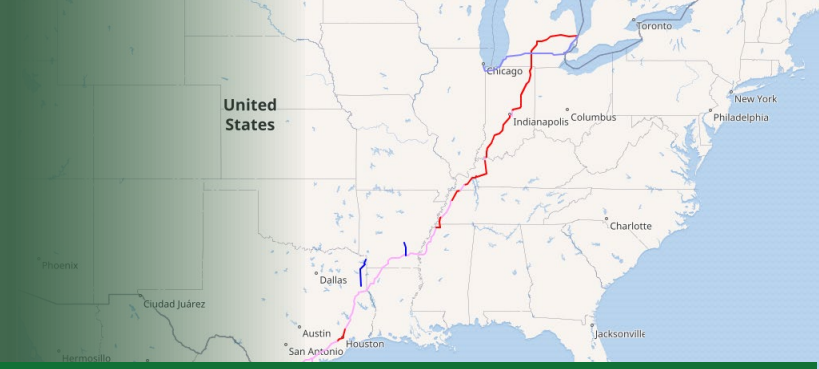

Multi-Year Testing on Highway I-69

Challenge:

The construction of I-69, a major US interstate highway that starts at the bottom of Texas and travels northeast to Michigan and into Ontario, was a multi-decade endeavor and a massive undertaking for the FHWA. GRL Engineers provided a multitude of testing services throughout the state of Indiana. Some of these projects included notable reconstruction on a 67-mile segment in Indiana, as well as the I-69 Finish Line Project, the final segment to connect Evansville and Indianapolis.

Method:

GRL conducted many tests on the reconstruction of I-69 while working with the Indiana Department of Transportation. Dynamic testing was performed to monitor hammer and driving system performance, calculate pile driving stresses, assess pile structural integrity, and evaluate pile bearing capacity. An 8G Model Pile Driving Analyzer® (PDA) unit was used to acquired and process the dynamic test data to meet these objectives. The CAPWAP® computer program was used to further assess static pile capacity, including the relative soil resistance distribution along the pile shaft and at the pile toe. At selected structures Static Load Testing (SLT) was provided to further assess pile capacity and refine the foundation design. Load was applied to the SLT Test Piles by increasing the pressure in a hydraulic jack located between the pile and the main reaction beam. The applied load was determined from a calibrated jack pressure transducer, and read from an electronic pressure gage.

The majority of the bridges were supported on driven pile foundations, but some of the river crossings were supported by drilled shaft foundations, which required evaluation of shaft integrity. Thermal Integrity Profiling (TIP) measures the elevated concrete temperatures that occur during the hydration process. These temperature measurements are made along the length of the pile and can determine the integrity over 100% of the pile cross section, both inside and outside the reinforcing cage. Crosshole Sonic Logging (CSL) was performed using the Cross Hole Analyzer (CHA) system to determine concrete quality inside the reinforcing cage. Low Strain Integrity Testing (PIT) was performed to evaluate shaft integrity and to identify any potential impedance changes along the shaft.

Project Details

Client: Indiana DOT

GRL Office: Illinois

GRL Services

- High Strain Dynamic Testing
- CAPWAP® Analyses
- Crosshole Sonic Logging
- Thermal Integrity Profiling
- Static Load Testing
- Low Strain Integrity Testing

GRL Provided Testing Services on:

I-69 Section	Construction Dates	Location	Services Provided*
Section 1	2007 - 2010	I-64 north of Evansville to S.R. 64 near Oakland City	High Strain Dynamic Testing, CAPWAP Analyses, Low Strain Integrity Testing, Static Load Testing
Section 2	2010 - 2012	S.R. 64 near Oakland City to U.S. 50 east of Washington, Indiana	High Strain Dynamic Testing Crosshole Sonic Logging
Section 3	2010 - 2012	U.S. 50 near Washington to U.S. 231 near NSA Crane	High Strain Dynamic Testing, Crosshole Sonic Logging

Section 4	2011 – 2015	U.S. 231 near Crane NSA to State Road 37 South of Bloomington	High Strain Dynamic Testing, Crosshole Sonic Logging
Section 5	2014 – 2018	Bloomington to Martinsville, Indiana	High Strain Dynamic Testing, Crosshole Sonic Logging, Low Strain Integrity Testing
I-69 Finish Line	2019 – 2025	Martinsville to I-465 in Indianapolis	High Strain Dynamic Testing, Thermal Integrity Profiling, Static Load Testing

*Services provided were not all performed on every shaft or foundation.

GRL Engineers provided various quality assurance testing services over an 18-year period for INDOT on the I-69 highway, culminating with the 1-69 Finish Line. GRL helped to keep the project timelines moving while assessing the safety of each foundation. The Illinois office of GRL Engineers is honored to contribute to this vital section of I-69 and values our longstanding collaboration with the Indiana DOT and local contractors.

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