RITE GEOSYSTEMS

ENCARDIO RITE METASENSING FOR MEGA STRUCTURES

Project Dossier

PROJECT DOSSIER

FOUNDATION TEST PROGRAM INSTRUMENTATION PROJECT

PROJECT OVERVIEW

The project involves the development of a test section for a future project to be constructed outside of Portland Oregon. The test section was composed of displacement grouted columns (DGCs) with a load testing platform constructed over the top of the test section. Floor loading on the load testing platform (LTP) was performed by adding steel plates to the load testing platform.

Project	**FOUNDATION TEST PROGRAM INSTRUMENTATION PROJECT**
Location	Oregon, USA
Contractor	Foundation Contractor
Duration	2021

WHY MONITORING?

Geotechnical instrumentation and monitoring program was planned for the test section, which assisted in the development of the final plans for production. The objective was to investigate the load paths along the LTP to the underlying soil and the DGCs. The selected geotechnical instrumentation were used to collect sub-surface changes in pore water pressures under the loading scenarios.

MONITORING SOLUTION

Rite Geosystems Inc. supplied instrumentation and real time monitoring results for the project. Instrumentation is installed by our client. The project required monitoring of four elements: excess pore water pressures, ground settlement, surface pressures and strain within the elements. The instruments used for this project included earth pressure cells (EPS-30V-S), vibrating wire piezometers (EPP-40V), arc weldable strain gauges (EDS-20V-AW) and target prisms (ERT-10P2). The client also utilized our data loggers (ESDL-30) and data management platform Drishti.

Scope of works include:

- Supply of geotechnical and geodetic instruments
- Automated monitoring with advanced datalogger

INSTRUMENT USED

Piezometers	Multi-level vibrating wire piezometer were installed to monitor pore water pressure at various depths. The displacement from the DGCs within the soil body has an expression on the groundwater and pore water pressures.
Arc weldable strain gages	The multi-level strain gauges assisted in evaluating how the load during the load testing program propagated along the DGCs and into the surrounding soils.
Earth pressure cells	The pressure cells were used to evaluate the amount of load that was transferred at the base of the load transfer platform to the DGCs or the underlaying soil.

INSTRUMENT USED

Prism targets	The prism targets were monitored before and after the floor loading using total station.
Datalogger	Our advanced data logger model ESDL-30 were used to collect and store the data from the above sensors auomaically at required frequency., which was at 5 minutes interval during testing. These wre installae at the exterior o the test section.

INSTALLATION CHALLENGES

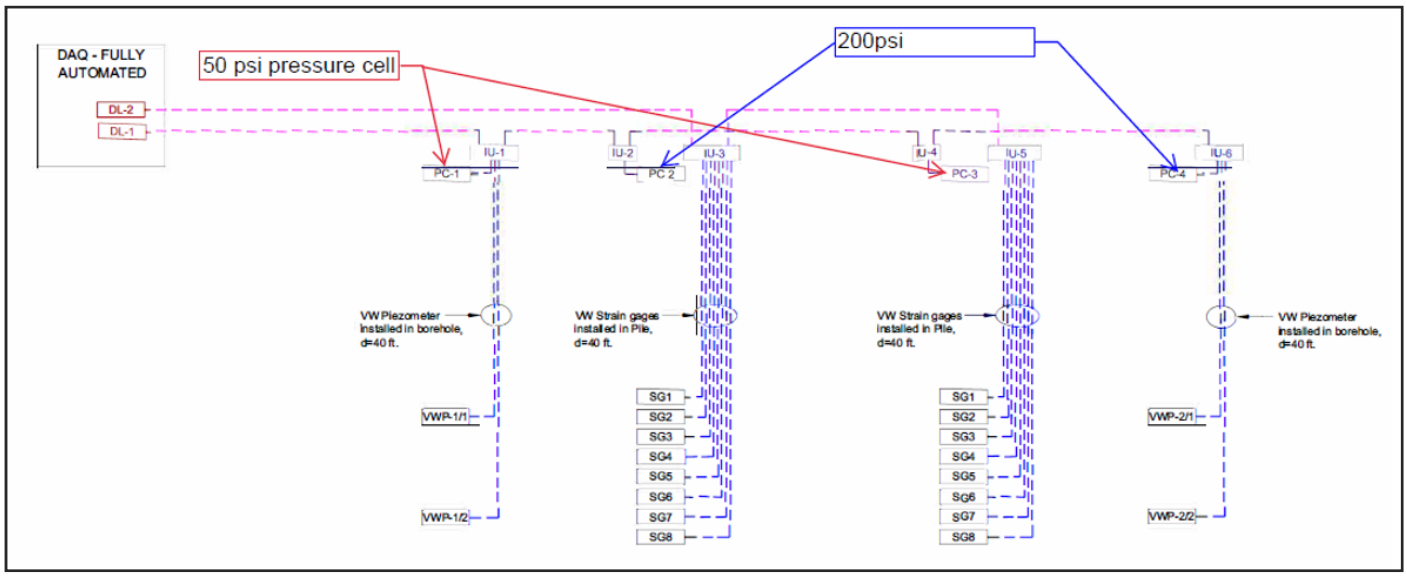
The main challenge was selection of strain gauges and means of installing them in order to collect meaningful data for the client. We worked with the client to find the best solution for the DGCs.

RESULTS

Rite Geosystems Inc. prepared the wiring schematic for the client to help them picture the entire systems and install it with ease. With plug-and-play sensor/datalogger set up, the installation of all the instruments was executed successfully, giving the client necessary information required for smooth progress of the project. We provided a hands-on approach with the client to help grow their knowledge base on instrumentation and obtain a high level of confidence on the instrumentation data.

The wireless datalogger collected and stored the data from the installed instruments. The data was wirelessly transmitted to our database management system Drishti on cloud server. is a web based real time automated monitoring system that collects data from multiple sensors, can store data from different sources and process large amount of data to provide meaningful data for risk management at fingertips, 24 x 7, with automated alarms and warnings.

The online data from the instruments were continuously accessible to the consultant/contractor and stakeholders at their desk, during works and loading scenarios. The near real-time data helped in the smooth and cost-effective progress of construction works and evaluation for the ultimate project execution.



Instrumenttaon schematic

Piezometer data at 5 minute intervals