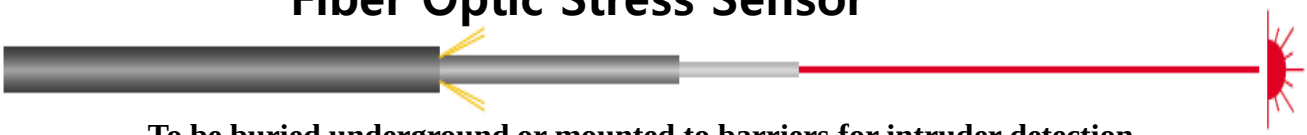
2018 Catalog

FOSS

Fiber Optic Stress Sensor



To be buried underground or mounted to barriers for intruder detection

- **Free from nuisance alarm**
- **Invisible to intruder**
- **Success Rate of detection : 95% or over**
- **Locate intruder presence within ± 25 meters**
- **No filed equipment up to 40km**
- **Easy to install & maintain**








FIBERTRON CO., LTD.

Innovative Fiber Optic Security
& Safety Systems Manufacturer

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Development Background

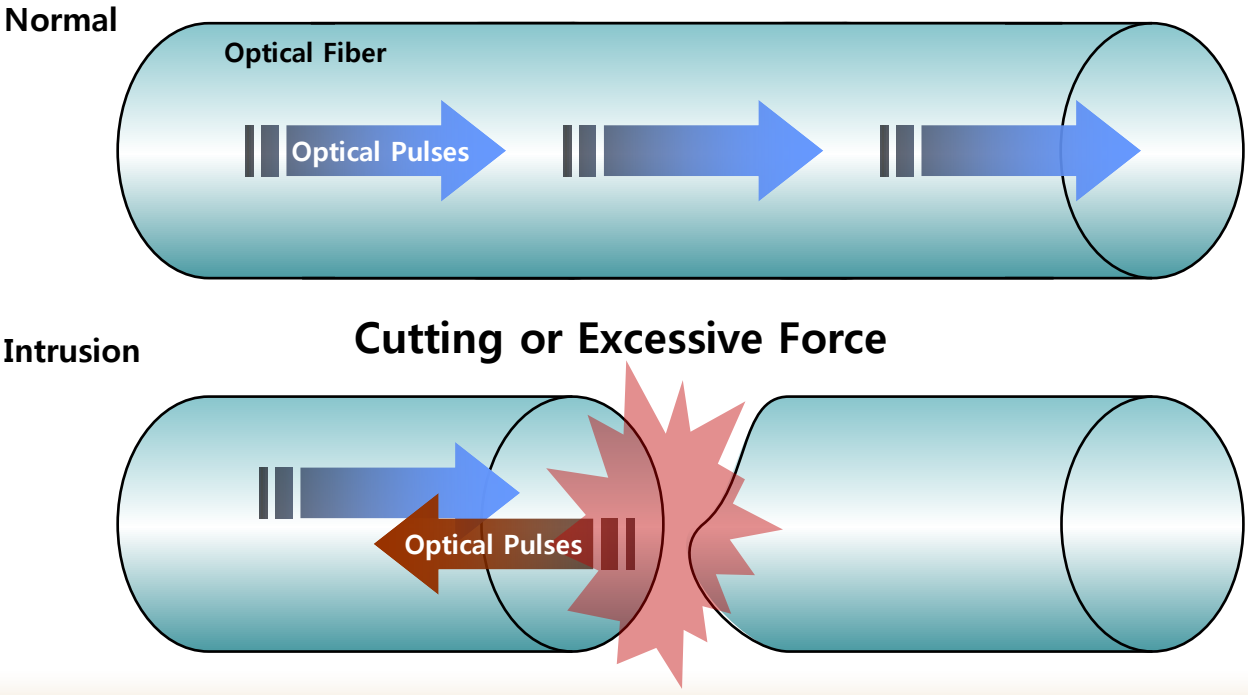
FOM at Saudi Top Military Site Wall 2015 AUG

FOM at Korea Top Gov't Site Fence 2015 MAY

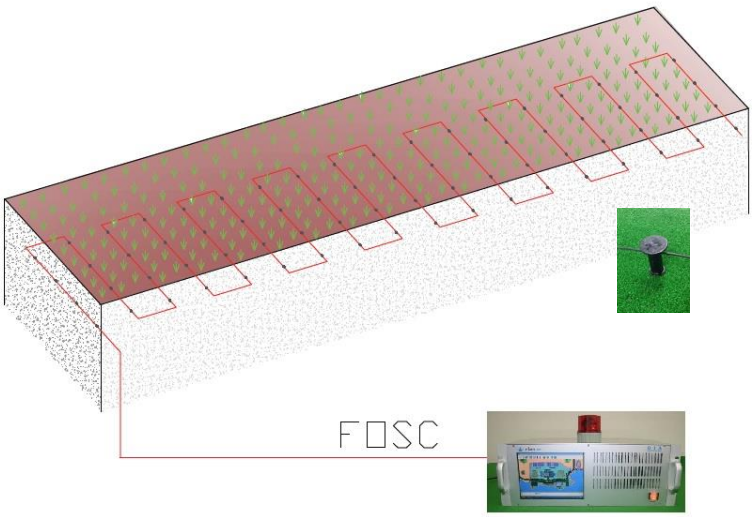
FOSM (Fiber Optic Security Mesh) operates based on the unique Optical Radar principle and throughout its worldwide installations over 15 years has been reputed as the unique foolproof accurate intrusion detection system being free from nuisance alarm. However FOSM costs high relatively and its application depends on fence type and perimeter condition.

Over the world exists no reliable intrusion detection system available for pipe line protection and for intruder disturbing barrier such as concertina and marine barrier.

Recently Fibertron Co., Ltd. presented **FOSS** (Fiber Optic Stress Sensor) as an extended application of FOSM technology to be buried underground or mounted to barriers so as to trigger alarm at intruder's disturbances and locate within ± 25 meters being free from nuisance alarm. The FOSS uses FOSC in combination with a number of appropriate mechanical parts (tiny pipe, rod, wire, etc.) as per specific application and shall provide new pipeline protection or detect intruder disturbances to barrier for the highest cost benefit which has not been seen ever.

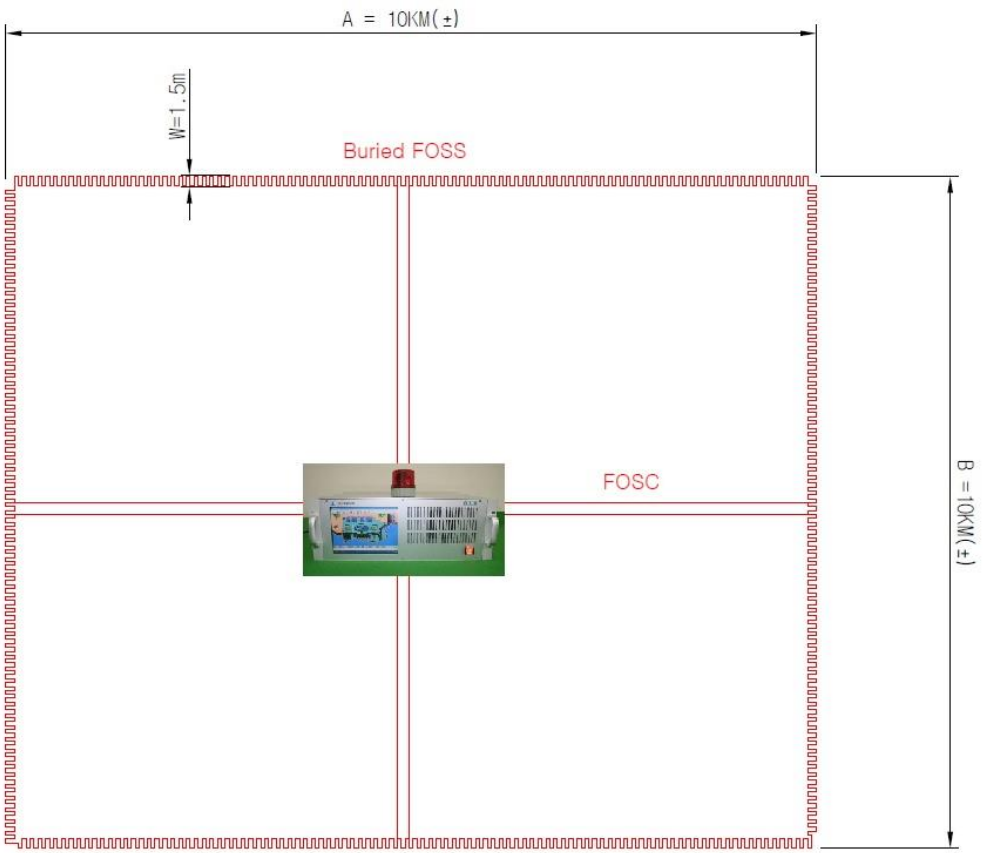


Buried FOSS under Grasses

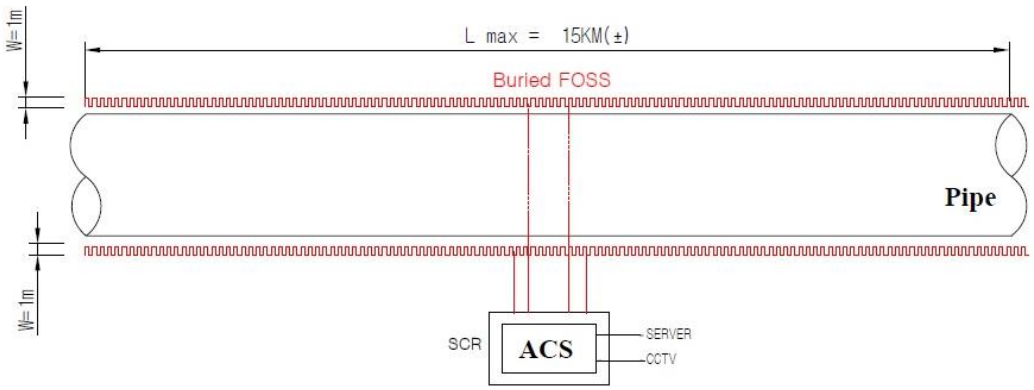


Bury FOSS in zig-zag pattern under grass or soft ground in the vicinity of the fence/wall to trigger an alarm at an intruder presence and locate accurately.

Buried FOSS diagram along 10KM x 10KM



Buried FOSS to protect Pipeline(s)



Here describes ,for example, **FOSS** (Fiber Optic Stress Sensor) buried nearby 200km pipeline(s).

Bury **FOSS** under ground along both sides of pipeline(s) to detect intruder presence in close proximity to the pipeline(s) on the soft ground. Presence of heavier vehicle such as poclain or car should be surely detected.

A **FOSS** (Fiber Optic Stress Sensor) shall be buried in zig zag patter of 1 meter thickness nearby pipelines(s) and shall be connected to one of 15 **OSU** (Optical Sensing Unit) at 15km spacing typically. All the fifteen **OSU** along the 200km pipeline(s) shall be connected to & controlled via WAN or SMF by **ACS** (Alarm Control Station) at **SCC** (Security Control Center).

Each Optical Port of **OSU** shall periodically inject Infrared Laser pulses into each FOSS to identify intrusion from the presence of abnormal Optical echoes related by external pressure and report abnormal Optical echoes to ACS for triggering alarm and locating the intrusion spot within ±15meters on its own map .

Each **OSU** should be capable to detect up to four (4) simultaneous intrusions per 15km .

The system shall be free from nuisance alarm being immune to such environment effect as rain, sand storm, air jet, vehicle vibration, lightning, thunder, power line, EMI/RFI, UV rays, temperature variation, falling debris, birds etc.

Security Matt

Security Matt between two military fences

Security Matt, Top

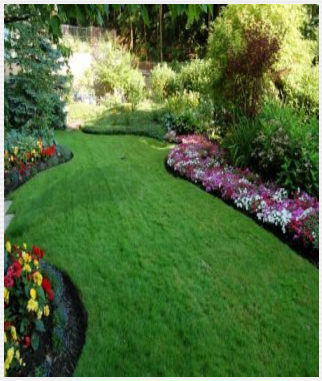
Buried FOSS under Lawn

Buried Carpet, Red

Buried FOSS near by Rails

Security Matt, Bottom

Buried FOSS under Grasses



Buried Carpet, Green

Security Matt consists with a Matt and FOSC (Fiber Optic Sensor Cable) attached in zig-zag pattern to the Matt bottom with fixture. Either one or both ends of FOSC shall be connected to OIA (Alarm Control Station) which periodically pumps Infrared pulses in to FOSC and trigger alarm and locate intrusion accurately from the abnormal Optical echoes related to the stress by intruder presence on the Matt.

The Coconut Matt is in widespread use to provide soft & pleasant way for walkers & pedestrians preventing the road surface from flood, grasses etc. In addition to this, the Security Matt having sensing capability itself shall protect the client facility/area from intrusion with following advantages;

- Hidden to intruder
- Easy to install
- Wide application unlimited by terrain surface condition
- Free from nuisance alarm
- Locate accurately within ± 15 m
- No field equipment up to 10KM
- Minimum maintenance
- Long life time use

For other than Coconut Matt, a FOSS can be buried under carpet or grasses or gravel near by rails to alarm at intruder presence and locate accurately.

Specification of Security Matt

- Coconut Matt Thickness : 40mm, typical
- Matt Width : 1 to 2 meters, typical
- Matt Weight : 8kg / square meter
- Material : Coconut
- Detection Coverage per OIA : 1.5M x 10KM
- Location Accuracy : ± 15 m, ± 25 m, ± 50 m, ± 100 m, Optional
- FOSC diameter: 3 mm
- Fiber Grade : MMF
- Immune to weather, free from nuisance alarm
- Power requirement for OIA : AC220V±10% 50/60Hz, 100Watt approx

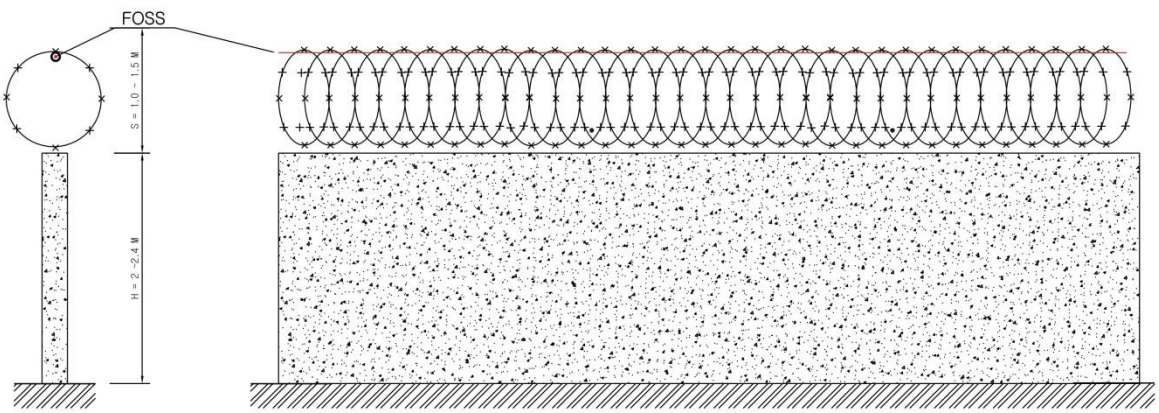
To mount FOSS on the concertina top on the Wall

The FOSS was invented in unique design comprising a number of passive elements such as Sensing Bar, Tension Wire, Support and FOSC (Fiber Optic Sensor Cable) so as to sense intruder presence in the unit of 1.5M segment and its functioning can be easily illustrated by the Spine Analogy.

The Human Spine is formed of 26 small segments. Each segment is only a few centimeters. All 26 spine segments share the same internal nerve which is connected to the brain. Tiny transverse impact to any spine segment by injury or disease will exert stress to the internal nerve and the nerve will send a pain signal to the brain for recognizing the stress.

The FOSS mounted to the 500M x 500M Concertina comprises 1,340 segments which are typically 1.5M long. All the 1,340 segments share the same FOSC connecting to OIA (Optical Intrusion Alarm) at SCC (Security Control Center). The FOSC functions as a nerve. Intruder presence on any one of FOSS segments shall exert transverse stress to the FOSC to generate abnormal Optical backscatter to the OIA for recognizing the stress and triggering alarm.

Both ends of 500M x 500M FOSS shall be connected via FOSC to OIA(Optical Intrusion Alarm) at SCC (Security Control Center).

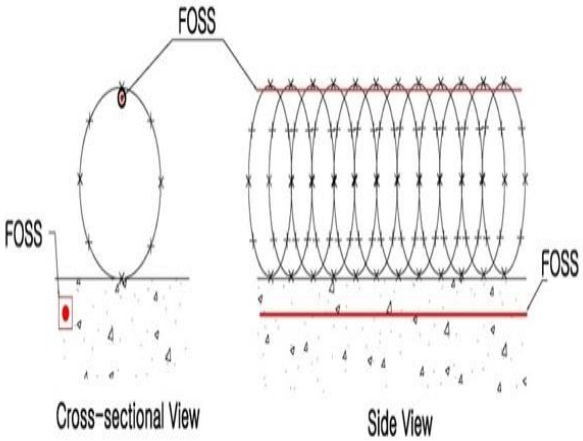


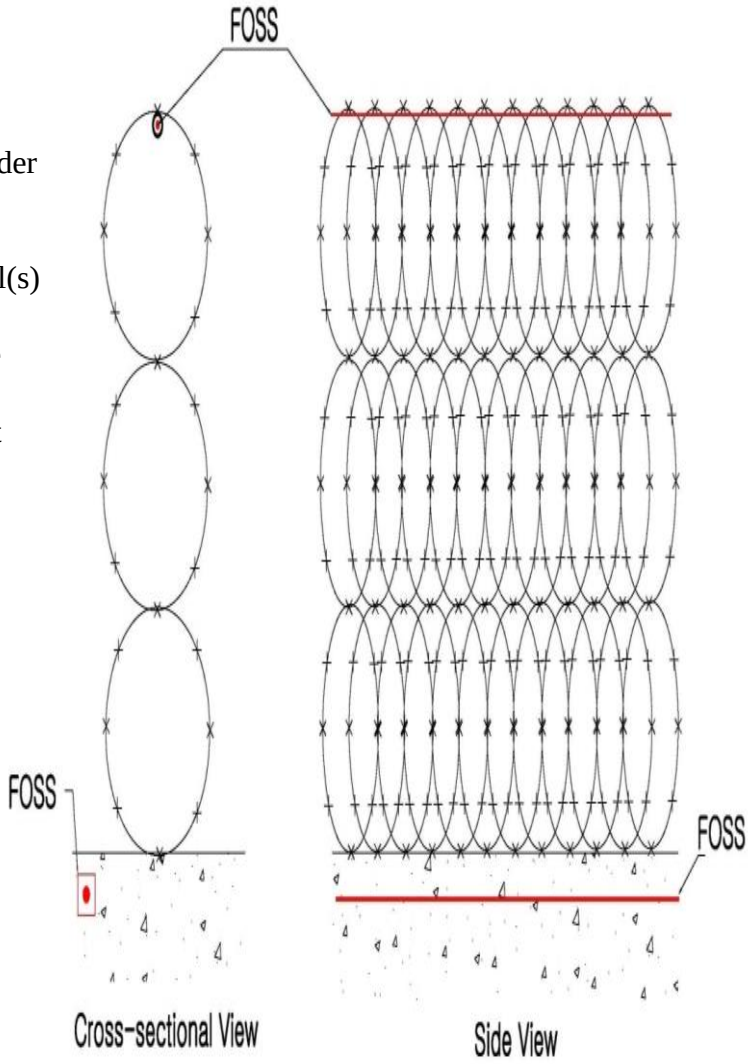
FOSS detecting Intruder Climbing Concertina Barrier

Concertina mounted to a Wall

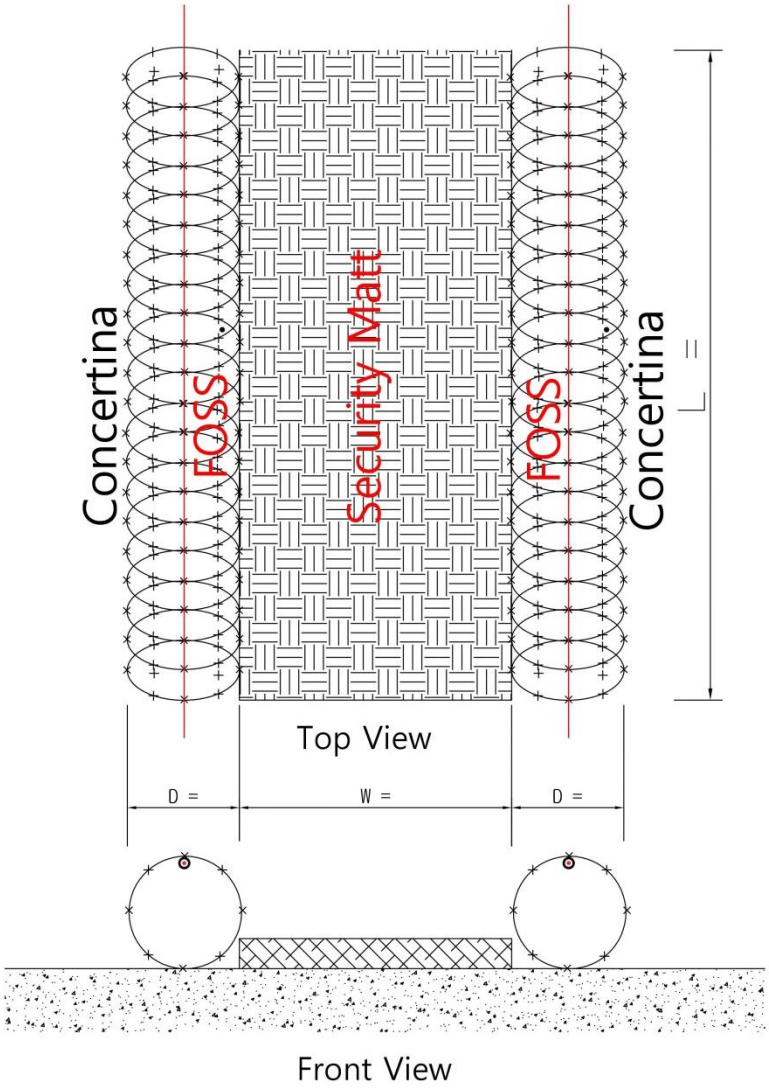
FOSS on Concertina Top

Concertina coil(s) can be put either on the fence/wall top or wall top or laid on the ground for the purpose of prohibiting intruder trespassing. Cutting through concertina coil(s) is much more difficult compared to cutting fence mesh. Usually concertina coil(s) are placed high on the fence/wall. Thus to trigger alarm when an intruder steps on the concertina while climbing over , FOSS mounted to concertina top must be the best solution for the highest protection costing lowest.





Concertina / Matt combined Smart Fence



Instead to have a convential fence or concrete wall along a perimeter, it is strongly recommended to have a Smare Fence which consists with Security Matt and Concertina with FOSS for much higher security as well for much less cost. One or two Concertina coiles equipped with FOSS shall be put along both sides of Security Matt.

An intruder crossing the Smart Fence must step on and disturb the concerina top and security matt to trigger alarm.
The Security Matt shall provide a soft & pleasant way for patrol (security guard) preventing the road surface from flood, grasses etc.

The Smart Fence having sensing capability itself shall protect the client facility/area from intrusion with following advantages;

- **Maximum obstacle to intruder**
- **Hidden to intruder**
- **Easy to install**
- **Wide application unlimited by terrain surface condition**
- **Free from nuisance alarm**
- **Locate accurately within ± 15 m**
- **No field equipment up to 10KM**
- **Minimum maintenance**
- **Long life time use**

Concertina /Matt combined Smart Fence

- Matt Thickness : 40mm, typical
- Matt Width = 1.5 to 2 meters, typical
- Matt Weight : 8kg / square meter
- Matt Materia : Walnut
- Coverage per Control Equipment : 1.5M x 10KM
- Location Accuracy : ± 15 m, ± 25 m, Optional
- FO Sensor Cable Diameter : 3 mm
- FO Sensor Grade : MMF
- Concertina Diameter D = 90cm, typical
- Environmental Characteristic : all weather

FOSS for Marine Barrier Crash Impact Detection

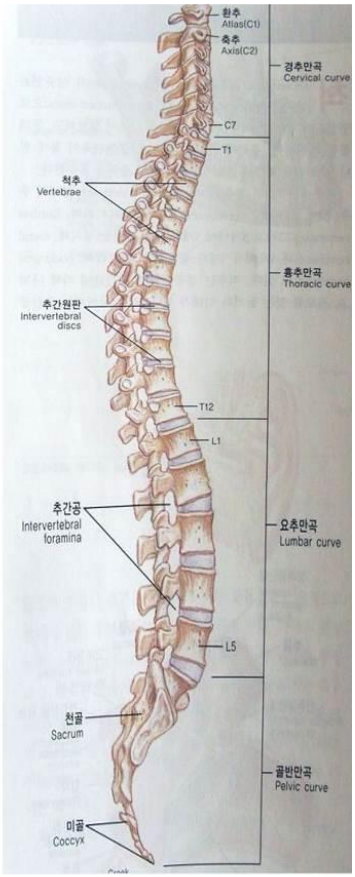
The FOSS design for the Marine Barrier Crash Impact Detection can be easily described by the Spine Analogy. The Human Spine is formed of 26 small segments. Each segment is only a few centimeters. All 26 spine segments share the same internal nerve, which is connected to the brain. Tiny transverse impact to any spine segment by injury or disease will exert stress to the internal nerve and the nerve will send a pain signal to the brain resulting in an "alarm" being created by the brain at the location of stress..

The FOSS implemented to Marine Barrier 5.1KM for example is formed of 3,400 FOSS segments. The FOSS segment is typically 1.5M. All the 3,400 FOSS segments share the same FOSC inside which is connected to OIA (Optical Intrusion Alarm). Tiny transverse impact to any FOSS segment by external crash will exert stress to the FOSC inside to result in alarm at OIA.

One of the main reasons to implement FOSS in 1.5M unit is to sensitively detect a localized disturbance (crash by a boat) filtering out distributed disturbances by waves.

FOSC is immune to sea environment (water, salt, wind, rain, shun shine, fishes, noise, lightening, thunder, temperature etc.)

Due to no fielded electronic equipment and fiber optic cable being rated for marine environment, the FOSS will detect Marine Barrier crash impacts, without nuisance alarms, for the most cost-effective protection.



Human Spine

Marine Barrier "Whisprwave"
from Wave Dispersion Tech, Inc. NJ, USA
www.whisprwave.com

FOSS for Marine Barrier Crash Impact Detection

The purpose of the FOSS (Fiber Optic Stress Sensor) is to detect Marine Barrier Impact by boat, bombing or hostile disturbances without nuisance alarming due to waves.

Let's describe FOSS construction to protect a Marine Barrier along a 5.1 KM marine perimeter.

A FOSC (Fiber Optic Sensor Cable) inserted in a metal pipe shall be inserted in the middle hole/other hole of the Marine Barrier floating on t he marine perimeter acting as the nerve spine of the barrier.

Both ends of the FOSC are connected to the control equipment OIA(Optical Intrusion Alarm) at SCC (Security Control Center).

The OIA shall periodically and continuously pumps Infrared Laser pulses into both ends of the FOSC and monitor the presence of any atypical Optical Backscatter caused by Marine Barrier Impact by boat, bombing or hostile disturbances .

At receiving of Optical echoes, the OIA shall generate audible and visible alarm indicating the intrusion spot within ±25 meter on its own monitor.

The OIA will detect at least one intrusion from both directions of FOSC inserted into 5.1km Marine Barrier.

The sensitivity of FOSS can be set/adjusted to ensure the alarm at intruder disturbances while filtering our nuisance alarms related to marine environment such as waves, wind, fishes, etc.

FOSC (Fiber Optic Sensor Cable)

In FOSS application, a FOSC can be buried under ground / carpet / matt or inserted inside a marine barrier / concertina with proper fixture to sense stress exerted by intruder disturbance.

Either one or both ends of FOSC shall be connected to OIA to receive Optical pulses periodically.

The FOSC serves as bidirectional transmission line for both Infrared Laser pulses from and Optical Echoes to the OIA.

The FOSC was specially designed for dual purposes as transmission and sensor by having the unique structure of a single core of multimode Optical fiber covered with heavy duty polyurethane jacket along with embedded Kevlar yarn for immunity to environment and proper strength.

Specification of FOSC-1C

• The cable diameter/color : 3mm/black

• Optical fiber grade : 125㎛ multimode

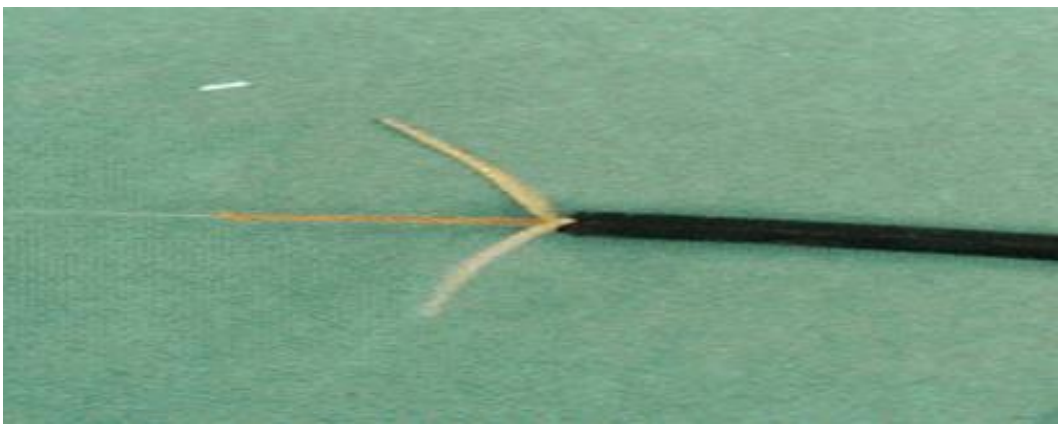
• Tensile Strength : 10kg, typical

• Operating temperature : -40℃ + 75℃

• Environmental characteristics : Immune to water (rain, snow, haze etc)/electricity (lightening, electrostatic, ground loop, power line, EMI, RF etc)/ sound & vibration (wind, storm, sound. vehicle vibration etc)

• Lifetime : over 15 yrs for proper maintenance

• Weight : 10kg /km



FOSC

OIA (Optical Intrusion Alarm)

OIA periodically & continusously injects Infrared Laser Pulses into FOSC(FO Sensor Cable) into each FOM end and trigger audible & visible alarming at reception of abnormal Optical Echoes flashing the intrusion spot on its own monitor site map within ±15m error. OIA also provides OTDR service function and operation data storage. OIA provides input ports for other sensors such as IR Sensor, Shock Sensor, Door Locks etc and communication ports with other PC, CCTV Control, Server PC, LAN, Internet etc

◆OIA-nP (Optical Sensing Unit)

- Operation mode : Normal, Test, Emergency, Setting, Stop
- Sensing mode : cutting and/or excess force
- Location Accuracy : ±1m , ±15m , ±25m, Optional
- No of Optical Ports : n (maximum 8)
- Sensing mode : cutting , excess force , selectable
- External connection port : PC interface
- Fiber Optic test function : semi-OTDR
- Auto-logging : event data (alarm,action,status,setting value etc)
- Monitor : 8.4" LCD color
- Interface : dry contacts, serial or LAN
- Acceptable output devices : warning light, signal phone
- O/S : Window XP
- Dimension : 19" 4U (177×483×300 mm)
- Operating condition : indoors
- Power : AC220V±10% 50/60Hz, 100Watt approx