RAMJACK®

2015 CASE STUDY

Type: Commercial | Issue: NV201502

Ram Jack Designs, Builds Customized Micropile Brackets for Seismic Retrofit

RAM JACK LOCATION:

VersaGrade, Inc.

www.versagrade.com | 775-284-1964

Sparks, NV

SEISMIC RETROFIT | CUSTOM MICROPILE BRACKETS

Sparks, Nevada

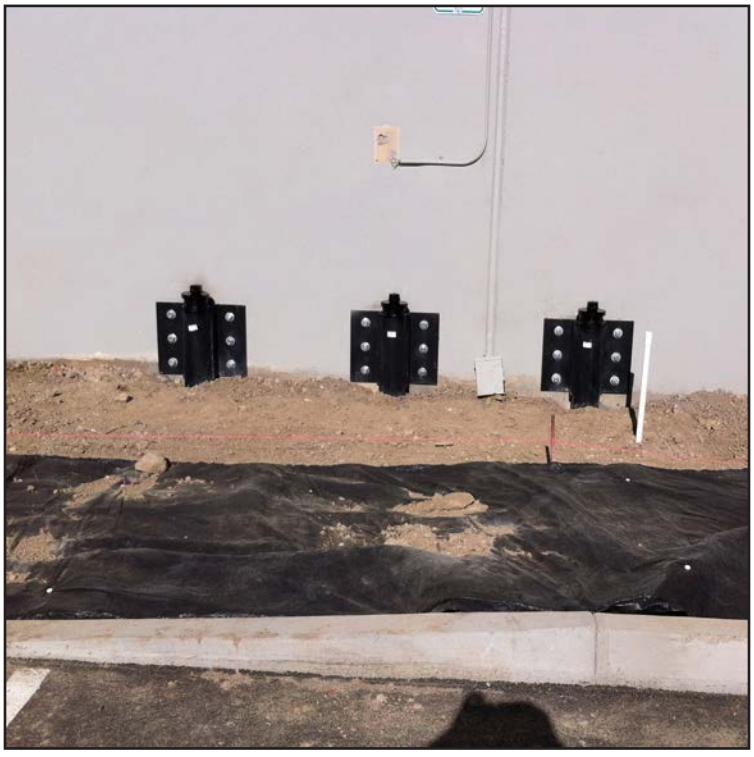
CASE STUDY 2015

Originally built in 1979, the warehouse was constructed for General Motors Corporation as a parts distribution center. The 634,000 ft.^{2} facility included dozens of truck dock openings and an interior railroad spur for the unloading of train cars inside the building. In 2015, a seismic retrofit and tenant improvement, including installation of additional truck docks, were planned, changing the structural characteristics of the tilt-up concrete building.

SITUATION

The installation of a moment frame on the interior of the structure required relatively high loads to be addressed in tension and compression at specific locations. VersaGrade, Inc. was contacted early in the design phase to help determine the best foundation system to address these loads.

While helical piles are ideal for seismic retrofit situations, the soils are predominately alluvium of the Truckee Meadows formation, consisting of pebble to cobble sand, silty sand, and sandy silts overlain by scattered, well-rounded volcanic and granitic cobbles. Due to the rocky nature of the site and limited soils investigations, VersaGrade, Inc. concluded that the use of micropiles would be the best system to meet the required loads. Pile groups of three to four would be necessary to achieve the 140 kip allowable loads at specific points along the perimeter foundation.



PROPOSED SOLUTION

VersaGrade, Inc. was awarded the subcontract to install 40 mm Contech Systems Micro Piles along with a custom Ram Jack bracketing system. VersaGrade, Inc. contacted Ram Jack Engineering to help design the micropile bracket and casing that would carry a 35 kip allowable capacity (70 kip ultimate) in tension and compression for each pile. Each bracket was designed to work on shear strength alone and attach directly to the tilt-up panels as there were no footings to attach to in some locations.

OUTCOME

Six (6) ⅞ in. diameter epoxy doweled bolts (per bracket) were used to secure the brackets to the face of the concrete tilt-up wall panels. VersaGrade, Inc. inserted a 5 ½ in. diameter x 8 ft. long steel casing sleeve through the brackets and set to elevation. After bracket installations were complete, VersaGrade, Inc. installed (14) Contech 40/16 micropiles with a 4 in. carbide cutting bit down through each casing. The micropiles were installed to an average depth of 21 ft.

Unconsolidated material and fissures created challenges, causing higher than expected grout usage during micropile installations. Some piles took in excess of 35 $ft.^3$ of grout to complete.

VersaGrade, Inc. used a Komatsu PC-160 track-mounted hydraulic excavator with an Excavator Mount TEI 350 Rock Drill and ChemGrout CG600 Batching Plant for the Micro Pile installations.

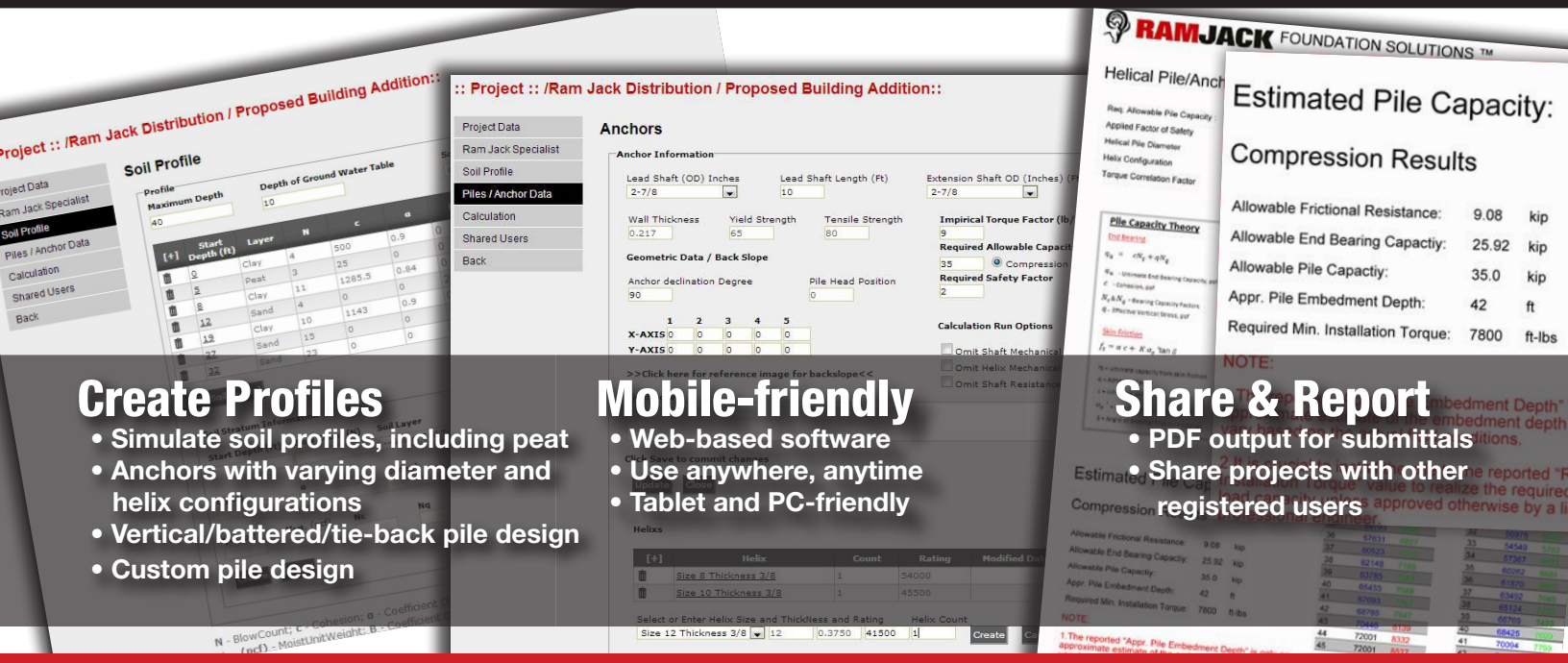
Proven Engineered Solutions.

RAMJACK®

- Engineered Foundation Solutions
- Products Manufactured in the USA
- 50+ Locations Nationwide

ICC ES™ Recognized as Code Compliant to Meet International Building Codes

Helical Pile Design Software: Foundation Solutions™



Create Profiles
- Simulate soil profiles, including peat
- Anchors with varying diameter and helix configurations
- Vertical/battered/tie-back pile design
- Custom pile design

Mobile-friendly
- Web-based software
- Use anywhere, anytime
- Tablet and PC-friendly

Share & Report
- PDF output for submittals
- Share projects with other registered users

www.ramjack.com/FoundationSolutions

888-332-9909

RAMJACK®