

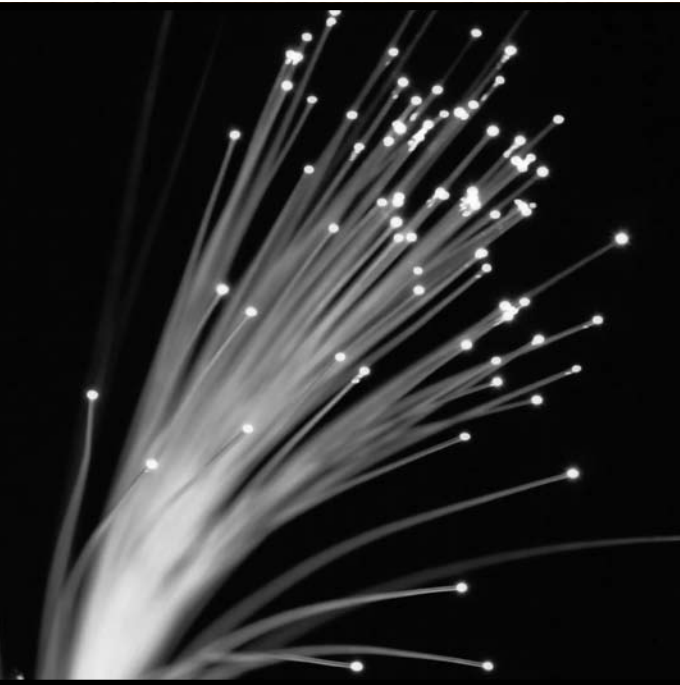
# Fibre Optic Structural Monitoring

FIBRE OPTIC SENSOR

## FEATURES

- Excellent long term stability
- Short Measurement time
- No Calibration required
- Easy & fast to install
- Automatic & / or remote measurement
- Insensitive to temperature, electromagnetic fields, humidity, vibrations, and corrosion
- Long base length: 25cm - 10m
- Deformation measurement
- Resolution: 2  $\mu\text{m}$  (2/1000mm)

The SOFO measuring system is based on the principle of low-coherence interferometry (see figure). The infrared emission of a light emitting diode (LED) is launched into a standard single mode fiber and directed, through a coupler, towards two fibers mounted on or embedded in the structure to be monitored. The measurement fiber is in mechanical contact with the structure itself and will therefore follow its deformations in both elongation and shortening. The second fiber, called reference fiber, is installed free in the same pipe. Mirrors, placed at the end of both fibers, reflect the light back to the coupler which recombines the two beams and directs them towards the analyzer. This is also made of two fiber lines and can introduce a well known path difference between them by means of a mobile mirror.



## APPLICATIONS

- Bridges
- Buildings
- Dams
- Nuclear
- Laboratory
- Harbours
- Tailings Dams

On moving this mirror, a modulated signal is obtained on the photodiode only when the length difference between the fibers in the analyzer compensates the length difference between the fibers in the structure to better than the coherence length of the source (in our case some hundreds of mm).

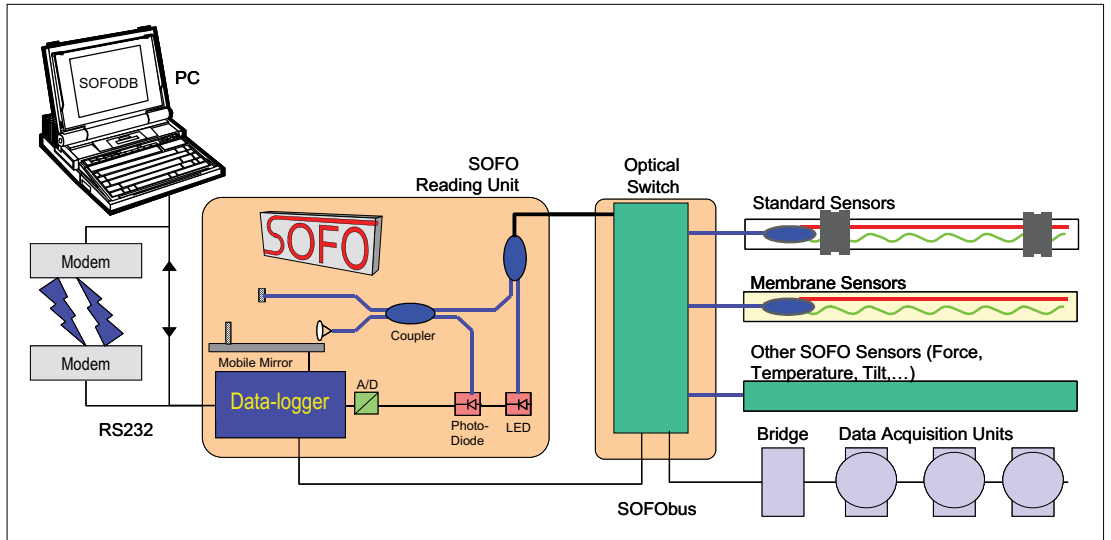
Each measurement gives a new compensation position reflecting the deformation undergone by the structure relatively to the previous measurement points.

The Reading Unit can therefore be disconnected and used to monitor other fiber sensors and other structures. If multiple sensor need to be measured automatically, in optical switch is installed. The SOFO unit is capable of storing measurements and later transfer them to the data acquisition PC via a cable or a modem (wired or wireless). Conventional (electrical) data acquisition devices can be connected to the SOFObus.

# TECHNICAL SPECIFICATIONS

## SOFO MEASUREMENT TECHNIQUE

The SOFO® Reading Unit is fully compatible with the SOFO® SDB software suite including SOFO® SDB Pro, View, SPADS and RealTime (see separate datasheets). The results can be stored in a standard SDB database and can be integrated with measurements from other sensors (e.g. static SOFO®, ADAM, DiTeSt, 3DeMoN). The user can therefore view and analyze all its data with a single interface.



## SOFO SYSTEM PERFORMANCE

<b>Max Cable Length</b>	up to 5km
<b>Measurement Speed</b>	less than 10 seconds for each sensor
<b>Calibration</b>	not necessary
<b>Number of Channels</b>	unlimited
<b>Datalogger Capacity</b>	10,000 expandable to 80,000
<b>Measurable Deformation</b>	Max 60mm
<b>Measurement Range</b>	-0.5% (shortening) to +1.0% elongation

