

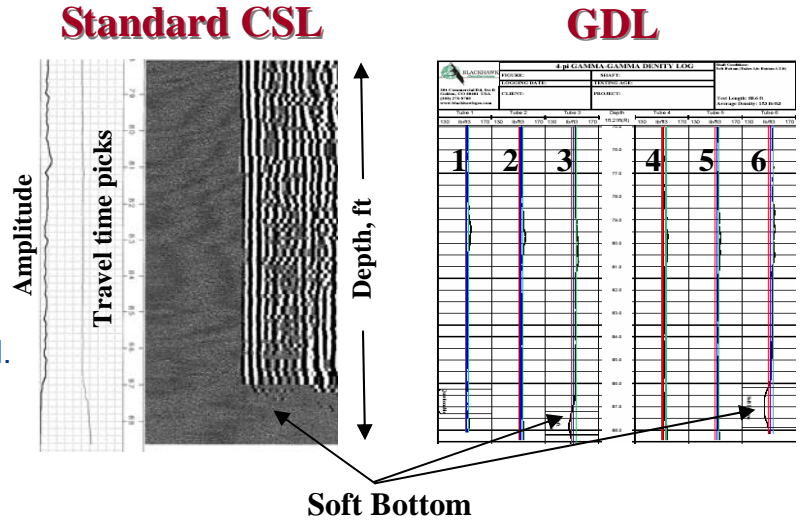
BLACKHAWK is Your Single-Source Provider of NDT Services for Transportation and Infrastructure Engineering Problems

Objectives: Determine the integrity of a newly constructed drilled shaft foundation both inside and outside the rebar cage using nondestructive testing (NDT) methods.

NDT Methods: Three NDT methods: Standard Crosshole-Sonic Logging (CSL); 4-pi Gamma-Gamma Density Logging (GDL); and 3-D CSL Tomographic Imaging (CSLT-3D™) were used to evaluate a 6-foot inside diameter, 88-foot deep drilled shaft. **The same steel access tubes were used for all NDT.**

NDT Results:

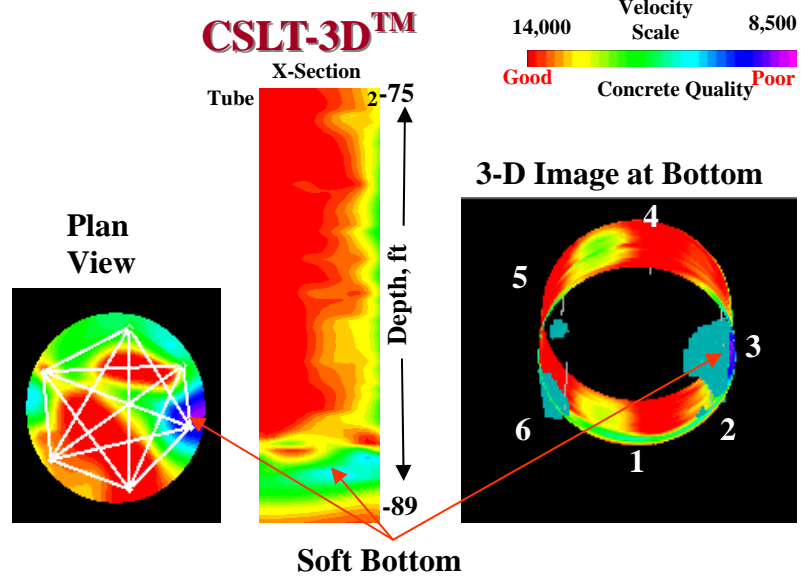
- ◆ CSL data indicated 1-2-foot “soft bottom” condition in the drilled shaft.
- ◆ GDL data also confirmed the soft bottom condition with poor-quality concrete, likely extending outside the rebar cage.
- ◆ CSLT-3D™ Tomography
- ◆ 3-D images defined poor quality concrete zones shown in green, blue, and purple colors. Good quality concrete is shown in red. The defect zones are shown at the bottom of the shaft primarily around Tubes 6, 5, and 3.



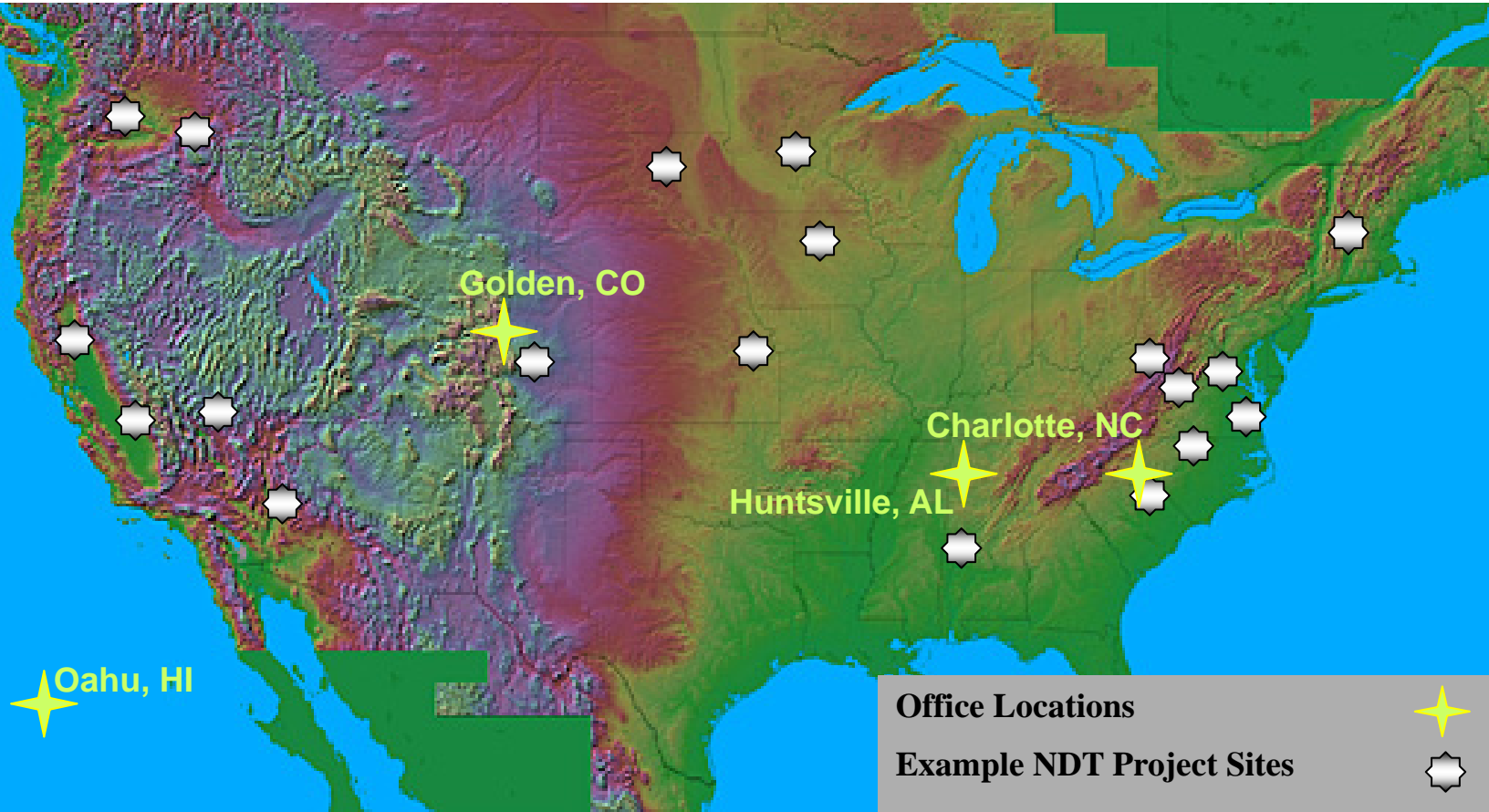
Benefits:

- ◆ Dual CSL/GDL initially provided the customer with independent verification of defect areas both inside and outside the rebar cage.
- ◆ Tomography provided images for coring confirmation of the defect zones.
- ◆ Compaction grouting was used for remediation of the soft bottom condition.

APPLICATION NOTE:
Integrity Evaluation of
Drilled Shaft Foundations



INFRASTRUCTURE TESTING SERVICES (ITS)



Partial List of Clients

- | | |
|----------------------|----------------------------|
| FHWA-CFLHD | City of Denver |
| Oregon DOT | City of Los Angeles |
| City of Portland | City of Santa Barbara |
| Las Vegas Paving | CALTRANS |
| CH2M Hill | Geotechnical Services Inc. |
| Kiewit Pacific | LAN Engineering |
| Corman Construction | Dominion Caisson |
| Haworth M&B | GAI |
| B&B Foundation | Coastal Caisson |
| AGRA Foundation | Republic Contracting |
| Bauer of America | San Juan Construction |
| Albuquerque Caissons | Case Foundation |
| Kleinfelder | |

