2000A FIBER OPTIC STRAIN MEASUREMENT SYSTEM

- REAL TIME REMOTE INTERROGATION
- HIGH DENSITY MAPPING GRID
- EXACT GEOGRAPHIC LOCATIONS
- CENTRALLY MONITORED
- FIBER OPTIC
- ALL WEATHER, ALL YEAR ROUND
- PRE-WARNING
- DISASTER PREVENTION
- NO ELECTRICAL INTERFERENCE

- OVER HEATING
- UNDERSURFACE
- EARTH MOVING
- MATERIAL FATIGUE
- STRUCTURE SHIFTING
- CRACK AND HOLE PROPAGATION
- REMOTE LOCATION
- HARSH ENVIRONMENT

The Fibera 2000A Fiber Optic Monitoring System is a system that identifies defects occurred in a structure that can not be easily detected from its surface. The integrity of structures such as building, nuclear reactor, power plant, rapid transit system, oil pipe, aircraft, and bridge, etc. that are vitally important to our lives, can be closely monitored and issue warnings if a defect is occurring. By doing so, major accident and disasters can be prevented.

The Fibera 2000A system is an invention of Fibera, Inc. The system is installed in a structure and is able to detect structure defects caused by material fatigue, material distortion, and cracking, earth moving, etc. It's high sensitivity allows the user to not only identify the exact location of the defect, but also the scale of defect. The growth and propagation of the defect can also be closely monitored so a pre-warning can be issued when its impact reaches a threshold.

The power plant, nuclear reactors, and rapid transit system in earth quake active areas can be benefited by adopting the Fibera 2000A Fiber Optic Monitoring System. Material fatigue, minor cracks and holes of an aircraft can be identified very quickly by the Fibera 2000A Fiber Optic Monitoring System. Preventive measures can be conducted to avoid serious accident.

The defect detection is conducted by an optical sensor and linked to the central controlling center via optical fiber. It's all optical and therefore doesn't produce electrical interference. There is no fire hazard because no power is used. The system can be configured to monitor multiple locations at a remote location, or in a harsh environment that is harmful to human health. All locations are centrally monitored and their conditions are reported on real time basis.

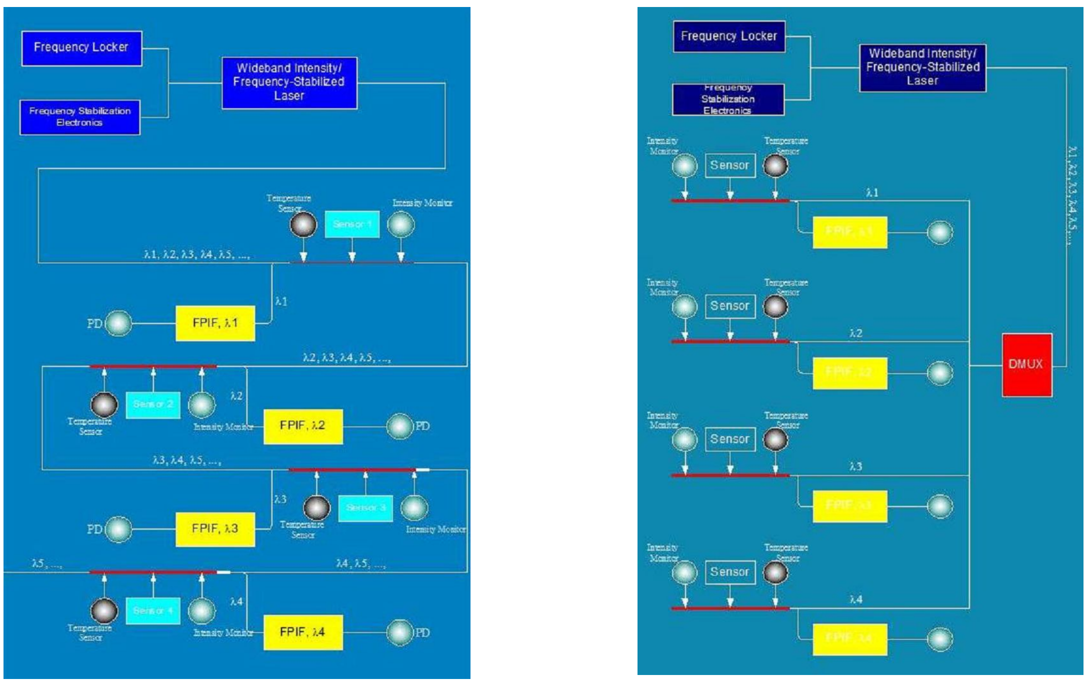

Figure 1.a.Daisy-Chain configuration, Figure 1.b. Parallel configuration of the Fiber Optic Monitoring System.

The Fiber 2000A Fiber Optic Sensing Monitoring System can be used in series or in parallel configuration, as shown in Figure 1.a. and 1.b. Please consult with Fibera Inc. for the selection of this system.

Fibera Inc. has developed the 2000A fiberoptic sensing monitoring system**,** in meeting the above criteria. It's accurate, reliable, and cost effective. In addition, it can be remotely monitored, produces no electrical interference, and also is immune to the electrical noise created by the moving trains. It requires no electricity on-site and can be used 24 by 7.

This fiber optic sensing system, developed with Fibera's advanced technology, can be embedded in the rubber, concrete, or welded/bolted to steel frame to detect the deformation of the target structure. The real-time output signal is very accurate can be used to differentiate the type of potential obstructions and to diagnose any safety, security and operational problem

This system is capable to monitor the response of different type of sensors including strain, pressure, temperature etc.

Figure 2. Fibera 2000A Fiber Optic Sensing Monitor System

The Fibera 2000A Fiber Optic Sensing System consists of a central monitoring system unit, optical fiber link, and numerous types of athermal fiberoptic sensors. The central system is comprised of a tunable light source, a receiver, and a microprocessor unit. The laser light travels through the optical fiber links to the sensors. These sensors are attached underneath or embedded in the slabs. When the slabs are not under weight, the sensors will respond to their specifically calibrated laser wavelengths (the "resonant wavelength") during manufacturing. When the target structure deforms, the sensors stretches or compresses proportionally with respect to the level of deformation, which results in changing the "resonant wavelengths" of the sensor. Each sensor will respond with different amount of shift in "resonant wavelength" owing to different installed locations. This change of "resonant wavelengths" is detected by the system receiver and the distribution of weight is calculated and analyzed by the microprocessor. Figure 3. describes the simplified principle of Fibera's athermal fiberoptic sensor.

The operation is straightforward and the sensors are packaged for ease of installation. Since the optical fiber and sensors are all made of silica; it's immune to moisture and can work in wide temperature ranges. Typical working temperature is between –10° and 70° Celsius.

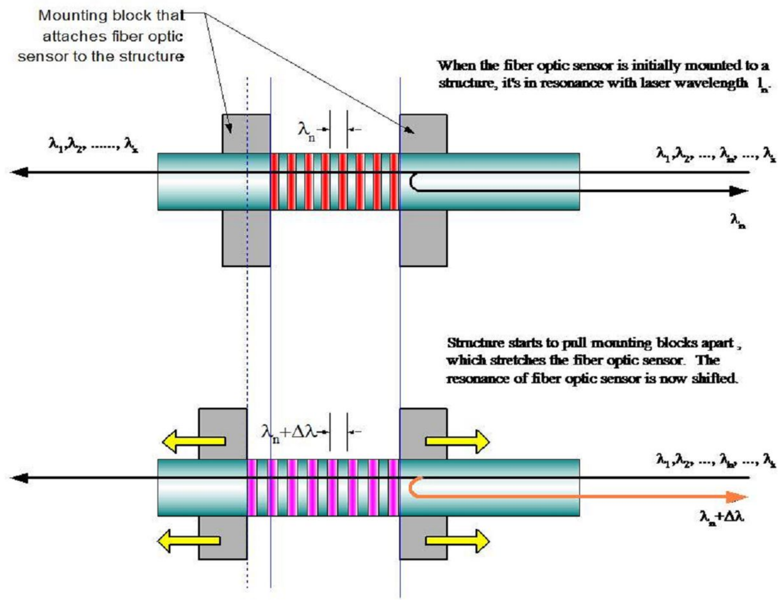

Figure 3. Fiberoptic sensor operating principle.

SPECIFICATIONS

Parameters	Units	Value
Power supply voltage	Volts	12V-DC
Power supply current	A	0.7/0.3 (max)
Power Consumption	Watts	50 (max)
Operating Temperature	°C	-10° to +60° C
System Dimensions	mm	382 x 255 x 68
Optical/Electrical		
Laser Power	10mW max	
Optical Connector	FC/APC	
Network Connection	Thru Notebook PC	
Sensors/Channel	20 max. at 250GHz spacing	
Number of Channels	2	
Local Storage	40GB	
Resolution	1 µS	
Repeatability	±2 µS max	
Sample Rate within Ch.	> 10Hz (resolution dependent)	
Sample Rate Ch. To Ch.	Synchronous	
Monitoring Distance	> 10 Kilometers	