



Brillouin DSTS System for Subsea and Power Cable Monitoring

OZ Optics ForeSight™ Brillouin DSTS Interrogator

Distributed Strain and Temperature Sensing instrumentation equipment provides an effective means to measure and monitor the quality and working status conditions of fiber optic cables or power cables with embedded optical fibers. Creating a baseline profile along the length of the power cable using the ForeSight™ Brillouin OTDA will provide manufacturers and utility/carrier operators a broader perspective on the status of the fibers and power cables.

PERFORMANCE MONITORING

- Strain Detection
- Hot Spot Detection
- Fiber Aging Analysis
- Critical Threshold
- Alarm Reporting
- Local and remote control, recording and reporting

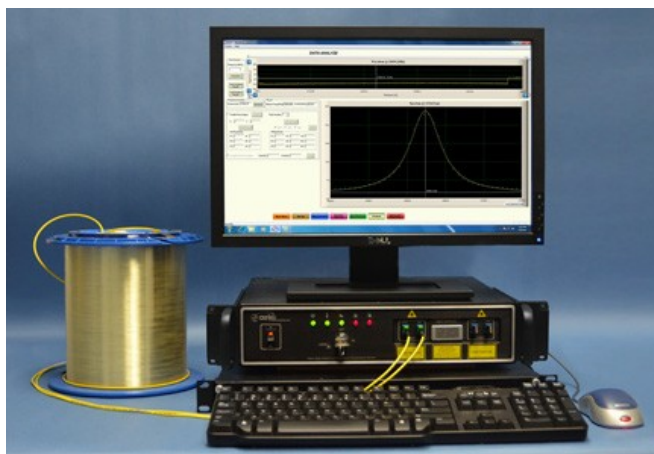
PRECISION

- Real-world performances
- Strain Detection: $\pm 10 \mu\epsilon$
- Temperature: $\pm 0.5^\circ\text{C}$
- 160 km sensing range

SPEED

- Standard Model: 3-7 minutes
- High Speed Model:
15 seconds to 3 minutes,

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OZ Optics ForeSight™ Brillouin DSTS

Solution Requirements

Successful implementation of DSTS systems for Power Cables with embedded fibers for monitoring will require several elements to work in conjunction with each other:

- Equipment Housing**
- Non-condensing humidity facility
- AC Power (UPS Recommended)
- Standard Singlemode fiber strands for measuring.
- Optional: Interfacings to a SCADA or other monitoring system
- Optional: External optical switch for multiple fiber monitoring with a single unit.

The typical standard for inspection and monitoring of Fiber Optic cables is an OTDR - Optical Time Domain Reflectometer. These low cost instruments can provide precise measurements of fiber length and attenuation. However, for demanding applications like Subsea and Underground Power Cables with embedded fiber optic communications links, measuring the strain and temperature becomes a more important and essential measurement consideration. The OZ Optics ForeSight™ Brillouin DSTS interrogator provides fast and extremely accurate multiple measurement modes to provide localized cable temperature and strain along the entire fiber length.

Examples of Subsea and Underground Power Cable monitoring:

- ❖ **Hot Spot Detection** of a power line caused by an impediment or an anomaly creates a localized increase in temperature. The DSTS can pinpoint such a temperature increase to within a few meters.
- ❖ **Temperature Monitoring** allows more efficient use of the true transport capability of power lines by safely monitoring the actual line condition.
- ❖ **Undersea Landslides, Earth Movements or Tidal Damage** which causes cable movement can be quickly detected and pinpointed by changes in strain.
- ❖ **Ship Anchor Damage** can be detected by measuring the cable strain.

Fiber Cable Aging – Prior to installation of your power cable, the DSTS can be used to establish a baseline measurement that can be used for future quality monitoring. Abnormal changes in strain may be an indicator of an impending failure, which allows corrective action to be taken before such failure occurs.

OZ Optics reserves the right to change any specifications without prior notice.

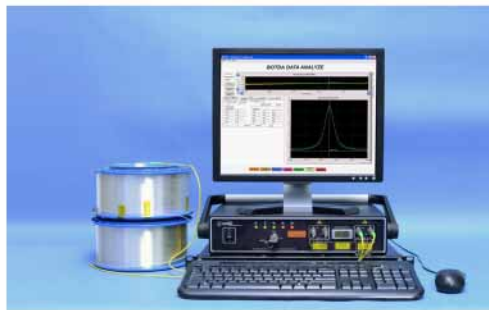
Brillouin DSTS System for Subsea and Power Cable with embedded fibers Monitoring

Failures of underground or subsea power cables with embedded optical fibers typically result in costly repairs and loss of revenue. For example, the Vattenfalls 300 MW Thanet Offshore wind farm had to run at ½ capacity for many months, due to a kink in an export cable. Monitoring of operational cables using Distributed Brillouin technology, could have led to early detection of the problem and possibly prevention of the cable failure.

The OZ Optics ForeSight™ DSTS interrogates, measures, logs, and generates alarms and reports based upon the initial setup. No further re-calibration is necessary. With an optional interface, the DSTS is capable of interfacing via a Remote Database Access (RDA) to a Supervisory Control And Data Acquisition (SCADA) system. Interfaces on the DSTS include Ethernet and USB.

Measurement time can vary, depending on the measurement and on the set-up; the high speed model can produce accurate results in 15 seconds to 3 minutes.

The standard OZ Optics ForeSight™ DSTS comes with 2 Channels. Additional channels can be added using an external multi-channel optical switch, available from OZ Optics. External optical switches can be controlled via the interface of the DSTS System. Virtually any number of channels can be provided by using an external bank of switches.



SCADA



Optional Multi Channel Optical Switch



Cable Reels

Sub Sea Power Cable with Optical Fibers

