

Client:

Port Authority of New York
& New Jersey

Location:

Bayonne, NJ and
Staten Island, NY

Services Provided:

- Instrumentation, monitoring and data management system
- SMART BRIDGE system

Value Provided:

- Verify performance assumptions used in the design of the raised roadway
- Real-time data to evaluate construction effects on the existing bridge
- Continuously assessing bridge health to help assure public safety during the continued operation of the structure during construction

Background & Project Challenges

This historic arch bridge, the fourth largest in the world, will have its deck raised 64-ft (from 151-ft to 215-ft) above the Kill van Kull while remaining open to traffic. The deck is being raised to accommodate super vessels traveling to and from the New Jersey marine terminals through the upgraded Panama Canal. This project is the first of its kind, installing a new roadway above the existing one with traffic remaining operational during construction. The new roadway will be hung from the original steel arch via steel cables. The construction value of the project is \$1.3 billion and work will extend into 2017.



Geocomp Role & Accomplishments

Geocomp is engaged in two critical areas of work on this challenging project. The first is to provide instrumentation and monitoring services during construction of the new foundations for the bridge and the raising of the roadway. Instrumentation is installed to monitor the effects constructing the new foundation and elevated roadway may have on the existing bridge piers and adjacent structure(s). Instruments include:

- tilt sensors (96),
- seismographs (40),
- vibrating wire piezometers (19),
- automated totals stations (16),
- high precision optical prisms (216),
- deep bench marks (8), and
- observations wells (6).

All data is gathered remotely and displayed in real-time on *iSiteCentral*[™], our data management system. All shareholders may access data 24/7 via the internet.

The second major item of work is to provide the "SMART BRIDGE" system for this historic structure. The system will facilitate the analysis of the effects of transferring loads from the original application points to new points 64-ft higher on the steel arch structure. It will also provide a comparison between the design assumptions and the actual field conditions during and after construction. The system consists of:

- vibrating wire strain gages (80),
- bridge resistance strain gages (32),
- vibrating wire tilt meters (4),
- vibrating wire displacement transducers (8),
- vibrating wire crack gages (4), and
- data loggers (5).