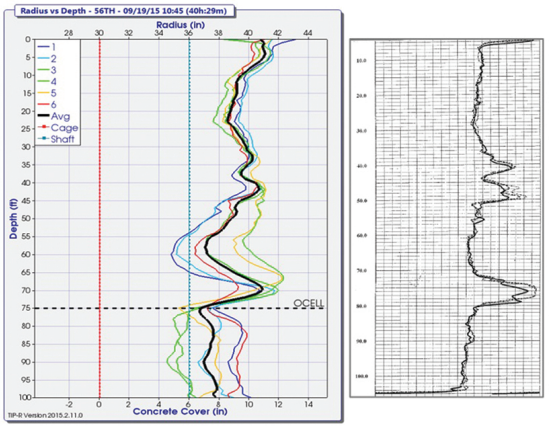
Thermal Integrity Profiling vs. Borehole Caliper Results

Non-destructive testing (NDT) of bored piles by Thermal Integrity Profiling (TIP) consists of measuring pile temperatures as its concrete cures, then analyzing them to identify anomalies and evaluate the position of the reinforcing cage. Measurements are often obtained by Thermal Wire® cables (with thermal sensors at every 300 mm) attached along the cage. TIP results are frequently compared to Cross-Hole Sonic Logging (CSL), a traditional NDT method. CSL assesses concrete integrity using waves that travel between transmitter and receiver probes inserted in parallel tubes pre-installed in the piles. Unlike TIP, CSL cannot assess the position of the reinforcing cage. Recently, **Pile Dynamics, Inc.** had the rare opportunity to compare TIP to borehole caliper results instead. Borehole calipers assess diameter and shape of a borehole prior to concrete placement. Six Thermal Wire cables were installed on a pile. Once temperatures were measured, TIP estimates of pile radius and caliper measurements just before concrete placement were plotted versus depth. Both plots display the same overall shape, increasing the confidence in TIP results. On the left graph, the colored plots coincide up to a depth of 13.7 meters, meaning the same temperature was recorded on all six measuring points at a given depth. Below 13.7 meters, some cables recorded warmer temperatures and others cooler ones. This is indicative of radial shifting of the reinforcing cage.■



Pile radius versus depth estimated by TIP (left) and measured by borehole caliper (right)