

# Governor Mario M. Cuomo Bridge Structural Health Monitoring System

## Client:

Tappan Zee Constructors, LLC

Welsbach Electric Corporation

## Location:

South Nyack, NY

Tarrytown, NY

## Value:

- Enabling engineers to make decisions related to operation, inspection, maintenance and rehab for the service life of the bridge with real-time data

## Live synchronized tracking of:

- Deck and tower rotations
- Joint and bearing displacements
- Cable and tower vibrations
- Stress cycles
- Weather
- Tower drifts
- Abutment settlements
- Corrosion
- Potential deterioration accumulation for life cycle analysis

## Services Provided:

- Design and installation of Structural Health Monitoring (SHM) system comprised of nearly 1000 sensors with 160 data acquisition units synchronized within 3 milliseconds.
- Deploy state-of-the-art iSite-Bridge software for graphical display of nearly 1000 measurements, live calculations, and reports



## Designing & Installing the Monitoring System on the Largest Design-Build Structure in the U.S.

Geocomp provided the largest and most sophisticated Structural Health Monitoring (SHM) system ever deployed on a bridge structure in the US. The system consists of 130 Geocomp high speed data acquisition units (iSiteHS), 12 data loggers for weather and corrosion measurements, 4 fiber optic interrogators and 15 GPS receivers integrated into a central server. The collected data are disseminated in a closed loop cyber-secured network that can only be reached via user authentication. All data are time synchronized within 3 milliseconds.

Geocomp's iSite-Bridge software platform collects and manages 1GB of new data each day to assess bridge performance in real time. Intelligent data reduction algorithms show immediately the effects of unusual loads and cumulative performance. Short and long term behavior can be seen from easy to read statistical summaries, data analysis reports and measurement correlations. The information is being used to mitigate risks to the bridge.

## Background

Governor Mario M. Cuomo Bridge replaces the former Tappan Zee Bridge crossing the Hudson River between Tarrytown & Nyack located 20 miles north of New York City. The new bridge is a 3.1 mile long cable-stayed twin span structure designed for a 100 year service life to remedy the issues of the highly deteriorated old bridge such as increased average daily traffic load, accident rate per mile and maintenance costs. The project is one of the largest ever transportation design-build contracts in the US with a \$3.98 billion contract value. Geocomp provided the Structural Health Monitoring (SHM) portion of this massive scale project from system design to integration by providing state-of-the-art software monitoring equipment and instrumentation expertise.

Geocomp worked with the bridge designer HDR and the owner, NY State Thruway Authority, to finalize the design of a SHM system that would serve the design objective to help ensure a 100-year design life for the new bridge.