China Unicom Fiber Optic Cable Laying Techniques

Article Overview

China Unicom employs advanced fiber optic technologies, including G.654E and hollow-core fibers, using overhead, pipeline, and hybrid installation methods to optimize transmission performance and environmental adaptability.

Fiber Types and Technological Innovations

China Unicom has been at the forefront of deploying large-effective-area optical fibers (G.654E) and hollow-core fibers to enhance network capacity and reduce transmission loss . The G.654E fibers are designed for high-speed, long-distance transmission, with low attenuation and large effective area, making them suitable for both terrestrial and submarine applications . Hollow-core fibers, recently tested in commercial networks, offer ultra-low latency and high bandwidth, supporting single-wavelength rates up to 1.2 Tbit/s .

Installation Methods

China Unicom uses multiple fiber laying techniques depending on terrain and network requirements:

o Overhead Installation: Fiber cables are suspended on poles or towers, suitable for desert, mountainous, or remote areas. This method was used in Xinjiang to cross the Gobi Desert and snow-covered mountains .
o Pipeline Installation: Cables are laid in underground conduits or communication pipelines, protecting fibers from environmental hazards and mechanical stress. This method was applied in Shandong along expressways .
o Hybrid Configurations: For commercial deployments, hybrid cables combining standard G.652 fibers with hollow-core fibers are used to maintain compatibility with existing networks while enhancing performance .
During installation, careful attention is given to mechanical stress, bending radius, and temperature control. Techniques such as "figure-8" loops are employed to prevent twisting and minimize pressure points, especially for armored or LSZH-sheathed cables . Protective materials are maintained on reels until installation, and sharp edges or obstacles are avoided to prevent damage.

Environmental and Performance Considerations

China Unicom emphasizes adaptability to harsh environments, including extreme temperatures, deserts, and snow-covered regions . The deployment of G.654E fibers and hollow-core fibers is accompanied by extensive field testing to ensure low-loss, high-capacity, and stable transmission. Network trials in Shandong and Xinjiang assess both optical attenuation and nonlinear effects, optimizing the balance between spectrum efficiency, transmission distance, and system capacity .

Maintenance and Future-Proofing

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The use of advanced fibers allows China Unicom to extend network lifespan and support future high-speed applications, including 400G backbone networks . Hybrid cable designs and modular installation techniques facilitate easy upgrades and maintenance, ensuring compatibility with evolving network standards and minimizing service disruptions . In summary, China Unicom combines innovative fiber technologies, precise installation methods, and rigorous environmental testing to deploy high-performance fiber optic networks capable of supporting next-generation telecommunications.

China Unicom has solidly advanced the "Three-Year Action Plan for Mobile Network Quality Improvement" and the "Special Action

BlazingFast Photonics delivers high-speed optical transceivers, silicon photonics, co-packaged optics, OSFP 1.6T modules, laser

China Unicom Group, one of China"s major telecommunications operators, has revealed plans for the construction of

Chinese state-owned telecom firms, China Telecom, China Mobile, and China Unicom, are developing a $500 million

They actively participate in global submarine cable investment, operation, laying, construction, maintenance and protection, providing

For longer distances, fiber-optic cables are typically installed by hanging them between

ABSTRACT This application note discusses fiber optic cable installation by blowing technique, the factors effecting blowing

Reuters reports that China state-owned telecom firms are developing a $500 million undersea fiber-optic internet cable

The construction of ADC submarine cable is of great milestone significance in the history of China Unicom"s submarine

Shen Shikui from China Unicom Network Technology Research Institute pointed out that the pilot project is in smooth progress while

The objective of this document is to be an optical fibre cable installation and laying guide, addressed to new

installers, also being

Explore the process and benefits of underground fiber optic cable installation. Learn how this infrastructure

This beginner-friendly guide will walk you through the step-by-step process of fiber optic

The designed capacity of 8 pairs of optical fibers exceeds 160Tbit/s, which can effectively improve the communication

China Mobile, China Telecom and China Unicom are building AI-driven operations centers (AIOps) that "automate

Fig.4 Performance changes of GYTA optical cable Research expectations and prospects After the completion of the research project,

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