



Drilled Shaft Base Cleanliness Evaluation

An important part of drilled shaft or bored pile construction is the cleaning and evaluation of the shaft base condition prior to placing the reinforcing cage and concrete. GRL Engineers perform base cleanliness checks using the SQUID (Shaft QUAntitative Inspection Device). The test provides a quantitative assessment of the drilled shaft base utilizing SQUID's three penetrometers and three displacement plates.

Test Procedure

After drilling and bottom cleaning is complete, GRL engineers perform a SQUID base cleanliness assessment to determine the thickness and relative lateral extent of any soft material or "debris" remaining at the shaft base. The SQUID is quickly attached to the drill rig's Kelly bar, and then lowered to the bottom of the drilled hole until the penetrometers encounter resistance. During the test, displacement plates remain on top of any soft material present at the shaft base, while the penetrometers penetrate below these plates and record penetrometer force as a function of displacement. The penetrometer force versus depth data is then evaluated to determine the thickness of any soft material or "debris". The SQUID test is repeated at multiple locations within the drilled shaft base area to provide an objective, quantitative assessment of soft material thickness and bearing material conditions. For small shafts a single test is typically performed. For shafts greater than five feet in diameter, tests are typically performed in the center of the shaft and in the four perimeter quadrants.



Benefits of Shaft Base Cleanliness Evaluation

- Shaft base material can be quickly tested at multiple locations with the SQUID device attached to a Kelly bar
- Base cleanliness assessment of the soft material or "debris" thickness provided in realtime by the GRL engineer on-site or at the office via SiteLink® technology
- Resistance from conical tip penetrometers pushed into base material may be correlated to subsurface exploration, dynamic, bi-directional, or static load test results

GRL Engineers, Inc.

Corporate Office
Ohio

Office Locations

California	Hawaii	North Carolina	Washington
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Florida	Louisiana	Texas	



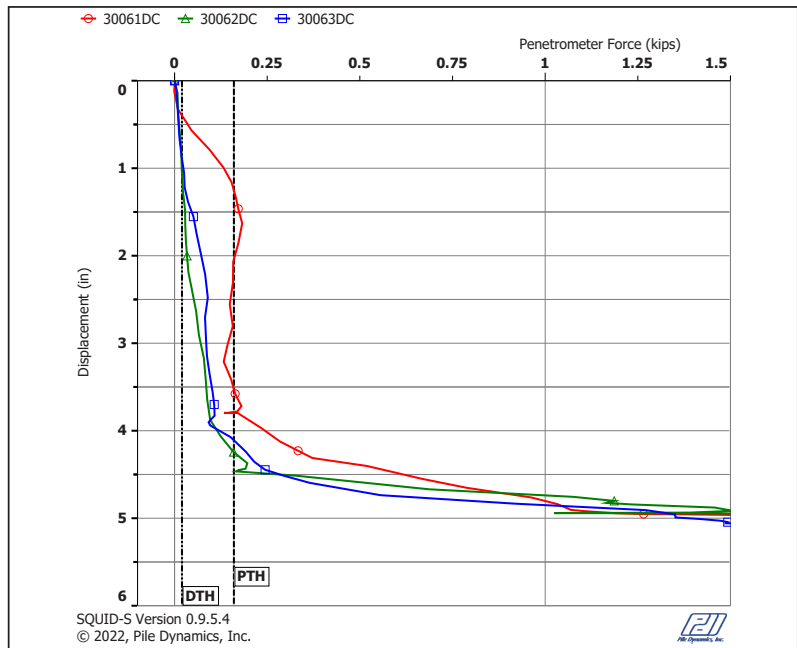
Data Collection

Assessment of shaft base cleanliness with SQUID is a quick process that can generally be completed within a few minutes. The drill rig provides downward force which pushes the penetrometers into the shaft base material. Both penetrometer force and displacement are monitored and recorded. The data is evaluated in real-time by the GRL engineer on-site or connected to the SQUID main unit via the internet, and the thickness of any soft material or debris determined. The need for additional cleanout, or the readiness to place concrete, can be immediately decided.

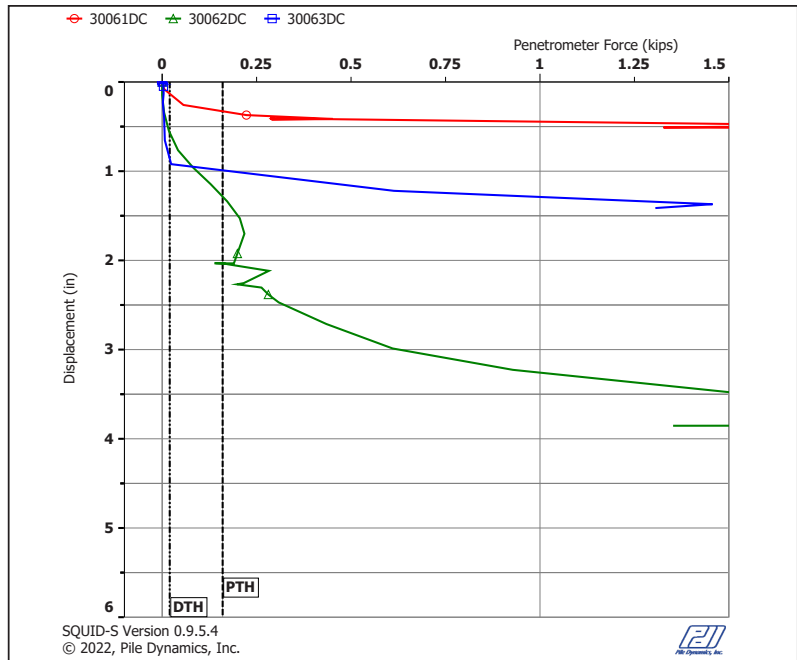
Data Analysis and Reporting

Base cleanliness test results are displayed in the field with the help of the SQUID device. The debris thickness is reported based on the established thresholds for debris and for competent soil or rock materials. For each shaft tested, the GRL engineer prepares a report summarizing the SQUID test details and results.

For additional information on Drilled Shaft Base Cleanliness Evaluations or any other GRL Engineers service please contact info@GRLengineers.com or visit us at www.GRLengineers.com.



Penetrometer resistance vs. displacement behavior at base before cleanout



Penetrometer resistance vs. displacement behavior at base after cleanout

