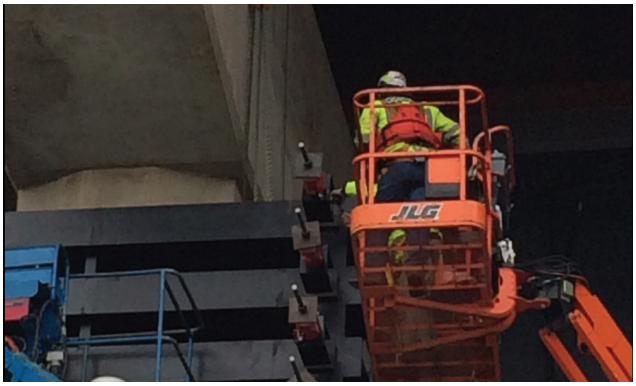


BRIDGE INSTRUMENTATION AND STRUCTURAL HEALTH MONITORING

A SUCCESSFUL BRIDGE-MONITORING PROGRAM REQUIRES APPROPRIATE PLANNING, DESIGN AND EXECUTION. TO FULLY MEET THE OBJECTIVES OF SUCH A PROGRAM, SPECIAL ATTENTION MUST BE GIVEN TO THE SPECIFICITIES OF EACH BRIDGE THROUGHOUT THIS PROCESS.

The primary function of monitoring is to ensure the longevity and safety of a bridge as well as optimizing its management. To implement corrective measures and maintenance actions, monitoring must enable the timely detection of any condition or behavior that could deteriorate the bridge, deem it unsafe or potentially result in its failure.

References

- Salzachbruecke Mittersill – Austria
- Schladming Bridge – Austria
- Pont canal – Belgium
- Alexandria Bridge – Canada
- Moses Wheeler Bridge - USA , 2015
- New Mexico I10 Bridge - USA , 2004
- Champlain – Canada
- Esplanade Riel – Canada
- Jacques-Cartier – Canada
- Joffre – Canada
- Laviolette – Canada
- Pont de l'Ile d'Orléans – Canada
- Wotton – USA
- South Perimeter Bridge – Canada
- Turcot Bridge – Canada
- Peldar – Colombia
- Vecchio – Corsica
- Krk Bridge – Croatia
- Alexandre III – France
- Bourgogne – France
- Elorn – France
- Pont d'Aquitaine – France
- Pont de Normandie – France
- Viaduct Millau – France
- Baiersdorf Road Bridge – Germany
- Lehrter Bahnhof Berlin – Germany
- Rio Puerco – USA

BRIDGE INSTRUMENTATION AND STRUCTURAL HEALTH MONITORING

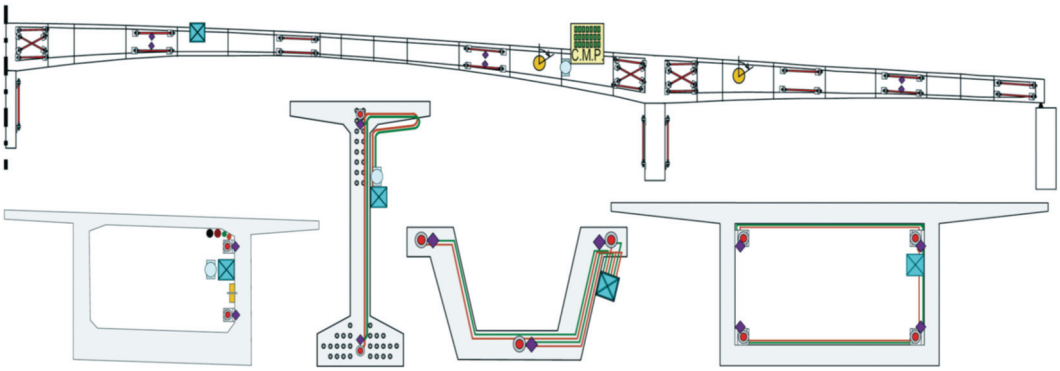
The monitoring program plays a fundamental role during the construction phase as it enables the verification of design hypotheses and construction processes, affecting, in some cases, the construction rate of the bridge and its overall quality. Most defects are already introduced at the time of construction.

Monitoring also allows performance evaluation of new materials and technologies used in bridge construction and rehabilitation. This objective is easily achieved with fiber optic sensors, since these sensors effectively integrate in new materials such as fiber-reinforced polymer composite.

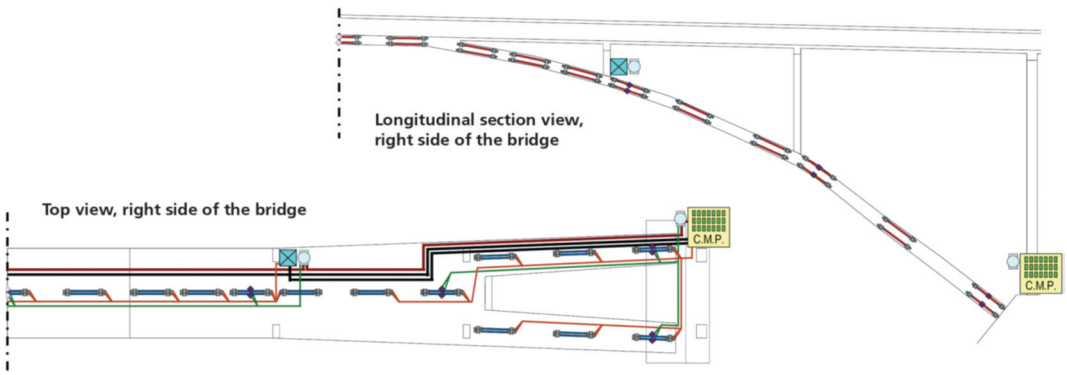
Furthermore, fiber optic sensors adapt perfectly to long-term monitoring of bridges behavior as well as short-term monitoring of the bridges dynamic behavior under traffic load.

Finally, monitoring can be used as a tool for the "supervised lifetime extension" of bridges approaching the end of their life or in need of major repair. It ensures that such bridges are operated safely while allowing the postponement of major investments and traffic disruptions.

CONTINUOUS BEAM BRIDGE

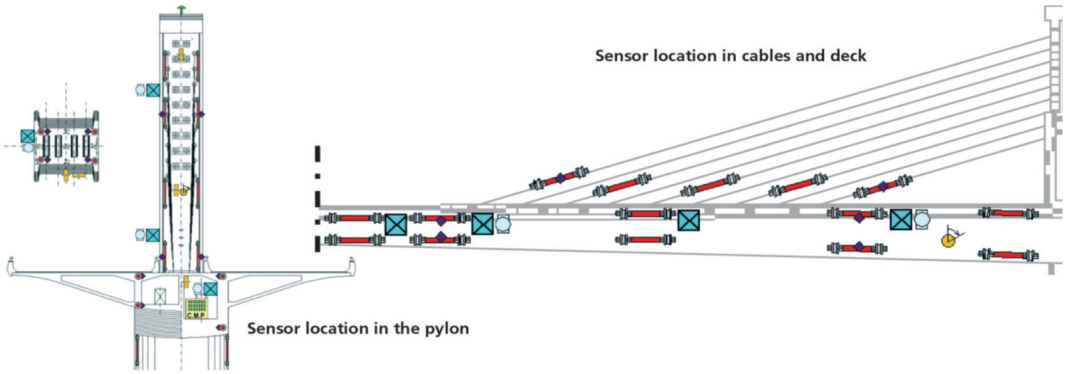


ARCH BRIDGE

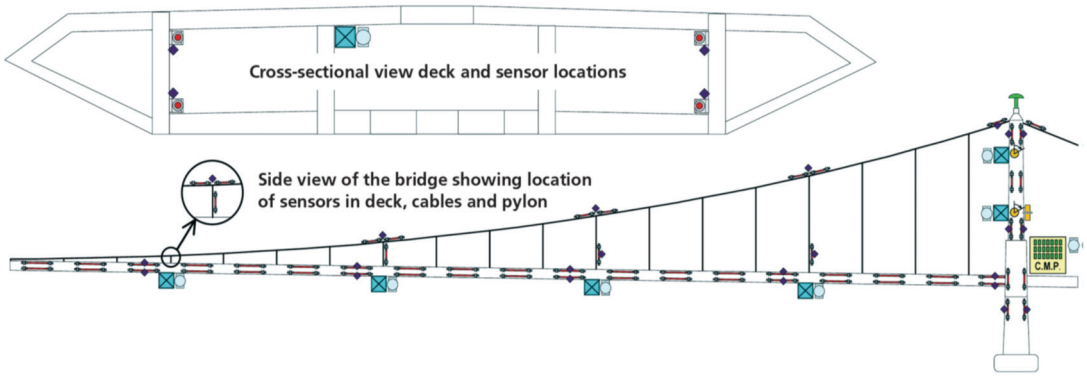


Bridges - Application Note

CABLE STAYED BRIDGE



SUSPENDED BRIDGE



Sensors and Sensors' Topologies

SOFO Standard Sensor - average strain monitoring

Pairs of crossed SOFO - average shear strain

Pairs of parallel SOFO Standard Sensors - average curvature monitoring

Chains of parallel SOFO Standard Sensors - deformed shape of beams and distribution of relative displacements perpendicular to beam

SOFO Inclinometer - absolute rotation

SOFO Thermocouple - T° monitoring

Sensors Installation Kits - for concrete, steel, composite surfaces

Intermediate Connection Boxes (I.C.B.) - centralization and connector protection for group of sensors

Extension Multifiber Cables - to connect group of sensors (linked to connection boxes) with remote reading unit

Central Measurement Point (C.M.P.) Reading Units.

SOFO VII Reading Unit - quasi-static, automatic, remote, scheduled monitoring in Central Measurement Point - C.M.P.

SOFO Dynamic - real-time dynamic monitoring (in C.M.P)

SOFO Bridge (in C.M.P) and ADAM Modules (in I.C.B.) -thermocouples integration

SOFO SDB Software - management, scheduling and data collection

SOFO DiView Software - visualization and export in forms of tables, diagrams, images and web site, setting warning

SOFO SPADS - curvature automatic analysis, deformed shape automatic analysis, data export

Engineering - support on selection of monitoring strategy including sensors' configuration, performances and feasibility study

On-Site Support - during installation of equipment

Bridges - Application Note

Long Base Interferometric Fiber Optic Sensors SOFO

Long Base Sensor SOFO

Distributed Fiber Optic Brillouin Analyser DiTeSt

Distibuted Fiber Optic Strain Gauge DiTest Smart Tape II

Fabry-Pérot Fiber Optic Sensors - SFO-W

Vibrating Wire Sensors Strain Gauge EM Series

Electrolytic Tiltmeter

Electrical Sensors Including Resistive, Inductive, Potentiometric and LVDT

BRIDGE INSTRUMENTATION AND STRUCTURAL HEALTH MONITORING

Roctest

Roctest is the leading developer, manufacturer and supplier of innovative sensing technologies based on vibrating wire and fiber optic sensors for geotechnical and structural instrumentation.

We are featuring a complete line of conventional sensor-based solutions ranging from the ultra-robust traditional vibrating wire technology to state-of-the-art fiber-optic technology used for the measurement and monitoring of geotechnical projects and structural health monitoring (SHM) of critical assets such as: dams, tunnels, mines, buildings, bridges, nuclear power plants and many other structures too numerous to list.

Roctest offers a wide range of pressuremeters, rock dilatometers, laboratory and in-situ testing equipment for soil and rock.

Available Application Notes

- FO Leak Detection for Dams and Dikes
- Dam & Dike Instrumentation and Safety Monitoring
- Tunnel Instrumentation & Structural Health Monitoring
- Bridge Instrumentation & Structural Health Monitoring
- Building Instrumentation & Structural Health Monitoring
- Historical Monument Instrumentation
- Geotechnical and Structural Monitoring
- Nuclear Power Plant Instrumentation
- FO Movement Detection in Tunnels
- FO Leak Detection for Chemical Plants
- FO Leak Detection for Pipelines
- Storage Facility Instrumentation
- Cliff Instrumentation

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