

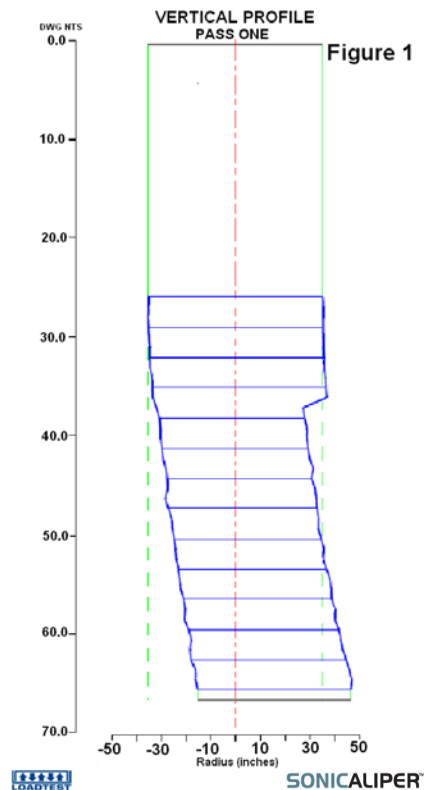
**CASTING PIT FACILITY**  
Michigan, USA

After unsuccessful attempts to insert a permanent inner casing into a 60-inch diameter shaft inside a production facility, the client called Loadtest to determine the shaft’s verticality using the SONICaliper. Initially the shaft was drilled to a depth of 65 feet. A 46-foot long, 65-inch diameter temporary casing was used at the top of the shaft, and the inner casing measured 53 inches in diameter with a length of 29 feet. This shaft was not designed as part of any foundation, or intended for load-bearing purposes. It was designed to house a large hydraulic cylinder, making verticality a critical component of its construction.

The first two passes with the SONICaliper revealed that during the drilling process the auger tool had wandered more than 18 inches off-center. Figure 1 shows a cross-sectional of what the shaft looked like when Loadtest first arrived on site. Due to space limitations inside the existing facility, moving the shaft and starting over in a new location was not an option; remediation of the shaft would be necessary.

**Services Provided**

- Verticality Determination of 73-foot Drilled Shaft
- Real-time Monitoring of Shaft Remediation
- Quality Control/Quality Assurance



An eight-foot long 60 inch diameter core barrel was used to remediate the verticality of the shaft. The total depth of the shaft was also incrementally increased to 73 feet. Four additional SONICAliper passes were made during periodic intervals of the remediation process to ensure verticality was improving, and to determine when sufficient verticality had been achieved. Figures 2 and 4 show the progress made during various stages of remediation.

After the client deemed verticality satisfactory, the specially designed inner casing with a welded bottom plate was placed on the pile toe. The SONICAliper was employed again to verify the casing verticality within the shaft. Two days and four passes with the Caliper later, the inner casing was ready to be jet-grouted in place. Four grout pipes had been welded to the outside of the inner casing to ensure even placement around the exterior. However, due to the significant problems encountered during the shaft construction process, the client wanted to ensure that the specialty casing would not float or fall to one side during the grouting process. The solution was to utilize the SONICAliper to monitor the grouting process.

The Caliper was lowered to a specified depth of 45 feet within the inner casing and left there for the duration of the grouting process to monitor any lateral movement at the top of the casing. The recording speed of the Caliper was slowed down significantly to render the most precise data possible, and to reduce the number of recording readings needed to last the duration of the 4-5-hour grouting process. Both in real-time and in the recorded results, the inner casing rocked back and forth, with encroachment never exceeding .08 inch, and typically remaining within .05 inch or less off-center. The final reading after grouting was complete showed encroachment to be at 0.1 inch. One final pass of the entire shaft was made after the grouting procedure was complete to verify verticality of the inner casing.

Perhaps the most significant information procured from this unusual situation is further verification of repeatability with the SONICAliper Technology. On each of the eleven passes during nearly five continuous hours (excluding grout monitoring), the SONICAliper produced congruous data of the shaft's characteristics, including consistency of the location of a large blowout on one side. This project exemplifies the power and versatility of the SONICAliper Technology.

