

Deep Foundation Remote Testing Services from Any Location

GRL Engineers can efficiently support projects in nearly any location, at any time with minimal notification, via our remote testing services. Leveraging SiteLink® technology, our engineers are able to stream real-time data from various testing devices directly to an offsite computer. GRL's remote testing services enhance collaboration, reduce project downtime, lowers overall testing costs, and significantly eases the burden of scheduling the testing. Our remote testing services include pile driving monitoring (PDA), shaft geometry and verticality (SHAPE), shaft bottom cleanliness (SQUID), and SPT analysis as illustrated in recent case studies.

I55/Memphis & Arkansas Bridge Replacement Project:

GRL performed Standard Penetration Testing for the new, seismically resilient replacement bridge in Memphis, TN. The SPT energy measurements were collected during fifteen sampling events at depths of 50, 100, 150, 200, 250, 300 and 400 ft. For the initial sampling, a GRL engineer was onsite to instrument the drill rods and obtain dynamic measurements using a Pile Driving Analyzer® (PDA). After the first sampling, our engineers utilized remote testing capabilities to review and collect the PDA data from one of our GRL office locations. Accessing the data remotely saved significant travel time, and expenses. The SPT testing was completed over a period of 5 days but our engineer was only needed onsite for one day.

I-55 Replacement Bridge:

Location: Memphis, TN

Service: SPT Analyses

Bonner Bridge Replacement Project:

The replacement of the Bonner Bridge on the Outer Banks of North Carolina required pile driving monitoring for hundreds of piles. To address the issues that led to the prior bridge's deterioration, the new design incorporated measures for extreme scour and storm impacts. The anticipated scour elevations resulted in pile foundations to be extended deeper. Extensive dynamic pile testing was required to evaluate the pile capacities after installation. To meet the specified demand, GRL engineers utilized SiteLink technology to remotely monitor the required quantity of piles and provide analysis services in real time. Approximately 150 piles were tested for the project with many of these requiring multiple tests to fully assess pile capacity. As the bridge spans across the Oregon Inlet weather conditions were highly variable and often changed quickly. By utilizing remote testing techniques, significant cost savings were achieved as onsite weather delays did not result in daily charges for PDA engineers when testing was not feasible.

Bonner Bridge:

Location: Outer Banks, NC

Service: Pile Driving Monitoring

Kentucky Lock Addition Project - M19

The KY Lock is the lower gateway to hundreds of navigable waters in the Tennessee River Basin. The Lock Addition project included drilling operations aiming to create rock sockets for rebar cages and beams, crucial for supporting the new lock structures. A total of 20 drilled shafts, each 5 feet in diameter and ranging from 27 to 62 feet deep, were installed. GRL Engineers remotely assessed several drilled shaft bottoms and vertical shape prior to concrete pour.

KY Lock Addition (M-19):

Location: Grand Rivers, KY

Service: Shaft Bottom Cleanliness Evaluation (SQUID)

Shaft Verticality and Volume Assessment (SHAPE®)

Shaft bottom cleanliness assessments (SQUID Testing) were performed at 5 locations at the bottom of each shaft (Center, North, South, West, and East). SQUID data is collected from 3 penetrometers and 3 displacement plates, providing force vs. displacement graphs for each penetrometer/displacement plate combination. These curves are evaluated for debris thickness by calculating the displacement between two thresholds.

Additionally, Shaft verticality and geometry (SHAPE®) testing was performed by centering an ultrasonic device then lowering into the shaft to roughly 12 inches above the base, then returning the device to the top of the shaft. SHAPE records approximately one scan per second with all eight channels scanning simultaneously. Data is collected from the sensors then analyzed based upon the arrival time of the sonic pulse. The report shows 4 profile views, a plan view, and an estimated depth vs volume plot. The plan view shows the offset direction and verticality of the drilled shaft.

Tenmile Bayou Bridge

GRL Engineers provided remote testing services for the pile foundation of the Rich Road over Tenmile Bayou bridge project in Memphis, Tennessee. The purpose of the testing was to monitor the performance of the hammer and driving system, while calculating pile driving stresses, assessing pile structural integrity, and pile capacity. The test piles were reported to be 155-185 feet long and were comprised of bottom 65-foot and 30-foot long splice sections. At the jobsite, two strain transducers and two piezoresistive accelerometers were bolted to opposite sides of the pile to monitor strain and acceleration. GRL used SiteLink technology to remotely monitor and collect the data during testing with a Pile Driving Analyzer® (PDA). This allowed the engineer to provide monitoring despite being away from the jobsite. Initial driving results determined that ultimate capacity was not reached, requiring the need to allow the soil to set up, before performing pile restrrike testing. GRL's remote testing services allowed the engineer to login to the PDA onsite during restrrikes after 5 days, and again after 12 days, saving significant travel time and expenses for the project.

To learn more about GRL Engineers, visit www.grlengineers.com or email us at info@grlengineers.com.

KY Lock Addition (M-19 cont'd):

Location: Grand Rivers, KY

Services: Shaft Bottom Cleanliness Evaluation (SQUID)

Shaft Verticality and Volume Assessment (SHAPE®)

Tenmile Bayou Bridge:

Location: West Memphis, AR

Service: Pile Driving Monitoring