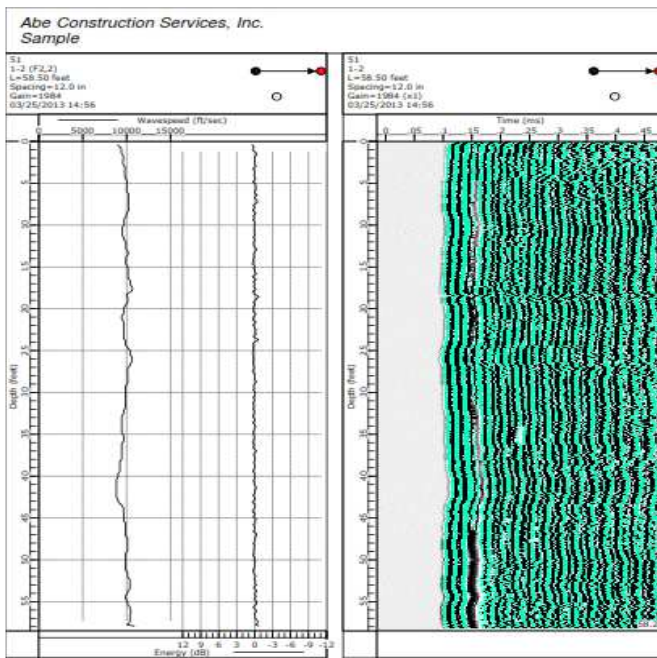




Cross-Hole Sonic Logging

Abe Construction Services, Inc. (ACS) is a deep foundation testing, monitoring, and consultation firm with over twenty years of experience, based in California, that services clients throughout the world.



Sample plot for typical CSL report

The Basics of Cross-hole Sonic Logging

Cross-hole sonic logging (CSL) is a non-destructive test that utilizes sonic pulses to evaluate concrete quality and detect defects in drilled shafts or slurry walls. Poor concrete quality, voids, and other issues will delay the time it takes those pulses to transmit through the concrete, as well as degrading the strength of those signals. From the records of the pulses, basic profiles of the piles can be developed and analyzed to locate and determine the extent of problems within the concrete.

ACS performs Cross Sonic Logging according to the ASTM D6760 test standard.

Testing Procedure

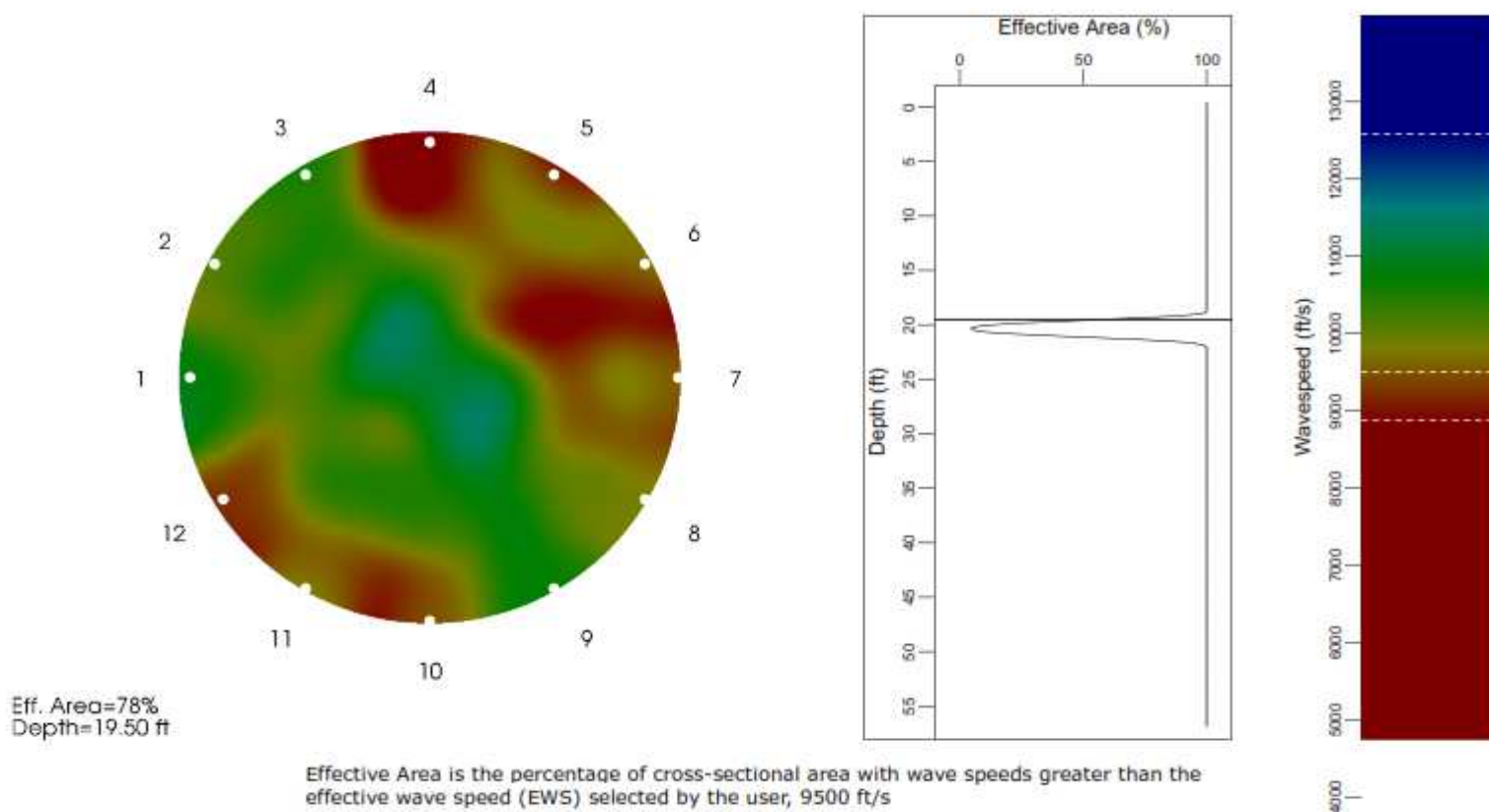
CSL testing requires the installation of either PVC or steel tubes in the pile. The tubes are spaced around the interior of the pile rebar cage, and typically start at the bottom of the pile and continue up through the concrete to ground level. The tubes should be clear of any blockage and must be filled with clean water.

The actual testing procedure consists of two probes being lowered through the tubes to the bottom of the pile, and then pulled up simultaneously. As the probes are pulled through the tubes, one emits a sonic pulse that is received by the second. The amount of time the pulse takes to reach the second probe as well as the signal integrity of that pulse is recorded at each depth interval. This process is repeated for each possible combination of tube pairs to create the sectional profiles. The more tubes installed, the more profiles of the pile can be collected. By analyzing and comparing these profiles, the location of potential issues within the piles can be confirmed with a high degree of accuracy.

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3-D Tomography Imaging

While the initial analysis results provide a good idea of potential issues within the concrete, ACS offers the option for 3-D tomographic imaging of the pile. This software utilizes the profiles collected by the CSL to provide additional imaging of the piles cross-section. Clients can inspect easy to view cross-sectional slices of the pile at depths of interest or concern to gain a better understanding of an anomaly's size and shape. The tomography results include a calculation of the effective area at each depth; the percentage of the pile area not affected by anomalous material. 3-D tomography imaging is especially useful when mitigation of piles is required.



Example of a single tomography cross-section

Cross-hole Sonic Logging in Conjunction with Gamma-Gamma Logging

CSL is extremely helpful when used in conjunction with Gamma-Gamma logging. In GGL testing, any anomalous material detected around a tube is described only in terms of depth and the percentage of the pile area. Using CSL in addition to GGL can allow for a more accurate localization of any issues within the pile. This is especially useful when determining whether anomalous material detected in the GGL testing is present on the interior or exterior of the pile rebar cage.