CLEVELAND ELECTRIC LABORATORIES

Fiber Optic Sensing Solutions

FiberStrike™

OPTICAL SENSING SOLUTIONS FOR BRIDGE STRUCTURAL MONITORING

FiberStrike™
by Cleveland Electric Labs
LIGHT CAPTURING MOTION

Cleveland Electric Laboratories 361 South 52nd Street Tempe, AZ 85281 480-967-2501

www.cel-atg.com

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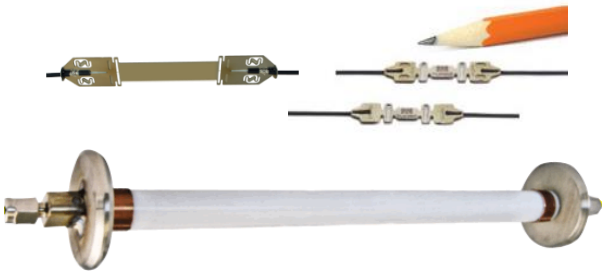
FiberStrike: An advanced fiber optic sensing platform that is flexible and scalable. System architecture facilitates configuration to monitor virtually any bridge structure. Multiple sensor types address a broad range of structural monitoring parameters.

Strain and temperature sensors



- Available in many different configurations
- Sensors may be externally bonded to new or existing structures (e.g., steel members)
- Sensors may be embedded in new construction (e.g., concrete and steel re-bar)
- Measure movements down to the picometer range
- Sensors provide continuous and valuable data on strain and tension in steel members (open or in concrete), temperature, curing, stability, wind loads, and effects of seismic activity or nearby excavations/erosion
- The same sensors used during construction may be integrated and used as part of a permanent structural health monitoring system
- Continuous monitoring facilitates predictive analysis of structural integrity and bridge health as a function of loads, age and/or later additional construction in surrounding area

Brainy Bolt sensors

- Brainy Bolt sensors allow continuous measurement of elongation and tension on a structural fastener in any location
- Sensor may be integrated into virtually any bolt, rivet, stud or screw having a body diameter of 12.7mm / 0.50” or greater
- Integration of sensor in fastener has no effect on ultimate tensile strength of fastener
- 20-30 sensors may be multiplexed on a single optical fiber, facilitating ease of installation

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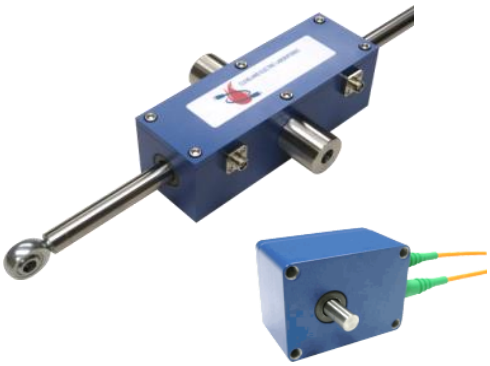
Accelerometers

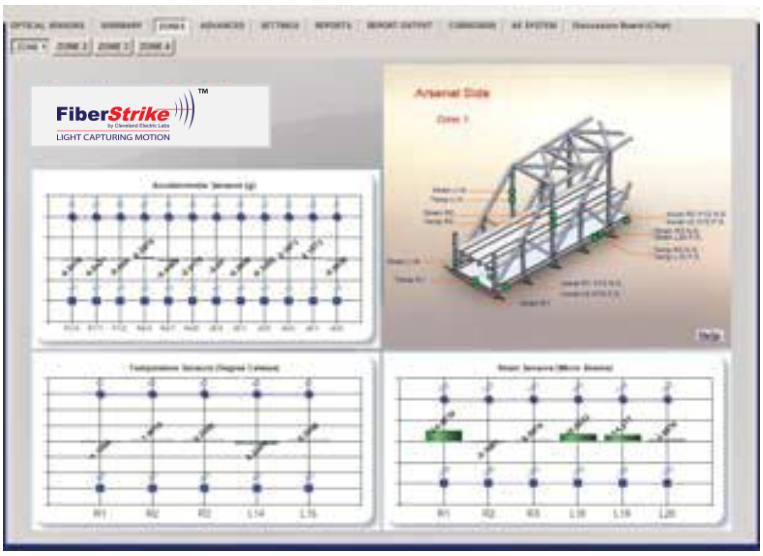
- Monitoring of wind- and traffic-induced acceleration and instantaneous loads
- Monitoring of vibrational modes, effects of seismic activity or nearby construction activities

Rotary and linear position sensors



- Linear travel up to 18” stock size, longer travels available
- Linear sensor resolution of 0.005”
- Rotation full 360°, rotary resolution of 0.25°
- Available in stainless steel for extreme environments
- Useful for monitoring bridge expansion joints and moveable sections

IntelliOptics™ Software



- Graphic user interface (GUI) is customized for every bridge
- GUI is intuitive and designed to be easily used by anyone without requiring detailed training
- Software monitors all installed sensors, gathers data, and provides alerts and analysis when any sensor parameters approach or exceed predefined limits
- IntelliOptics software communicates with multiple sensing systems, displays status and provides information via one centralized user program that can be accessed remotely

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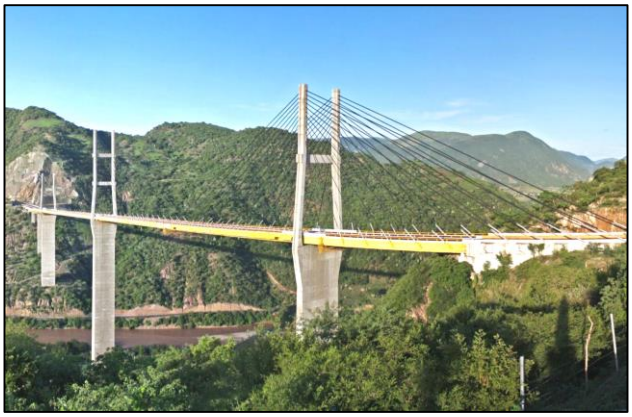
Advantages of the FiberStrike system for bridge structural health monitoring:

- All FiberStrike sensors are passive, emit no signals and require no electrical power
- Sensors are immune to electrical interference and degradation due to harsh environments
- Hundreds of discrete sensors may be interrogated over one fiber bundle
- Multiple sensor types may be mixed and matched on one fiber
- Nonconductive interconnecting optical fibers may carry data as well as sensor information
- Multiple optical fibers are easily deployed for redundancy
- Sensors may be 25+ kilometers from monitoring equipment, no booster amplifiers required



FiberStrike sensing systems have been installed and proven effective on multiple bridges, both domestically and internationally. Cleveland Electric Laboratories has effective solutions to help meet your bridge structural health monitoring requirements, and we invite your inquiries.

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