Geocomp

Technologies to manage risk for infrastructure

Project Brief

Tappan Zee Bridge Replacement Structural Health Monitoring System

Client:

Tappan Zee Constructors, LLC (TZC)

Welsbach Electric

Location:

South Nyack and Tarrytown, NY

Services Provided:

- Design and installation of Structural Health Monitoring System
- Development of software for graphical display of data

Value Provided:

- Collect and disseminate real-time data for asset management decisions related to operation, inspection, and maintenance throughout the service life of the bridge
- Document original bridge structural signature for comparison response after event driven conditions

Background & Project Challenges

The existing Tappan Zee Bridge is a cantilevered steel truss bridge in New York, crossing the Hudson River at one of its widest points, between Tarrytown and South Nyack. The deteriorating structure, built in 1952, bears far more traffic than it was designed for. This has led the owner, the New York State Thruway Authority, to replace it with a new bridge. The new New Tappan Zee Bridge will be a twin-towered, cable-stay bridge (four lanes per span in opposite directions). The new bridge is scheduled for completion in 2018.

Geocomp Role & Accomplishments

For this new bridge, Geocomp is providing the largest and most sophisticated Structural Health Monitoring System on a bridge structure in the United States, operating as a "closed loop" system, in which collected data is immediately processed and used for maintenance decisions in a real-time application. The system is comprised of more than 75 standalone Geocomp high speed data loggers interfaced to a central server in the Bridge's main control room where data is displayed in using custom-designed user interfaces for automated graphical presentation of data.

Instrumentation will be placed in approach span piers and pre-cast deck elements in 2015. This will include tilt meters to measure pier rotation, sonic displacement sensors to measure expansion joint movements and bridge bearing sensors to measure bearing rotation and displacement. The bulk of the instrumentation will be in the main-span superstructure on the stay cables, pier towers, and main span sections. This will include accelerometers and fiber optic sensors to monitor force in the stay cables, accelerometer and GPS on the towers and bridge deck to measure mode shapes of the structure and weather stations and corrosion sensors to measure environmental conditions.

Data will be collected continuously and filtered for peak values or triggered conditions, archived for long-term comparison of response and used to help focus regularly scheduled or triggered maintenance of the structure.