



*Technologies to manage risk
for infrastructure*



Bridge Instrumentation and Monitoring



Geocomp Bridge Instrumentation & Monitoring Services:

Bridging the future with the latest technologies

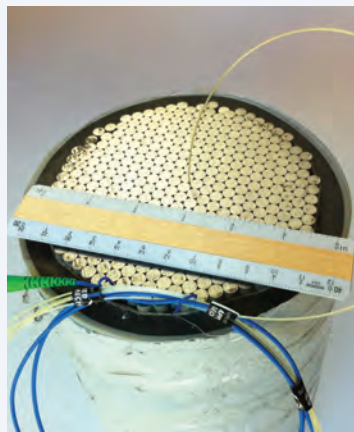
Geocomp's staff have extensive experience in instrumentation and monitoring of foundation and bridge structural elements before, during, and after construction.

For more than 30 years, Geocomp's staff have developed turnkey structural health monitoring systems for bridges, including steel truss, post-tensioned segmental box girder, cable stay, and composite-type structures. Clients have used our comprehensive data collection and visualization platform, iSiteCentral™, which offers continuous data coverage over large, multi-point sensor arrays to provide contractors, engineers, and owners with immediate feedback on structural performance and conditions as well as real-time alarm programs that warn of unexpected performance.



CABLE STAY BRIDGE CASES

- Geocomp will design and install the most sophisticated "closed loop" Structural Health Monitoring System in the US on the new Tappan Zee Bridge in New York. This system will integrate the latest in technologies including fiber optics to aid in the long-term Asset Management for this structure.
- Geocomp personnel developed SMART cable technology which was implemented on the Meizhou City Bridge in China using embedded fiber optics to measure forces in stay cables.
- Geocomp implemented an instrumentation program to monitor cracks and deck deflections on the Leonard P. Zakim Bridge during construction of the Central Artery/Tunnel Project in Boston, MA. Continuous monitoring was required through the jacking of bridge elements and tensioning of the stay cables.



STEEL TRUSS BRIDGE CASES

- Geocomp is installing a structural monitoring system on the Bayonne Bridge in New York to help mitigate risk and control construction operations for the raising of the bridge deck 64 feet without closing the bridge to traffic. A geotechnical instrumentation program was also implemented by Geocomp to monitor existing base structure response during the retrofit operation.
- Fiber optic strain gage arrays were used to measure temperature induced stresses for comparison of two spans on the Goldstar Bridge in Connecticut where one span's rotational movement is restrained by a rusted rocker bearing.
- Over 800 strain gages and a continuous data collection system was utilized to control construction operation and mitigate risk to the owner during the widening of the Huey P. Long Bridge in New Orleans, LA. A real-time monitoring system was also developed for the contractor to control lifting operations during the three paired 2400-ton pre-fabricated truss lifts.



Our Capabilities

Our geotechnical engineers have the expertise to support the design, deployment, and management of real-time monitoring programs which serve as a cornerstone of our risk management programs.



COMPOSITE BRIDGE CASES

- Geocomp installed instrumentation to provide real-time strain, deflection and rotation monitoring during the transporting and installing of the pre-fabricated superstructure for I-84 in Southington, CT. This was a 56-hour weekend operation as part of the Accelerated Bridge Construction Program.
- Geocomp provided a dynamic strain monitoring system and developed rainfall-counting algorithms to perform fatigue analysis of critical members on the I-91 Springfield Viaduct in MA. This data was used to validate a fatigue model and extend remaining service life of the structure.
- Working with the Research Center of the Louisiana Department of Transportation and Development (LaDOTD), Geocomp installed sensor arrays and data logging systems to monitor in-service performance of the I-10 Twin Span Bridge over Lake Pontchartrain near New Orleans, LA. The sub- and super-structure were instrumented to validate reliability of design methods for lateral loading of piles in large storms and document actual loads for long-term performance assessment. A 2,000,000 lb. lateral load test was also performed to check capacity predictions.

USE OF INNOVATIVE MATERIALS ON BRIDGES

- Working with Micron Optics and TenCate Geosynthetics, Geocomp is the system integrator for the installation of GeoDetect® fiber optic sensing geogrid material in the use of Geosynthetic Reinforced Soil – Integrated Bridge Systems (GRS-IBS). The GeoDetect® sensing grid utilizes embedded fiber optics to measure load distribution both horizontally and vertically through the placement in multiple compacted lifts. This process is being used on the federally funded I-70 Bridge replacement project in Aurora, CO and the PR-140 Bridge replacement project in Puerto Rico.
- Working with Lawrence Tech University and Michigan DOT, Geocomp is managing four bridge instrumentation programs that utilize carbon fiber materials for pre-stressing, post-tensioning and reinforcement elements. Being non-corrosive and unproven, the measurements will be used to help develop design codes and standards for the use of this material in future bridge design. A custom MDOT website was developed in Geocomp's *iSiteCentral*™ GIS database management system to allow the owner password protected access to their in-state bridge monitoring program.



Photo courtesy Nick Champion, media producer, Louisiana Transportation Research Center.

Photos: (Cover) Mystic/Tobin Memorial Bridge - Boston/Chelsea, MA; (Inside Left) Leonard P. Zakim Bridge - Boston, MA; A fiber optic sensor inserted in a PWS cable; Bayonne Bridge - Staten Island, NY; Huey P. Long Bridge - New Orleans, LA; (Inside Right) I-10 Bridge at Lake Pontchartrain - New Orleans, LA; I-84 Bridge, Southington, CT (Back Cover) M50 Bridge - Jackson, MI; I-20 Bridge - Vicksburg, MS; Tappan Zee Bridge - Tarrytown, NY; Penobscot Narrows Bridge - Bucksport, ME



Representative Bridge Projects

Bayonne Bridge, Staten Island, NY
 Bayview Bridge, Quincy, IL
 Bosphorus Bridge, Istanbul, Turkey
 Falls Creek Gorge, Ithaca, NY
 Fort Duquesne Bridge, Pittsburgh, PA
 Goldstar Bridge, New London, CT
 Homer Hadley Floating Concrete Bridge, Seattle, WA
 Huey P. Long Bridge Widening Project, New Orleans, LA
 I-10 Twin Span, New Orleans, LA
 I-20 Bridge, Vicksburg, MS
 I-355 Extension, Lamont, IL
 I-90 Bridge, Cleveland, OH
 Jindo Grand Bridge, Jindo, South Korea
 MASS Accelerated Bridge Program, MA
 MIDOT Carbon Fiber component bridges, MI
 Mystic/Tobin Memorial Bridge - Boston/Chelsea, MA
 Namhae Bridge, Korea
 Penobscot Narrows Bridge, Bucksport, ME
 Sakonnet Bridge, Portsmouth, RI
 SR-520 Floating Concrete Bridge, Seattle, WA
 Sunshine Skyway Bridge, Tampa, FL
 Tappan Zee Bridge, Tarrytown, NY
 US-41 over the Ohio River, Evansville, IL
 Vernon Avenue Bridge, Barre, MA
 Weirton-Steubenville Bridge, Weirton, WV
 Woodrow Wilson Bridge, Washington, DC
 Zakim Bridge, Boston, MA

About Geocomp

Geocomp provides comprehensive geostructural design and performance monitoring services to clients across the United States and around the globe. Our professional staff combine in-depth understanding of structural and geotechnical material behavior with the latest in performance monitoring technologies to provide innovative and sound geostructural solutions – resulting in better control of risk and cost of projects.

Our subsidiary company, GeoTesting Express Inc. (GTX), provides state-of-the-art testing facilities to measure the mechanical and physical properties of soil, rock, geosynthetics, concrete, and other geo-materials. GTX also provides field testing services to inspect, sample, test, document, and monitor quality projects.

Geocomp Products manufactures, sells, and supports remote monitoring systems for both static and dynamic applications worldwide that provide web-based GIS access to instrument data used for real-time monitoring of structural performance during construction and operation. It also manufactures automated soil testing systems and custom-designed pavement sensors and load cells used by commercial, governmental, and university laboratories.

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