CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

Bridge Monitoring

Data Acquisition for Reliable, Stand-Alone Bridge Monitoring

Campbell Scientific data-acquisition systems can support a variety of bridge monitoring projects ranging from simple beam-fatigue analysis, and structural mechanics research, to continuous monitoring of large, complex structures for performance and safety. Over the years, our systems have monitored structures, ranging from local traffic to internationally known critical bridges. Campbell Scientific is committed to providing quality instrumentation and support.

Custom Systems

Most of the systems we sell are customized. Tell us what you need and we'll help you configure a system that meets your exact needs.

Dataloggers

We offer a range of dataloggers, from the most basic system with just a few channels to expandable systems that measure thousands of sensors. Our new vibrating wire loggers provide the highest quality vibrating wire measurements in the industry. Non-volatile data storage and a battery-backed clock ensure data capture and integrity. The control functions of our dataloggers allow them to sound alarms and control devices based on time or measured conditions.

Sensors

The versatility of our systems begins with sensor compatibility—they can measure virtually every commercially available sensor—allowing them to be used in a variety of ways for a variety of measurements. Our dataloggers have many channel types and programmable inputs including vibrating wire, analog (single-ended and differential), pulse counters, switched excitation, continuous analog output, digital I/O, and anti-aliasing filter. Our dataloggers have input resolutions to 0.16 microvolts, allowing strain measurements with a resolution of a single micro-strain.

Typical Sensors

- Vibrating-wire strain gages
- Strain meters
- Vibrating-strip sensors
- Inclinometers
- Crack and joint sensors
- Tilt sensors
- Piezoresistive accelerometers
- Piezoelectric accelerometers
- Capacitive accelerometers
- Borehole accelerometer
- Force balance accelerometers
- Weather
- Foil strain gages (in quarter-, half-,or full-bridge strain configurations)
- Camera

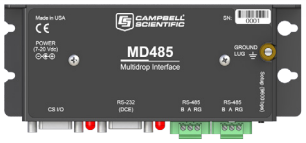
Vibrating Wire Interfaces

In addition to our vibrating wire loggers, Campbell Scientific's AVW200-series interface modules and CDM-VW300-series Dynamic Vibrating Wire Analyzers allow the measurement of vibrating-wire strain gages, pressure transducers, piezometers, tiltmeters, crackmeters, and load cells. The CDM-VW300 -series is the only true dynamic vibrating wire interface in the world.

Both the AVW200-series and the CDM-VW300-series interfaces use a spectral-interpolation approach that provides superior noise immunity and measurement resolution compared to the time-domain period averaging approach. The AVW200-series devices are optimal for systems that exclusively require measurement rates slower than 1 Hz. The CDM-VW300-series devices, are appropriate when measuring sensors at rates from 1 to 333.3 Hz.

Communications

Telecommunication options include short-haul, telephone (land-line, voice-synthesized, and cellular), radio frequency, multidrop, and satellite. Onsite communication options include direct connection to a laptop, microSD cards, CompactFlash cards, Wi-Fi, and field displays.



Software

Our Windows-based software simplifies datalogger programming, data retrieval, and report generation. The datalogger program can be modified at any time to accommodate different sensor configurations or new data processing requirements. Software provides automated alarm and communication functions.

Representative Projects

- James Joyce Bridge—Dublin, Ireland
- Bronx Whitestone Bridge—New York, NY
- Brooklyn Bridge—New York, NY
- Verrazano Narrows Bridge—New York, NY
- Williamsburg Bridge—New York, NY
- Throgs Neck Bridge—New York, NY
- Medway Bridge—Kent, UK
- Menai Bridge—North Wales
- Confederation Bridge—Prince Edward Island, Canada
- I-83 Ramp—Harrisburg, PA
- Birmingham Bridge—Pittsburgh, PA
- Sawmill Run Bridge—Pittsburgh, PA
- Neville Island Bridge—Pittsburgh, PA
- SR 33 Bridge—Easton, PA
- Girard Point Bridge—Philadelphia, PA
- Church Street Bridge—Melbourne, Australia
- David Trumpy Bridge—Queensland, Australia
- 15 Mile Creek Bridge—The Dalles, OR
- I-5 Mckenzie Bridge—Eugene, OR
- Willamette River Bridge—Willamette, OR
- I-64 over Kanawha River—Charleston, WV
- AMTRAK Susquehanna River Bridge—Perryville, MD

Bridge Monitoring Case Studies

Campbell Scientific systems have helped a variety of organizations reach their goals.

Campbell Scientific equipment was used as part of a structural health monitoring (SHM) program to facilitate the maintenance and performance monitoring of the Fremont Bridge.

Campbell Scientific system monitored thermal loading effects on bridge tie girders for the Fremont Bridge in Portland Oregon. A network of our dataloggers performed calculations on the collected data and communicated with the system via an RF450 radio network. From the extensive data that was collected, the engineers were able to prioritize their retrofitting efforts for the Fremont Bridge.

www.campbellsci.com/fremont-bridge

Our gear monitors bridge stresses while widening of the Huey P. Long Bridge in New Orleans, Louisiana. This bridge is instrumented with an array of 827 static and dynamic strain gages that measure axial and bending load effects on 433 truss members. Campbell Scientific's AVW206 Vibrating Wire Interface allowed the many vibrating wire sensors to be measured without losing data due to noise, and permitted an accelerated construction schedule.

www.campbellsci.com/louisiana-bridge

Campbell Scientific's CR1000 dataloggers monitor a lift span and counterweight system for the Interstate 5 Bridge near Portland, Oregon. The dataloggers collect structural performance data that is automatically loaded into a database and presented to the bridge engineers over a computer network. This allows the engineers to evaluate lift event data, enabling them to make quick decisions regarding the ongoing safe operation.

www.campbellsci.com/i5-bridge

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