



Micropile Testing with TIP

Using the Thermal Integrity Profiler (TIP) to Test Micropiles

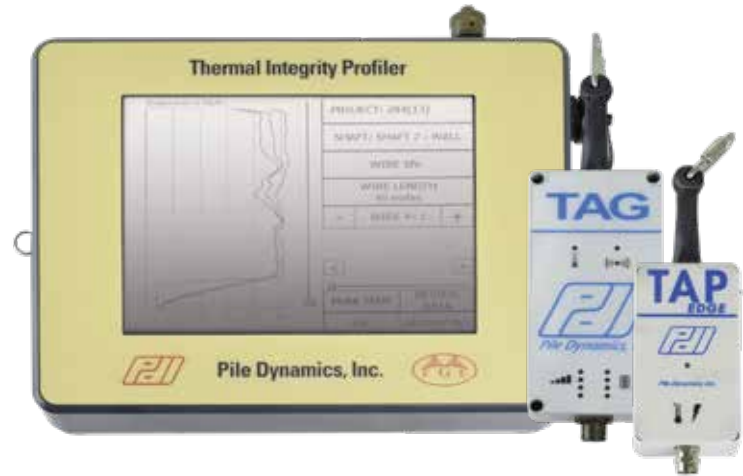
Next generation quality assurance to assess the quality of cast in place concrete foundations

The Thermal Integrity Profiler (TIP) uses heat generated by curing cement to assess the quality of cast-in-place concrete for micropile deep foundations. The TIP system evaluates the concrete quality of the entire cross-section, including outside the reinforcing cage along the entire length. TIP tests are typically completed within 48 hours of pile casting- earlier than any other integrity evaluation of cast-in-place concrete foundations, and meets the requirements of ASTM D7949-14 - Standard Test Methods for Thermal Integrity Profiling of Concrete Deep Foundations.

Benefits of testing micropiles with TIP:

- Analysis of the temperature vs. depth data yield qualitative results for assessing general characteristics of the pile shape
- Estimates effective pile diameter vs. depth when the thermal profile is combined with pile installation records including the concrete volume placed and constructed pile length
- Identifies potential anomalies such as bulges, necking, or reductions in concrete quality
- Accelerates construction with tests conducted during concrete curing
- Thermal Wire® cables can replace access tubes required for other testing methods
- Thermal Aggregator Units (TAG) allow for real-time data review via a secure Cloud server

* *The expected temperature at any location is dependent on the shaft diameter, mix design, time of measurement and distance to the center of the shaft.*



Cloud Enabled Data Collection

- Provides real time data collection via a secure Cloud server
- Allows the engineer, designer, and contractor to evaluate data from any location
- Saves construction time and money with early shaft evaluation



Testing Methods

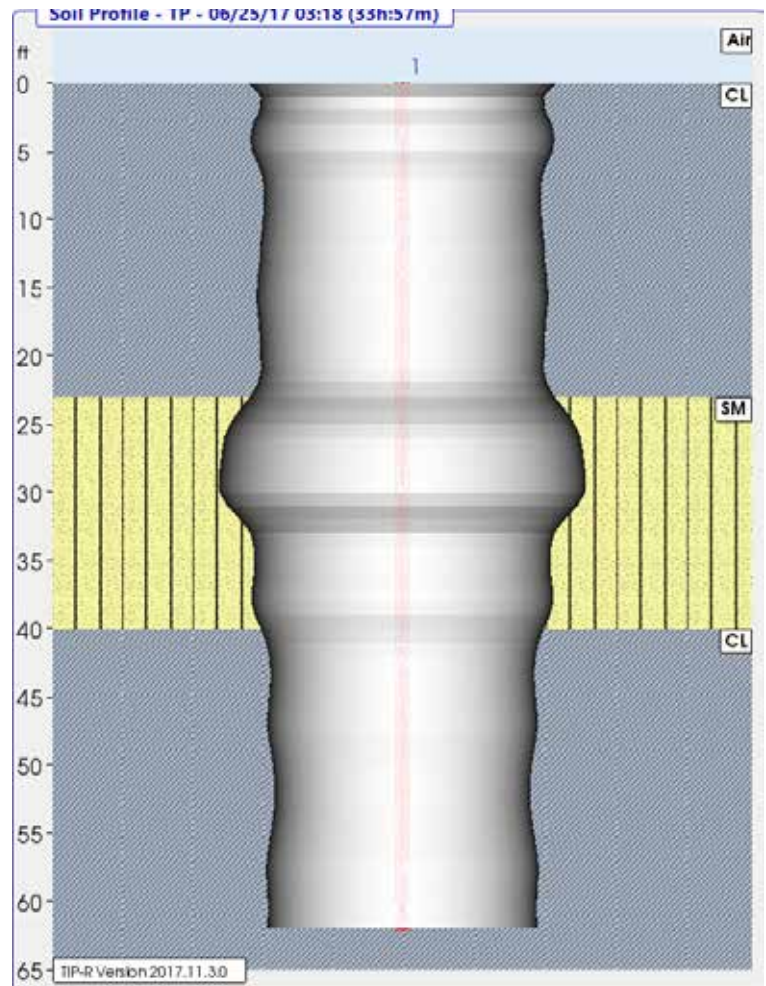
A Thermal Wire® cable is typically installed along the length a center bar. The instrumented center bar is inserted (i.e., wet set) into the column of concrete immediately after placement. In applications where a hollow thread-bar is left in place after installation, an instrumented bar can be set within the hollow thread-bar.

After the instrumented center bar is set, a TAG or TAP-EDGE data logger is connected to the Thermal Wire cable to commence the data collection process. Temperature vs. depth measurements are sampled in 15 minute intervals. Data is automatically uploaded to the PDI-Cloud Portal via cellular connection where the consulting engineer or project team can monitor results in real time. After peak temperature of the micropile is observed, generally within 24 hours after placement, the data is downloaded for further interpretation and analysis using the TIP-Reporter software.



Testing Results

Thermal results can be used to confirm a uniform pile or raise awareness of quality control issues soon after placement. By viewing the thermal profiles on the PDI-Cloud Portal, quality issues can be detected and preliminary results can be issued in as early 5 hours after placement. This streamlined process not only helps mitigate potential quality issues on subsequent piles, it also helps ensure a level of confidence for the project team to move forward with construction sooner, thus accelerating project schedules.



Pile Dynamics, Inc. (PDI) is the world leader in developing, manufacturing and supplying state of the art QA/QC products and systems for the deep foundations industry. The company is headquartered in Cleveland, Ohio, USA, with offices and representatives worldwide. For additional information visit us at www.pile.com or contact info@pile.com.