

# Asset Management State-wide Bridge Monitoring Program using iSiteCentral GIS

## Client:

Lawrence Technological University  
Michigan Department of Transportation (MIDOT)

## Location:

Bridge St & M-102 bridges, Southfield, MI  
M-39 Bridge, Warrendale, MI  
M-50 Bridge, Jackson, MI  
I-75 Bridge, Southgate, MI

## Value Provided:

- Development of Instrumentation plans for each bridge
- Installed and commissioned remotely positioned Structural Monitoring System for each bridge
- Performed Load Testing of several bridge structures prior to bridge openings
- Integrated all five bridges into unified database monitoring system (iSiteCentral GIS) for state-wide monitoring program
- Provide annual maintenance and reporting for each bridge system through 2020

## Background & Project Challenges

Through research and development efforts, Lawrence Technological University and the Michigan Department of Transportation (DOT) have been developing and implementing the use of carbon fiber reinforced polymer materials for major bridge components. Current uses include carbon fiber reinforced polymer (CFRP) post-tensioning cables and barrier walls, carbon fiber composite cable (CFCC) for transverse post-tensioning, and new fiber composite material for reinforcing concrete (NEFMAC) grid reinforcement for bridge decks. These new materials help combat the effects of steel reinforcement corrosion, provide long-term durability of bridge structures, and require less maintenance. Currently five bridges have been constructed in Michigan using these materials.

## Geocomp Role & Accomplishments

During the fabrication process, each of the five bridges were instrumented to evaluate the operations of the bridge structures, including constructability and performance during construction, and to gather a measured response from load testing and long-term performance.

Based on the type of bridge and composition of carbon fiber structural elements, Geocomp developed an instrumentation plan specific to each bridge. Instrumentation included internal/external strain gages, custom built load cells and displacement transducers, and precision survey monumentation to measure beam/girder camber for both the short- and long-term. Each bridge has its own stand alone, remote access, continuous data collection system to provide data during and after construction. The first bridge was instrumented in 2004 and has been remotely monitored since then.

In 2012, a second bridge was instrumented to measure long-term performance. At that time, Geocomp implemented iSiteCentral GIS database monitoring to incorporate the first and second bridges into a unified monitoring database for the DOT. Later that year, a third bridge was added and subsequently a fourth and fifth were added over the next few years.

The iSiteCentral GIS database monitoring system provides a combination of almost any type of structure, monitoring hardware, and/or documentation record keeping all integrated under one password protected platform providing a unified system for asset management purposes.

