

Serbia s underground temperature measurement optical cable



AI Overview

Serbia uses optical fiber-based Distributed Temperature Sensing (DTS) systems to monitor underground power cables, enabling real-time temperature profiling and hotspot detection. Overview of Optical Cable Temperature Monitoring Optical fiber-based systems, such as DTS, are widely used for monitoring underground transmission and distribution (T&D) cables. These systems embed or attach optical fibers along the cable length to continuously measure temperature with high spatial resolution, often better than 1°C , over distances up to 40 km, extendable to 70 km with long-range systems. The data collected allows operators to detect hotspots, assess cable load, and predict thermal limits in real time, enhancing both safety and operational efficiency.

Key Technologies

- Distributed Temperature Sensing (DTS):** Provides continuous temperature profiles along the cable, identifying thermal bottlenecks and enabling Real-Time Thermal Rating (RTTR) to optimize current-carrying capacity without exceeding insulation limits.
- Distributed Acoustic Sensing (DAS):** Detects vibrations and acoustic signals along buried cables, identifying potential faults, third-party intrusions, or mechanical damage.
- Distributed Temperature & Strain Sensing (DTSS):** Combines thermal and mechanical monitoring to detect hotspots, cold spots, and strain, ensuring early identification of cable degradation.

Benefits and Applications

- Real-time monitoring:** Continuous assessment of cable temperature and load allows operators to prevent overheating and optimize energy transport.
- Hotspot detection:** Early identification of abnormal thermal behavior prevents insulation degradation and extends cable lifespan.
- Integration with RTTR software:** Enables dynamic cable rating, allowing temporary operation above nominal capacity during peak demand while maintaining safety.
- Reliability:** Optical...

Article Content

(PDF) Development and Improvement of an Intelligent Cable

The change in operating conditions of HV underground cable links has led many utilities to consider on-line and/or off-line temperature monitoring via optical fibres.

Prevent Cable Failures w. Underground Cable

Underground cable monitoring is crucial for maintaining reliability and preventing failures caused by environmental and mechanical threats. By detecting issues

Prevent Cable Failures w. Underground Cable Monitoring | AP Sensing

AP Sensing, together with our partner Crony, completed a project in Serbia aimed at monitoring underground, urban HVAC power cables and detecting activities that pose a risk to power cables,

Distributed Temperature Sensing

Principles of DTS Technology The underlying principle of distributed temperature sensing is a Raman scattering-based temperature measurement combined with optical time-domain reflectometry. To

Temperature sensing in underground facilities by Raman optical ...

2 Temperature sensing method The techniques used in this study are based on the method of distributed temperature sensing (DTS). DTS systems rely on the fact that an optical fiber can function

Temperature sensing in underground facilities by Raman optical ...

High-resolution temperature sensing with Raman optical frequency domain reflectometry (OFDR) using optical communication fiber cables shows great potential as it allows the surveillance of several

(PDF) Temperature Sensing in Underground Facilities by

High-resolution temperature sensing with Raman-OFDR using fiber-optical communication cables shows great potential as it allows the surveillance of several kilometers of

Distributed Temperature Sensing (DTS) | AP Sensing

Distributed Temperature Sensing (DTS) systems provide temperature information for accurate thermal monitoring, fire detection, and condition assessment by utilizing standard fiber optic cables. These

Multi-Parameter Optical Monitoring Solution Applied to Underground ...

The monitoring system demonstrated herein uses Fiber Bragg Grating (FBG) sensors to measure multiple parameters, such as the distributed temperature of the power cable, external

Fiber Optic Temperature Sensing and Measurement

Measure temperature with fiber optic sensors for high-resolution distributed and multipoint monitoring in batteries, processes, and harsh environments.

Development and Improvement of an Intelligent Cable Monitoring

In the case of the optical fiber composite power cable (OFCPC), which is a power cable embedded with optical cables, electrical power networks and communication networks can be established

Distributed Temperature Sensing and Real Time Thermal Rating for ...

This paper presents the distributed temperature sensing (DTS) technology and its application mainly on underground power cables. The main measuring principle is detecting the back-scattering light via

Optical Fiber Sensors for High-Temperature Monitoring: A Review

High-temperature measurements above 1000 °C are critical in harsh environments such as aerospace, metallurgy, fossil fuel, and power production. Fiber-optic high-temperature sensors are

Distributed temperature measurements using optical fibre technology

This article experimentally examines the applicability of a temperature measuring and monitoring system using distributed temperature sensing by means of an optical fibre in an

How is the distributed fiber optic temperature measurement system ...

After the application of fiber optic temperature measurement system in coal mines, a total of 6314 temperature monitoring points were arranged along various high and low voltage cables with

Temperature Sensing in Underground Facilities by Raman-OFDR

High-resolution temperature sensing with Raman-OFDR using optical communication fiber cables shows great potential as it allows the surveillance of several kilometers of underground transport facilities

Conductor temperature monitoring system in underground power ...

A conductor temperature monitoring system using the current method was developed to estimate conductor temperatures at joints of extra-high-voltage (EHV) underground power transmission XLPE

Distributed temperature sensing

Temperatures are recorded along the optical sensor cable, thus not at points, but as a continuous profile. A high accuracy of temperature determination is achieved over great distances.

Anomalous Condition Detection for Subsea Cables using Distributed ...

This paper proposes a unique approach to utilize Distributed Temperature Sensing (DTS) data for detecting anomalies in underground/submarine cables. The idea is to establish a set of system

Considerations for advanced temperature monitoring of underground

Temperature monitoring using fiber optic sensors to get a distributed temperature profile along an underground cable circuit is increasingly being used by utilities. However, effectively

Distributed Temperature Sensing: Review of Technology and

Abstract—Distributed temperature sensors (DTS) measure temperatures by means of optical fibers. Those optoelectronic devices provide a continuous profile of the temperature distribution along the

Distributed temperature sensing

Distributed temperature sensing systems (DTS) are optoelectronic devices which measure temperatures by means of optical fibres functioning as linear sensors. Temperatures are recorded along the optical

Temperature monitoring techniques of power cable joints in

This study proposed a sensor module that can monitor the temperature of the power cable joint using a fiber optic sensor. The advantage of using fiber optic sensors is that they are not

Temperature Measurement Using Optical Fiber Methods: Overview

The paper deals with the overview of fiber optic methods suitable for temperature measurement and monitoring. The aim is to evaluate the current research of temperature

Fiber Optic Sensor Cables for Advanced Monitoring | AP Sensing

Fiber optic sensor cables are the key enabler for real-time monitoring of temperature, strain, and acoustic signals across diverse and challenging environments. Depending on the application and the

Temperature monitoring techniques of power cable joints in

We placed the proposed FBG on an energized cable joint of the power distribution grid and measured the temperature. Herein, we present the configuration of the sensor module and the measured results.

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.estlascleaning.co.za>

Email: info@estlascleaning.co.za

Phone: +27 63 214 8579

Address: 22 Oxford Road, Parktown, Johannesburg, 2193, South Africa

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