

Terminal and Parking Garage Expansion at the Mobile International Airport

Challenge:

The Mobile International Airport began construction on a new terminal and parking garage in 2024 with a budget of \$381 million. The new terminal was designed to accommodate five new air gates, with space to expand to twelve, and a five-story parking garage with 1,250 parking spaces. Load Testing was required on selected test shafts to optimize the required drilled shaft length. Based upon static load testing results, a higher resistance factor that may be utilized to calculate the shaft capacity which would optimize the drilled shaft lengths. GRL Engineers were engaged for the project to assess drilled shaft capacity using [Bi-Directional Static Load Testing](#) (BDSLT) as well as shaft integrity from [Crosshole Sonic Logging](#) (CSL).

Method:

Two production shafts utilized the BDSLT method to obtain load capacity data. Five Thermal Wire® cables were also installed for [Thermal Integrity Profiling](#) (TIP) testing on the production/test shafts. Data from the Thermal Wire cables plus the shaft installation log information was used to assess the as-built diameter along the shaft length. The Load Test Assembly (LTA) consisted of one hydraulic jack positioned between top and bottom 2-inch-thick steel bearing plates.

All of the production shaft required Crosshole Sonic Logging (CSL) to assess relative concrete and shaft construction quality. The drilled shafts were approximately 54 inches in diameter and roughly 65 to 80 feet in length. Four steel access tubes were cast into the concrete during placement. CSL testing was then performed after sufficient curing of the concrete had occurred.

Results:

During the BDSLT, the LTA applied a maximum downward gross load of 628 and 926 kips and simultaneously upward net loads of 509 and 843 kips. At this maximum test loading, the top and bottom of the load test assembly were displaced approximately 0.05/0.16 and 0.70/0.16 inches, respectively. Sample results of the bi-directional static load test can be viewed in Figure 1 and Figure 2. The effective radius vs depth chart from Thermal Integrity Profiling can be viewed in Figure 3. The soil profile created from TIP testing can be viewed in Figure 4.

The CSL results, consisting of waterfall diagrams and corresponding plots of first arrival time and signal strength can be reviewed in Figure 5.

Project Details

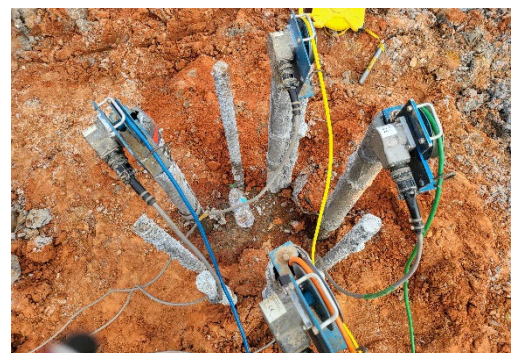
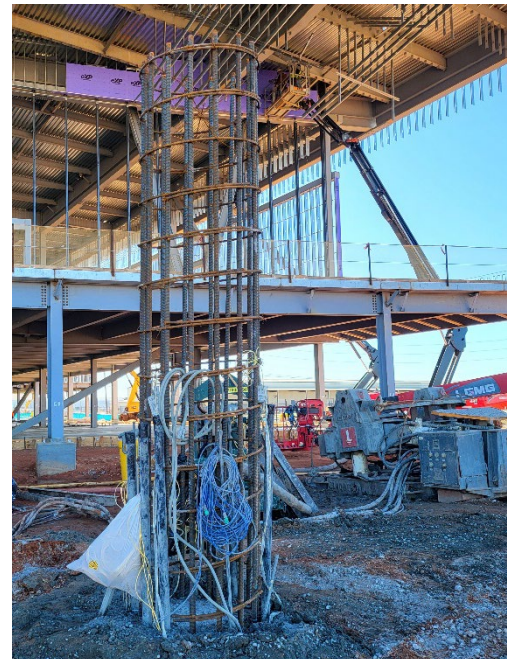
Client: A.H. Beck Foundation Co., Inc.

Location: Mobile, AL

GRL Office: Central & Texas

GRL Services

- Thermal Integrity Profiling (TIP)
- Crosshole Sonic Logging (CSL)
- Bi-Directional Static Load Testing (BDSLT)



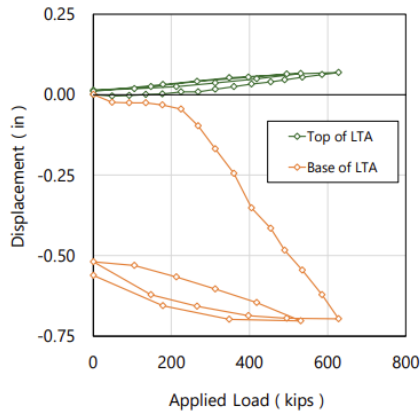


Figure 1. Load vs Displacement Curves

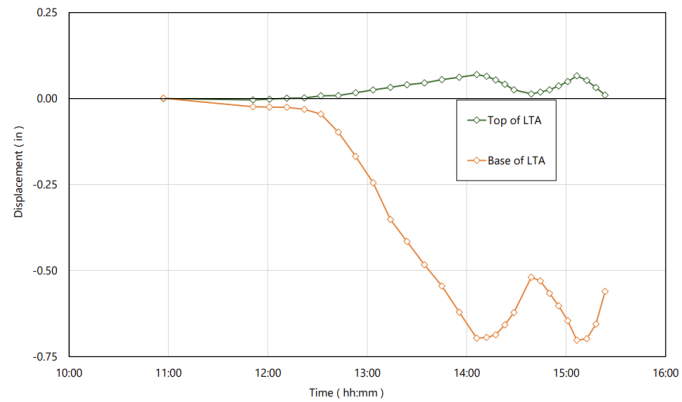


Figure 2. Displacement vs Time Curves

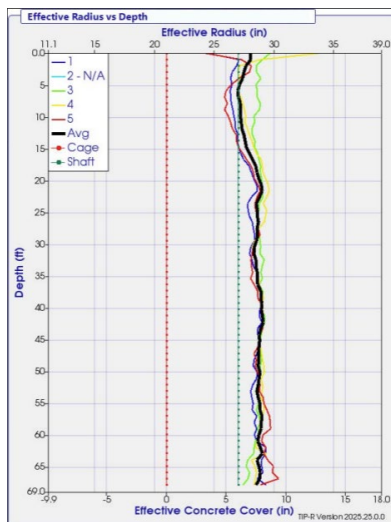


Figure 3. Effective Radius vs Depth

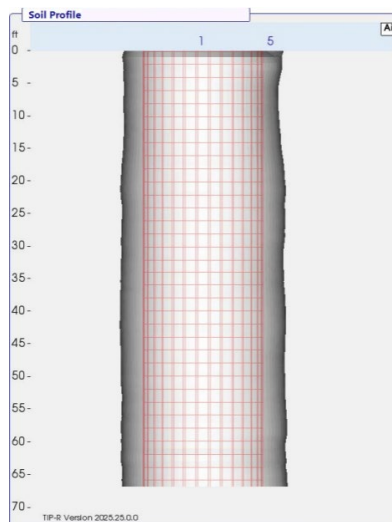


Figure 4. Soil Profile

GRL Engineers, Inc.

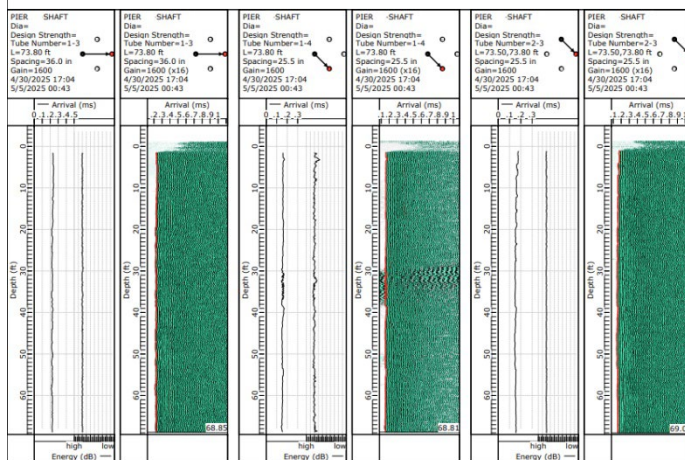


Figure 5. Sample CSL data

To learn more about GRL Engineers, visit www.grlengineers.com or email us at info@grlengineers.com.