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2011A Fiber Optic Strain Gage

Strain gage is a key device to measure deformation of an object. Many of weighing systems and vehicle existence detection systems use it to sense the bending of mechanical beam and calibrate the level of bending to correspond to the amount of applied load.

Traditional strain gage requires three electrical wires to operate – power, ground, and signal. The use of electricity limits the operational distance of the sensor. In order to ensure that the system can operate 24/7 and battery is needed. These requirements bring the possibility of short circuit, electromagnetic interference, and limited lifetime of product usage.

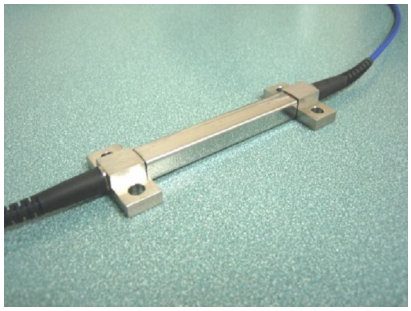
Mounting of traditional strain gage is another concern. In general, adhesive is used for attaching the strain gage to the structure. The quality of applying the adhesive decides the sensitivity and accuracy of the measurement. In addition, adhesive has limited lifetime by nature. This means maintenance and service are very important after installation. This increases the cost to ownership during the use of traditional strain gage.

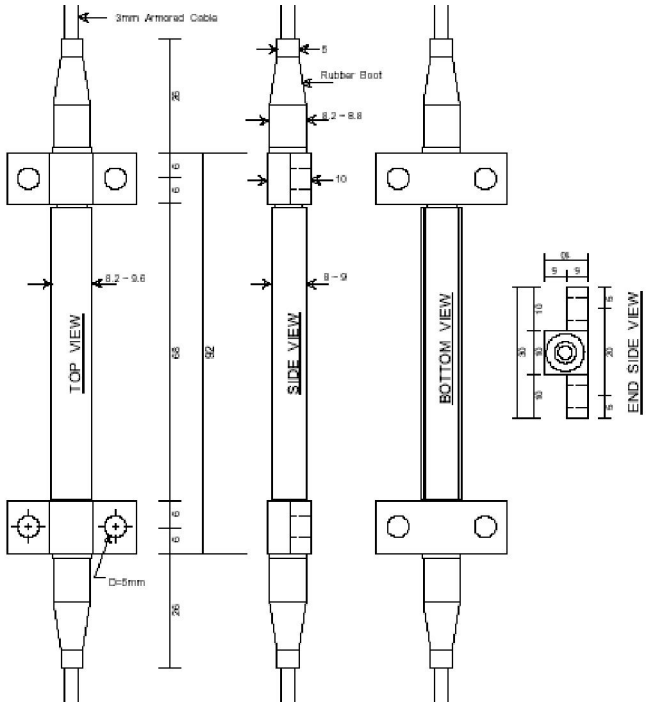
The fiber optic strain gage that Fibera has invented eliminates all these concerns. A system can be installed at many kilometers away without the need of supplying electricity and the inspectors can monitor the object conditions from his remote office through optical fiber.

Fibera's fiber optic strain gage not only can be welded or bolted to the surface of the monitored structure, but also embedded into a concrete structure. Once it's installed, there is very little maintenance required. There is neither degradation in measurement performance nor deterioration attaching to the structure, since no adhesive is used.

The fiber optic strain gage is well packaged in stainless housing. The stainless housing not only protects the sensors from mechanical damages, but also prevents the intrusion of moisture. Therefore, the fiber optic strain gage can work reliably under harsh environmental conditions.

Fibera's user friendly fiber optic strain gage minimizes the installation labor and time. In general, it takes only a few minutes to install a fiber optic strain gage to the structure.





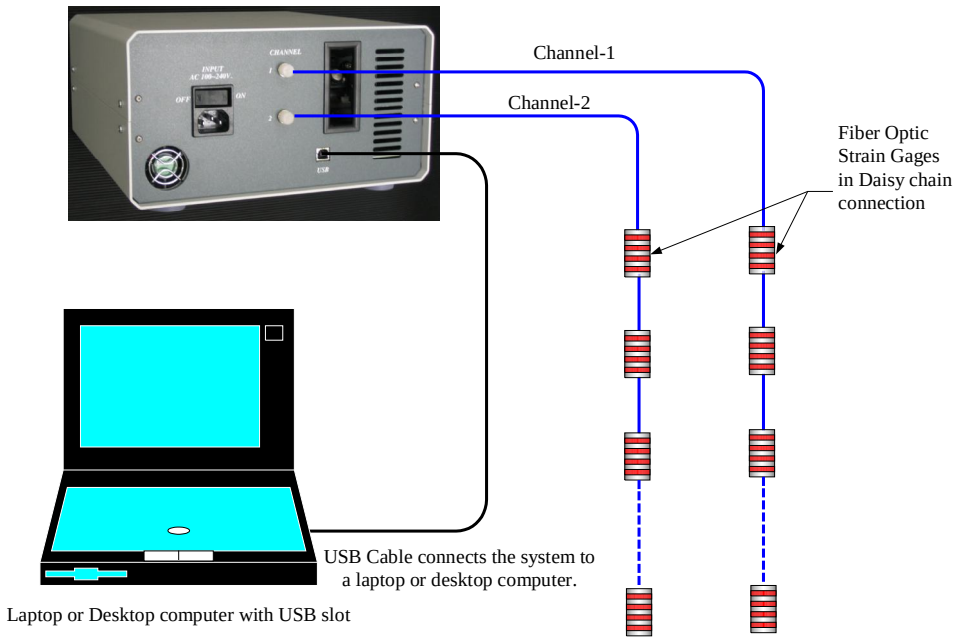
Some of the applications for Fibera's fiber optic strain gage include:

- load cell,
- vehicle existence detection,
- parking lot vehicle parking management,
- street intersection signal light management,
- traffic counter,
- vehicle weigh in motion,
- railway track defect detection,
- railway track infrastructure,
- earth movement,
- tunnel and underground excavation stability,
- retaining wall stability,
- bridge,
- oil pipe / chemical pipe monitor applications,

Fibera's fiber optic strain gage has the following characteristics:

- **All weather** – It's a passive device and does not require electricity to operate. Therefore, moisture such as snow or rain will not cause short circuit to the device.

- **All optical** – It's an optical device. Therefore, it will not cause electromagnetic interference to the surrounding instruments. Vice versa, its performance is not affected by the electromagnetic noise by the surrounding instruments.
- **Long range** – The monitor station can be located at far distance from the measurement site with the link of optical fiber. It's therefore an ideal device for remote monitor applications.
- **Economical** – Traditional strain gage is electrical and requires three wires per sensor. When multiple gages are used, they need to be connected in parallel. Our fiber optic strain gage can be connected in Daisy chain, therefore much lower cost.
- **Easy installation** – Our fiber optic strain gage can be easily installed by welding, bolting, or embedded into concrete structures. In addition, on optical fiber can link multiple fiber optic strain gages. This greatly reduces installation complexities and cost.
- **No electricity required** – Electricity sometimes is scarce at construction site. Fiber optic strain gage uses laser beam propagation through optical fiber to detect signals.
- **Extremely reliable** – Traditional strain gages uses adhesive to attach to the measured structure. The adhesive will degrade through time and lose accuracy, especially when mounted on structure in outdoors. Our fiber optic strain gage can be welded, bolted, or embedded to the structure, therefore no degradation to be concerned. The consistency of accuracy is maintenance.
- **Low maintenance cost** – There is little, or no maintenance is required after installation. This make it very low cost of ownership through the use of our fiber optic strain gage.
- **Athermal performance** - Traditional strain gage is sensitive to temperature, which induces uncertainties to the measured data. Our fiber optic strain gage is athermal, therefore, what observed data is the actual deformation of the structure.



SPECIFICATIONS

Parameters	Specifications
Operation Range	+/- 1,000 µS
Resolution	0.3 µS
Accuracy	+/- 1 µS
Thermal Stability	< 1 µS/°C
Fiber Type	SMF – 28
Storage Temperature	-40°C to 85°C
Operating Temperature	-5°C to 70°C
Fiber Length	1.5m
Fiber Bend Radius	>25mm

Contact

Please contact Fibera, Inc. at sales@fiberausa.com or 408-492-9555 for details.