

Storrow Drive Tunnel Rehabilitation

Client:

Massachusetts Department
of Conservation &
Recreation (DCR)

Location:

Boston, MA

Services Provided:

- Provided near real-time data for informed project decision making
- Monitored strain gauges to provide sensitive load-bearing data

Value Provided:

- Data alerting of apparent structural distress in the girders enabled effective mitigation measures to be implemented

Background & Project Challenges

Storrow Drive is a major cross-town expressway in Boston, Massachusetts, and is maintained by the Massachusetts Department of Conservation & Recreation (DCR).

A portion of Storrow Drive eastbound drops into a tunnel beneath Storrow Drive westbound at the Berkeley Street Underpass. This 55-year-old section — the Storrow Drive Tunnel — carries 103,000 vehicles a day through Boston's Back Bay neighborhood, and was showing serious signs of decay. DCR began interim repairs to the tunnel.

The structural members in the roof of the eastbound tunnel showed unusual indications of structural distress. Structural engineer for DCR, designed an instrumentation program consisting of strain gages and temperature sensors to evaluate strains induced by in-service live loads and loads from controlled load tests. Strains resulting from changes in temperature will also be evaluated. The aim of the program is to help evaluate questions about the current level of safety for vehicular traffic and indications of incipient cracks in the girder webs where the diaphragm beams connect.



Geocomp Role & Accomplishments

Geocomp provided instrumentation and monitoring services by installing 20 uniaxial strain gages and 6 strain gage rosettes on the web and flanges of girders at locations specified by the structural engineers. Three thermistors were also placed onto the beams. Geocomp's *iSite*TM-HS (high speed) data loggers were installed to read all of these sensors at 50 times per second. The data are streamed through a wireless modem to Geocomp servers. The *iSite*TM-HS data loggers also send a separate stream of data consisting of readings on all sensors every 15 minutes to Geocomp's *iSiteCentral*TM system. Users access this information via a web browser to see real-time graphs of sensor readings over time.

The system produces approximately 3GB of data per day that must be processed and graphed for evaluation. Processing takes the system about one hour to process and graph 24 hours of data. The strain gages are sufficiently sensitive to detect each car traveling over Storrow Drive westbound.