AGI™
ADVANCED GEOSOLUTIONS INC
Ground Improvement and Specialty Piling Contractors

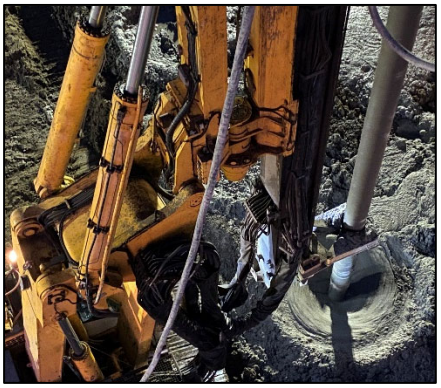
Project Summary

Alameda Landing Waterfront
Alameda, CA

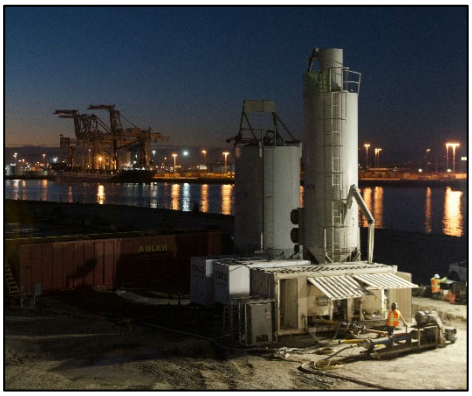
The Premier Design-Build Geotechnical Contractor™

Rapid Impact Compaction (RIC), Wick Drains, and Cement Deep Soil Mixing (DSM)

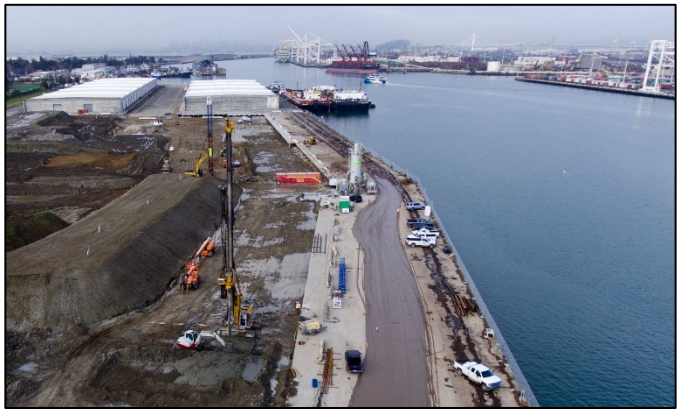
Wick Drain Installation



7-foot Diameter DSM Columns



On-site Grout Batch Plant



Multi-disciplinary Ground Improvement Project

Rapid Impact Compaction

Project Description:
Design and construction of ground improvement to mitigate geohazards for the Alameda Landing Waterfront real estate development. The ground improvement work comprised over one million linear feet of Wick Drains to expedite a surcharge program to mitigate the compressibility of the soft bay mud, Rapid Impact Compaction of 750,000 square feet of undocumented fill soils, and 43,000 cubic yards of DSM buttress wall to limit the lateral spreading risk to tolerable displacement goals during a seismic event.

Geotechnical Risks:
- ❖ Liquefaction and lateral spreading
- ❖ Compressible Bay Mud
- ❖ Undocumented Fill

Ground Conditions:
- ❖ Undocumented granular fill soils
- ❖ Compressible clay soils
- ❖ Liquefiable natural soil deposits
- ❖ Frequent subsurface obstructions

Geotechnical Engineering Collaborative Team:
Advanced Geosolutions, Inc (AGI) / Langan

Owner and General Contractor: Catellus Development Corporation

13 Orchard Rd., Suite 105, Lake Forest, CA 92630 ph. 310.796.9000 fax 310.796.9001

Site Investigation and Testing: AGI and Langan each conducted drilling and cone penetration test in various areas of the site. AGI performed additional plate dilatometer testing along the shoreline area to support the selection of engineering parameters used in the constitutive models of our fininte element analyses. Additional compressive and tensile load testing of the existing wharf piles to evaluate the load capacity and expected performance for the proposed site development. Pile Integrity Testing was also conducted to assess the condition of the existing piles. The capacity and integrity of the existing piles was considered in the design of the project for both vertical and lateral stabilization of the proposed development.

Compressive Load Test of Existing Wharf Piles

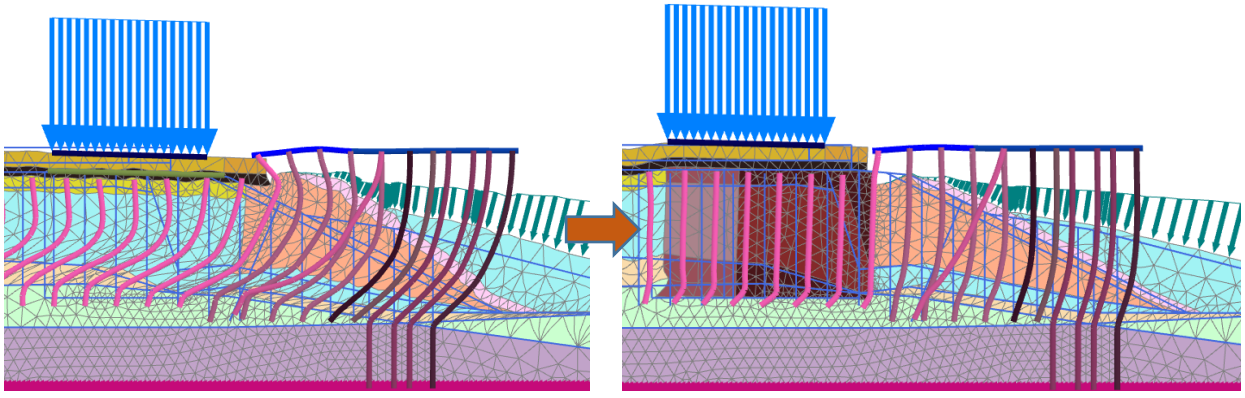
Plunging Failure Experienced During Compression Test

DSM Buttress Design and Evaluation:

- Site specific Soil-Foundation-Structure-Interaction (SFSI) Analyses to evaluate DSM Buttress wall performance.
- PLAXIS 2D finite element model (FEM) calibrated by subjecting wharf structure to ground motion observed during the 1989 Loma Prieta Earthquake, and comparing deformation to existing conditions.
- FEM tested against earthquake time histories from nearby stations scaled to match the target Maximum Considered Earthquake level ground motions for a 2,475-year seismic event.
- FEM subjected to earthquake scenarios from the Hayward and San Andreas faults.

DSM Buttress Performance:

- DSM panels work with the existing wharf structure to act as a shear key buttress.
- RIC densifies the near surface fills and reduces ground level deformation during a seismic event, working to optimize the DSM Buttress ground improvement system.
- Differential lateral and vertical movement of the proposed future building footprints within 150 feet of the wharf edge reduced to within tolerable limits by the DSM buttress.
- Earthquake movement reduced by more then 65% across the site.



b - Unimproved

a - Improved

13 Orchard Rd., Suite 105, Lake Forest, CA 92630 ph. 310.796.9000 fax 310.796.9001