems

On-site sand cement slurry batching for DGC

CPT verification testing

Project Description:
Design and build of ground improvement for a 4.5-story building with an 823,000 square foot footprint. AGI designed a solution to mitigate static and liquefaction settlements through a hybrid system consisting of DGC columns beneath the slab on grade with a Load Transfer Platform (LTP), and DSM columns beneath isolated footings and grade beams. AGI-Fudo, JV constructed over 2,200 DSM columns to depths of 75 feet, as well as 2,650 DGC columns to 60 feet over the course of a four-month schedule duration.

Geotechnical Risks:
- Liquefaction settlement
- Deep compressible soils

Design-Build Contractor:
Advanced Geosolutions, Inc (AGI) and AGI-Fudo, JV

Developer:
Trammell Crow company

General Contractor:
Layton Construction Co., LLC

Geotechnical Engineer:
NV5 (GeoDesign, Inc.)

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Pre-production Testing: AGI performed a pre-production testing program consisting of compression load tests of DSM columns up to 1,300 kips, as well as monitoring of a slab on grade test area with a 500 psf load covering an area 64-feet long and 16-feet wide for a period of two weeks.

Through the monitoring of instrumentation including strain gauges, pressure gauges, vibrating wire piezometer and load cells, as well as the measurement of settlements over the loading period, AGI was able to refine the 3D Plaxis model to increase element spacings and allowable design loads. Through this process, AGI saved the project $3.4M.

Slab-on-grade test area loading using ECO blocks and steel plates

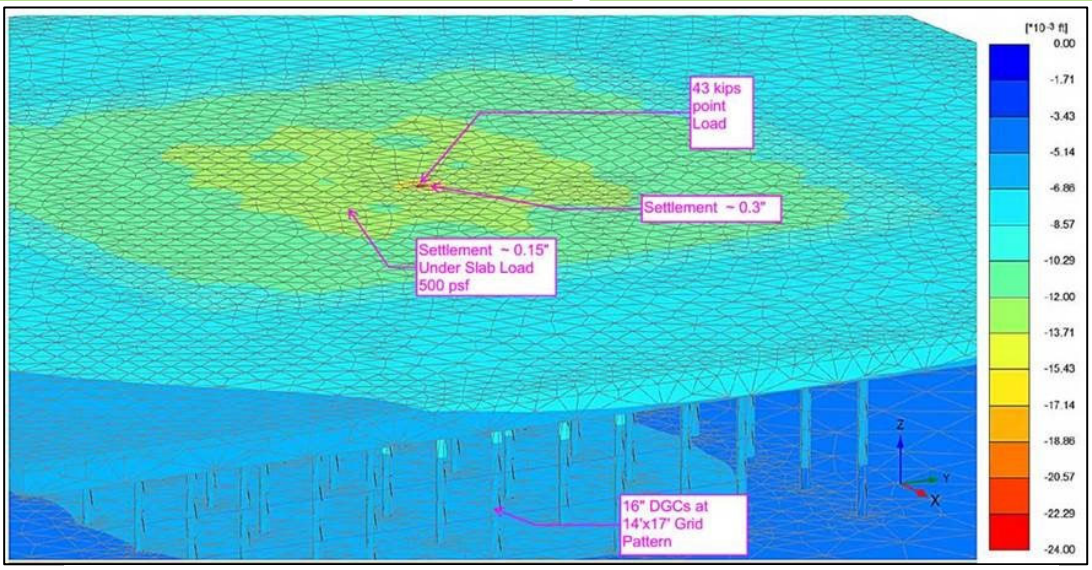
Compression load test of DSM column to 1,300 kips

DSM Load Test and Slab-on-grade Loading:

- Slab-on-grade supported by an LTP over DGCs settled 0.15-inches beneath the design service load, with negligible permanent deformation.
- DSM columns with a compacted gravel load transfer layer were subjected to 2-times the design load and displaced up to 0.53-inches at design load and 1.14 inches at the ultimate load.

2D PLAXIS Model:

- PLAXIS 2D finite element model (FEM) calibrated by instrumentation monitoring results.
- In-situ soils modeled by the Hardening Soil (HS) constitutive model within PLAXIS 2D.
- Stress-strain behavior of DSM, DGC, and LTP materials modeled using the simple elastic-perfectly plastic Coulomb constitutive model.



PLAXIS Model of DGCs and LTP with displacements from a 43-kip point load scaled up 500 times

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