

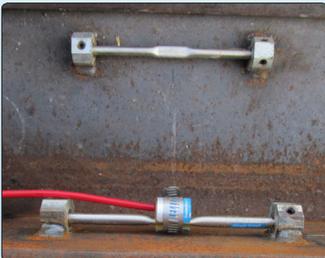
Highway 418, Downdrag Pile Monitoring, Ontario



• Transducers on a five-point MPBX



• Automatic Data Acquisition System



• Arc Weldable Strain Gauges (Model 4000) on flange and web of pile



• Instrumented pile being maneuvered into position

GKM Consultants is proud to have been involved in the design and field portions of an instrumentation and monitoring program employed to measure the magnitude, distribution, and time dependency of drag load on driven steel H-piles for a three-span integral bridge structure at Nash Rd/Black Creek and Hwy 418 (East Durham Link). The project was managed by the Blackbird Infrastructure Group, with significant input from the Ministry of Transportation Ontario and University of Western Ontario.

The monitoring system included instrumentation installed directly on the piles to measure the action and deformation of the piles as well as instrumentation installed in the surrounding soil stratigraphy to measure the movement and pressure changes of the native soils near the monitored piles in response to construction activities.

We installed Geokon Arc Weldable Strain Gauges (Model 4000) and Single Point Extensometers (Model 1250 A-5) directly on the piles to measure localized and total strain, respectively. We used Geokon Vibrating Wire Piezometers (Model 4500S) with a 350-kPa capacity to monitor the pressure changes in the native

clay and till due to both the initial driving of the piles as well as the subsequent loading of the earth embankment. We also installed Geokon Multipoint Borehole Extensometers (Model 1280 A-6) with five (5) anchor points to measure settlement at multiple depths due to the loading of the embankment material.

The instruments are connected to a datalogger and collect readings in real time. Using an online data visualisation platform, the results are continuously compiled, updated and plotted to provide visual representations of the actions of the pile and surrounding soils.

This study is scheduled to be monitored until late 2021, at which point the field monitoring, in conjunction with lab studies at UWO, should give the industry a better picture of the forces at play with drag loads on driven piles.