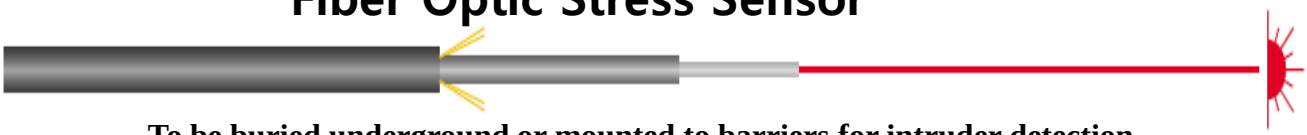
2016 Catalog

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 up to 40km**
- **Easy to install & maintain**

FIBERTRON CO., LTD.

Innovative Fiber Optic Security
& Safety Systems Manufacturer

www.fibertron.co.kr

Kyungi Do, Korea

Email : sensor@fibertron.co.kr
doctorbaekorea@gmail.com
Tel : +82 31 777 5612 / CP : +82 10 3783 4681

Development Background

FOM on Kuwait Diplomatic Facility Wall 2011 Dubai

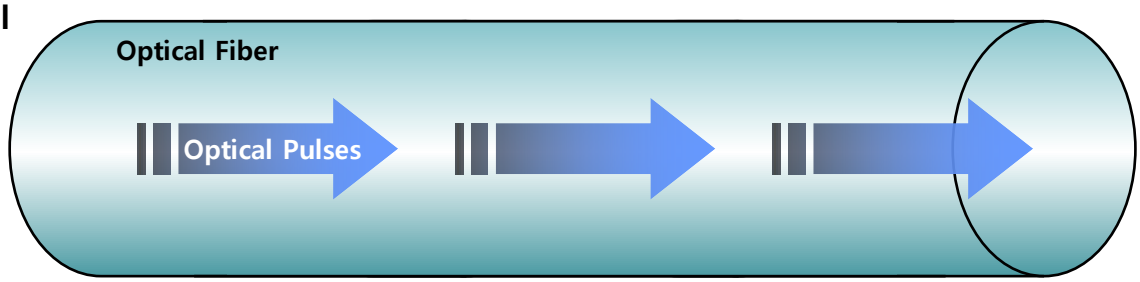
FOM at Korea Top Gov't Site Fence 2015 MAY

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.

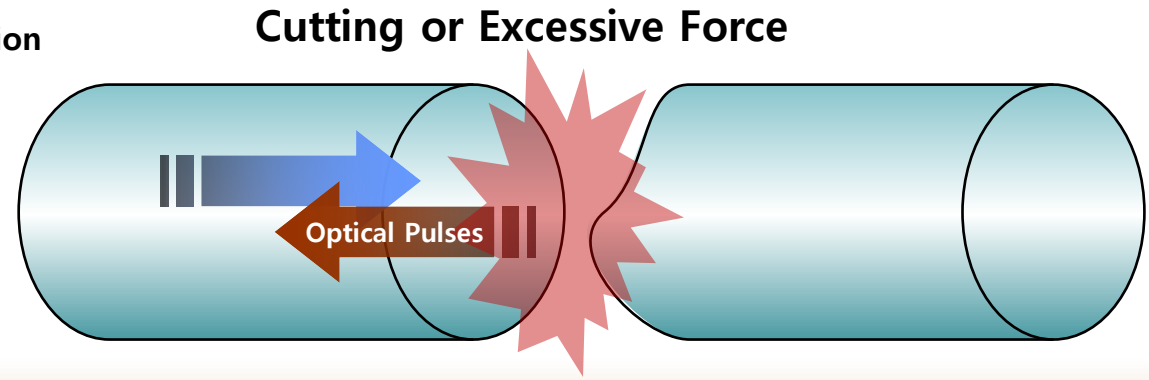
Over the world exists no reliable intrusion detection system available for pipe line protection and for intruder disturbing barrier such as concertina and marine barrier.

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.

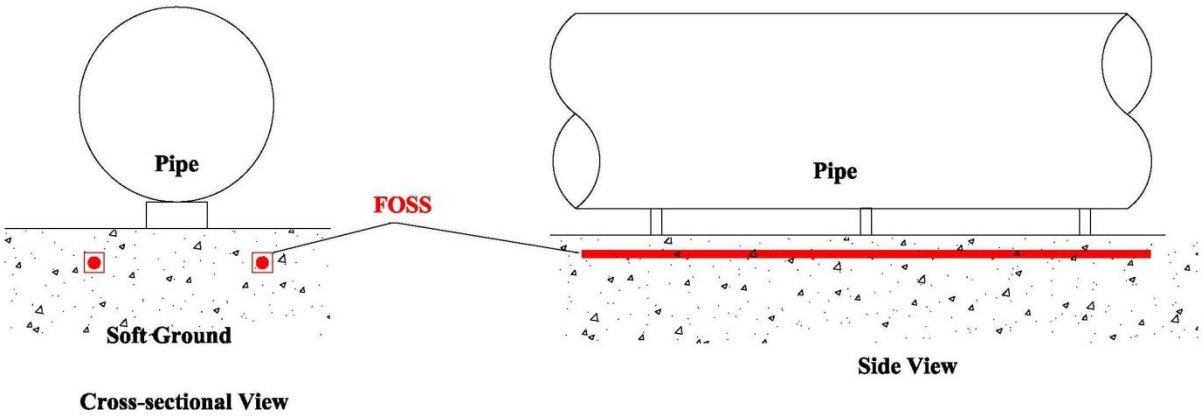
Normal



Intrusion



FOSS for Pipeline Protection



Here describes ,for example, **FOSS** (Fiber Optic Stress Sensor) System construction along 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 number of **FOSC** (Fiber Optic Sensor Cable) along the pipelines(s) shall be connected to **OSU** (Optical Sensing Unit) at 15km interval 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 FOSC 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 ±25meters on its own map .

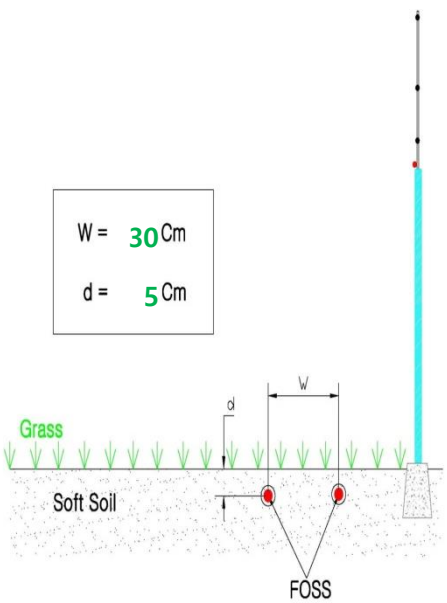
Each **OSU** should be capable to detect up to four (4) simultaneous intrusions per 15km .

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.

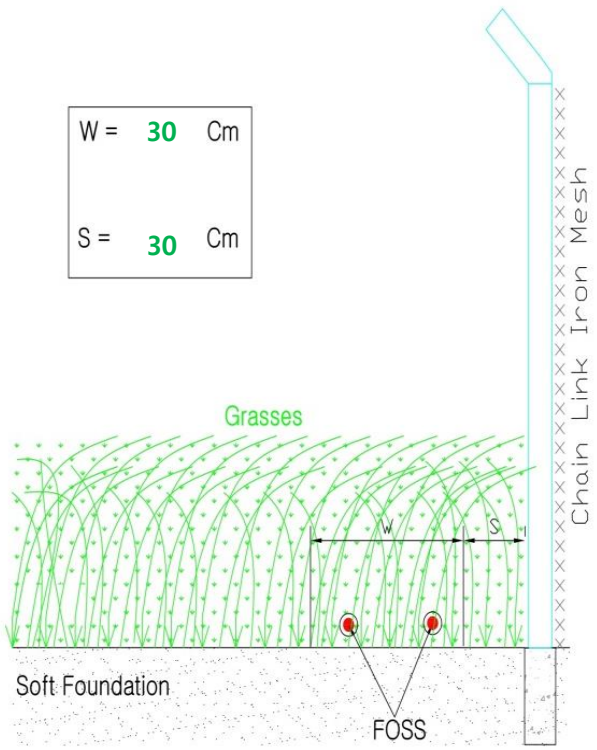
Buried FOSS under Grasses

Bury FOSS under grass or soft ground in the vicinity of the fence/wall to trigger an alarm at an intruder presence.

FOSS buried underground



FOSS buried under Grasses



Hardware Specification

FOSS-Buried, uncovered

FOSS-Buried, covered

1 : PSH (Pressure Sensing Head)

2 : PSB (Pressure Sensing Bar)

3 : FO Sensor Cable

FOSS-Buried, Drawing

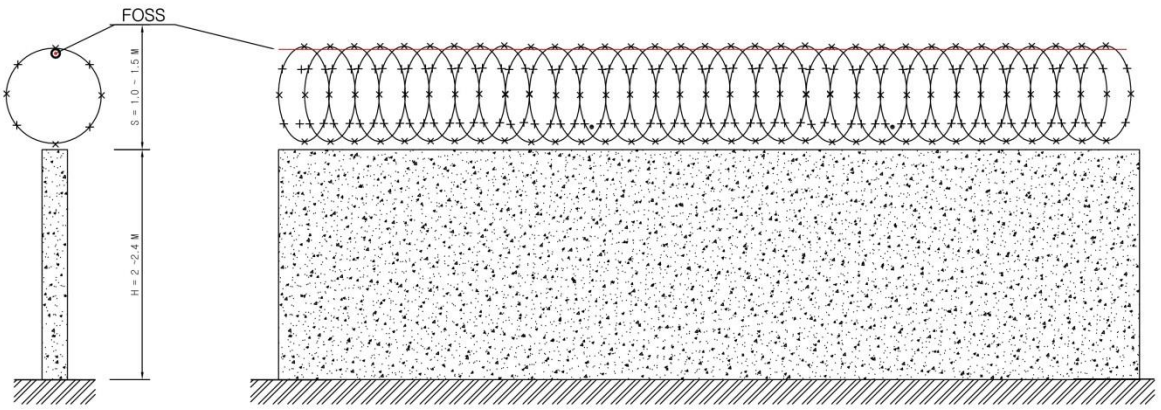
The FOSS-Buried consists of a FOSC (Fiber Optic Sensor Cable) and metal parts such as PSB (Pressure Sensing Bar) and PSH (Pressure Sensing Head). Either one or both ends of FOSC shall be connected to OIA (or OSU) to receive Optical pulses periodically to return back the Optical echoes. Thus it serves as bidirectional transmission line for both Infrared Laser pulses and Optical echoes.

Specification of FOSS-Buried

- Sensing Origin : displacement 1 cm typical
- PSH Size : 25Φx300
- PSH Material : SK5
- PSH Weight : 2kg
- PSB Size : 32x3tx1500
- PSB Material : SS41, Zn Coat
- PSB Weight : 5kg
- Immune to weather and water enviroment
- Operating Temp. : -25 ℃ ~ +75℃
- Power requirement : None

To mount FOSS on the concertina top on the Wall

Mount the FOSS to the Concertina on top of the Wall to trigger an alarm when an intruder steps on the concertina while climbing over.

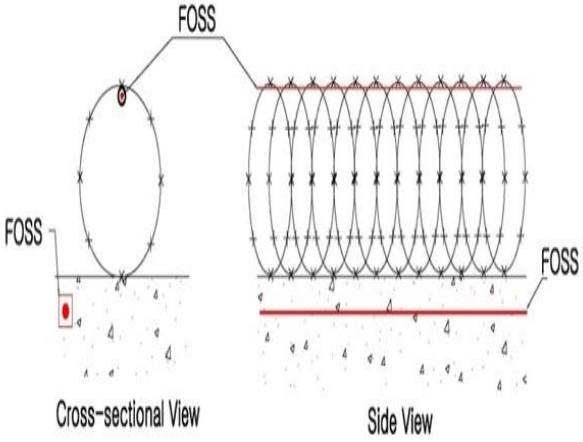


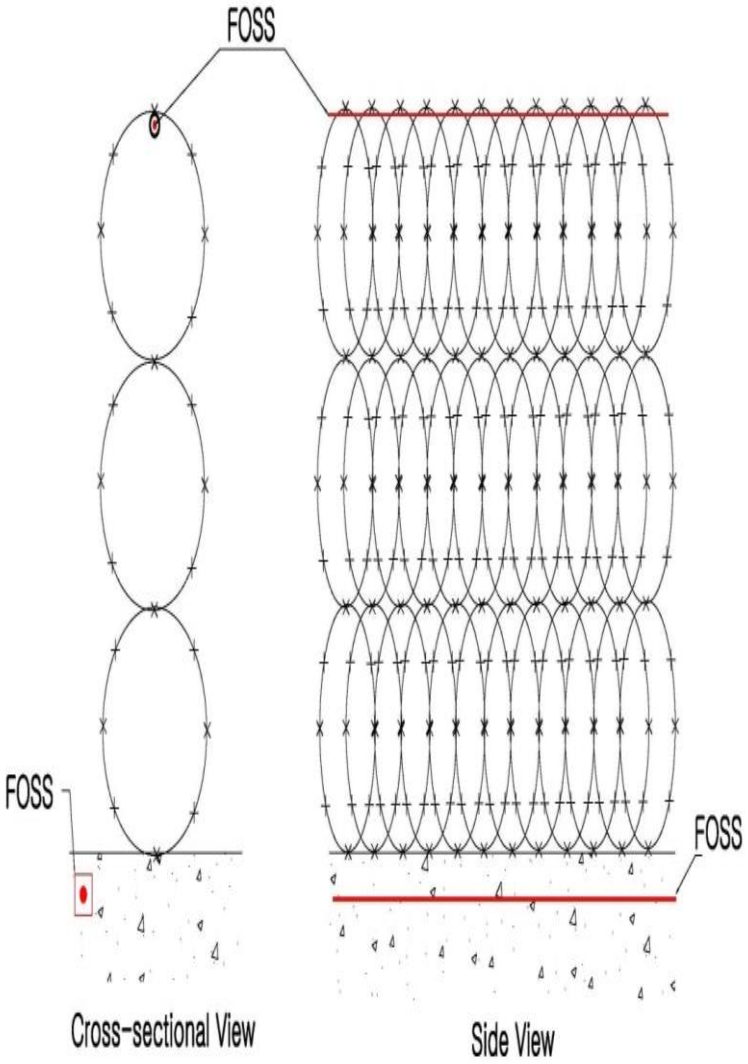
FOSS detecting Intruder Climbing Concertina Barrier

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 mounting FOSS to concertina top to trigger alarm when an intruder steps on the concertina while climbing over can be good enough to secure the perimeter costing very low.





FOSS for Marine Barrier Crash Impact Detection

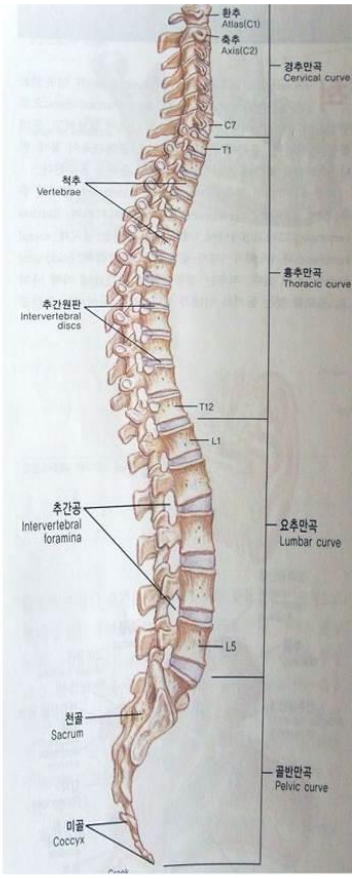
The FOSS design for the Marine Barrier Crash Impact Detection can be easily described by the Spine Analogy. The Human Spine is formed of 26 small segments. Each segment is only a few centimeters. All 26 spine segments share the same internal nerve, which is connected to the brain. Tiny transverse impact 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).

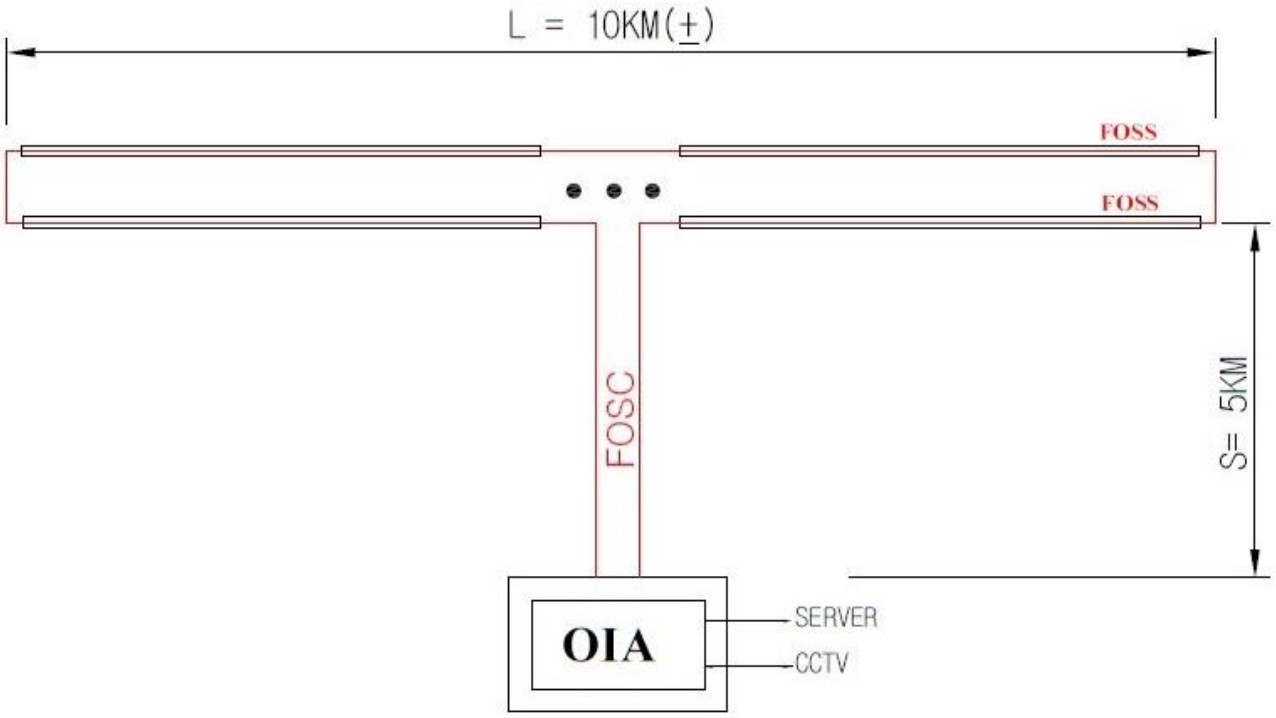
The OIA shall periodically and continuously pumps Infrared Laser pulses into both ends of the FOSC and monitor the presence of any atypical Optical Backscatter caused by Marine Barrier Impact by boat, bombing or hostile disturbances .

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

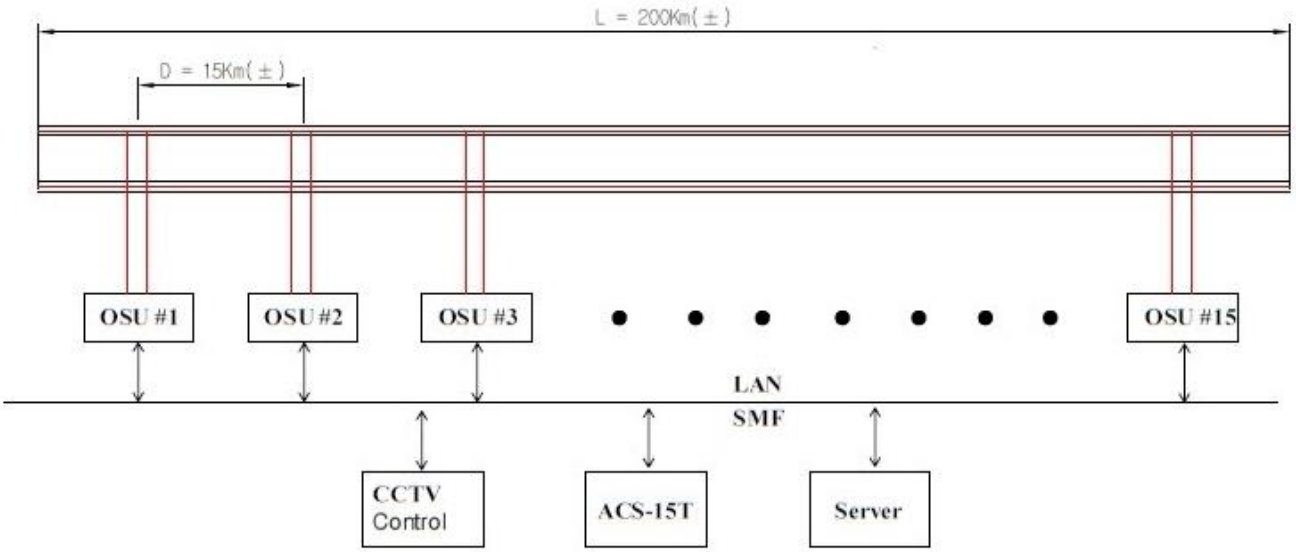
The OIA will detect at least one intrusion from both directions of FOSC inserted into 5.1km Marine Barrier.

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.

FOSS System Diagram along 10KM, typical



FOSS System Diagram along 200KM, typical



FOSC (Fiber Optic Sensor Cable)

A FOSC can be inserted along with a pipe inside a marine barrier to sense external disturbance to the barrier.

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

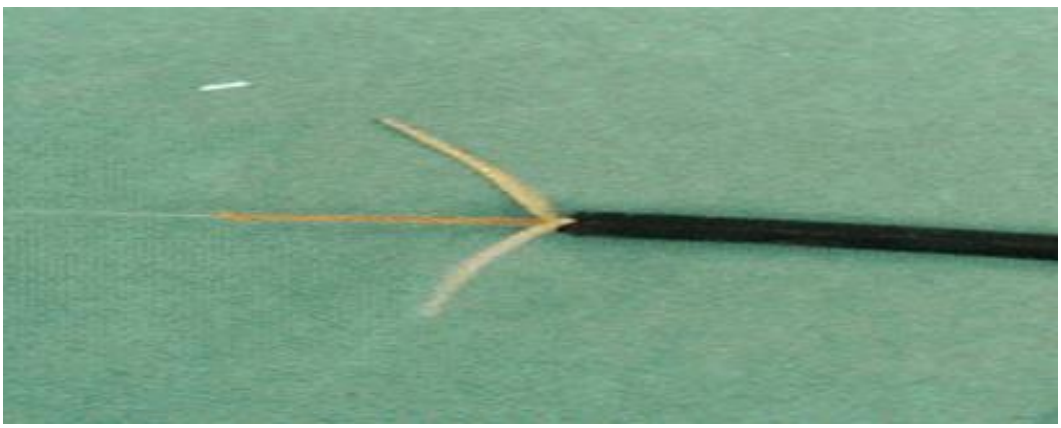
• Tensile Strength : 10kg, typical

• 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

Control Equipments

The ACS is the intelligent main unit which receives the presence of the abnormal Optical echoes from OSU and processes it to identify and pinpoint on monitor with visible and audible alarms. There are two different models. ACS-nP houses an OSU-nP in the same rack. ACS-kT is to control k OSUs at separate remote location. ACS also provides OTDR service function and operation data storage. ACS 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

ACS(Alarm Control Station)

◆ **ACS-nP/kT (Alarm Control Station)**

- 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 (upto 8)
- No of terminals : k OSUs (upto 64 typical)
- External connection port : PC interface
- Fiber Optic test function : semi-OTDR
- Auto-logging : alarm, action, status, setting value etc
- Monitor : 17" color
- Interface : dry contacts, serial or LAN
- Acceptable output devices : warning light, signal phone
- Acceptable input devices : IR/MW sensor, shock sensor
- O/S : Window XP
- Dimension : 195 x 60 x 75cm or 150 x 60 x 75cm
- Operating condition : indoors
- Power : AC220V±10% 50/60Hz, 400Watt approx

The OSU injects infrared Laser Pulses into the FOM and measures any optical echoes to pick up any external disturbances. The OSU transmit abnormal symptom data to the Alarm Control Station to process and trigger an alarm. The OSU is either housed within ACS-nP or remotely at the site.

OSU (Optical Sensing Unit)

◆ **OSU-nP (Optical Sensing Unit)**

- No of Optical Ports : n (upto 8)
- Sensing coverage per Optical port : 3m x 250m for break, 3m x 200m for excess force stronger than 20kg
- Fiber Optic connector type : FC multi-mode
- Dimension : 177×483×300 mm
- Weight : 10 kg, typical
- Operating condition : indoors, inside shelter for outdoors
- Power : AC220V±10% 50/60Hz, 250Watt

OIA-nP is a PC body size desktop version of ACS-nP. OIA injects Infrared Laser Pulses to the FOSC (Fiber Optic Sensor Cable) periodically and shall identify & accurately locate the presence of intrusion from the abnormal Optical Echoes to trigger an alarm visibly & audibly operators. OIA also provides OTDR service function and operation data storage. ACS 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 (Optical Intrusion Alarm)

◆ **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 built in or 17" LCD external
- 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