

Project dossier



PROJECT DOSSIER

DLC Transmission Towers Project, USA

PROJECT OVERVIEW

As part of DLC's (Duquesne Light Company) investments to upgrade their transmission infrastructure, four galvanized steel lattice towers were under consideration for replacement. These towers carry two 138 kV circuits and are located along a right-of-way with landslide potential. The new tower structures are proposed to be weathered steel monopoles, approximately 155 feet high on average.

WHY MONITORING?

An instrumentation plan was required for slope monitoring as well as structural monitoring of towers. The instrumentation would provide essential data to evaluate site characteristics used in tower design and construction.

Due to the slide prone nature of the site, monitoring data was also required to provide early warning in case of an event of significant earth movement around the towers, in advance of DLC's plan to replace the structures.

MONITORING SOLUTION

Rite Geosystems Inc., USA was entrusted to provide complete instrumentation and automated, near real-time monitoring results for the project.

Project	DLC Transmission Towers Project
Location	Pittsburgh, PA, USA
Owner	Duquesne Light Company (DLC)
Client	Civil & Environmental Consultants, Inc.
Duration	2021 - 2023



Tilt meters installed on the tower



Instrumentation planned for this site included tilt meters attached to each of the four towers and in-place inclinometers in boreholes adjacent to selected towers, with online data at client's desk.

SCOPE OF WORKS

Rite-Geosystems, USA scope of works included:

- Supply of instrumentation
- Technical support and supervision of the installation
- Training to the client's team on datalogger commissioning and configuration for automatic monitoring at desired frequency
- Setting up an online web-based data management system (WDMS) with instant alerts via SMS/emails, and training to client's team on setting up dashboard and using the software.

INSTRUMENTS USED

- Tilt meters (8 no.)

On each of the four towers, two types of tilt meters were installed:

- 1 no. model EAN-93 tilt meter in the center of the structural member connecting the two downslope tower legs.
- 1 no. model ESDL-30MT wireless tilt meter with in-built datalogger in the center of one of the cross members connecting a downslope and upslope leg.

The objective was to detect and measure differential settlement and tower deformation in the event of unanticipated ground movement.

- In-place inclinometer (2 systems)

Near two of the tower locations, model EAN-52M in-place inclinometer were installed in 35 feet deep boreholes to monitor sub-surface lateral movement. A string of seven digital IPI sensors at 5 feet gage length was installed in each of the gage well.

The EAN-93 tilt meters as well as the EAN-52M in-place inclinometers were connected to either in-built datalogger of ESDL-30MT tilt meters or to model ESDL-30 datalogger. The data was collected at desired intervals and transmitted wirelessly via cellular network to the cloud based data management system.



Tilt meters installed on the tower



In-place inclinometer installed adjacent to the tower

RESULTS

The remote data collection system and online data management platform displayed the displacement profile of the slope and the structural movement of transmission towers.

The data management software processed, analysed and presented the collected data in near real time, with threshold limit alerts. The data was available in near real time over our web based data management software, with provision to send instant alerts via SMS and emails.



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